

Asymmetric strategic problems in nuclear nonproliferation

Tongfi Kim *

*Griffith Asia Institute and Centre for Governance and Public
Policy, Griffith University, 170 Kessels Road, Nathan,
Queensland 4109, Australia*

**E-mail: tongfi@gmail.com*

Accepted 4 February 2014

Abstract

This article explains cooperation problems between powerful democratic states and weak non-democratic states in the context of nuclear non-proliferation. Focusing on the interactions of the United States with North Korea, Iran, and Libya, it suggests that power asymmetry and information asymmetry foster mutual distrust by exacerbating two main strategic obstacles to cooperation: the time inconsistency of the stronger state's policy and the incomplete information regarding the non-democratic states. The nature of negotiations over nuclear weapons programs further exacerbates these problems. The overall implications of this article leave us pessimistic about the possibility of negotiated nuclear disarmament, but the theoretical analysis may help the negotiation strategy of the United States.

'We must envelop our environment in a dense fog to prevent our enemies from learning anything about us'. Kim Jong-il (Hassig and Oh, 2009, p.v).

‘Over one night they change their mind and they start bombing ... and the same thing could happen to any other country’. Saiful Islam al-Gaddafi on NATO’s attack on his father’s regime, 1 July 2011 (Cigar, 2012, p.5).

This article explains asymmetric cooperation problems between powerful democratic states, such as the United States, and weak non-democratic states, such as North Korea and Iran, in the context of nuclear nonproliferation. Cooperative nuclear disarmament of the aspiring nuclear states has been difficult because the states involved in the negotiations distrust each other. This distrust arguably results from two main factors: the time inconsistency (change of preference over time) of the stronger state and the incomplete information (lack of information about the other actor’s preference and strategies) regarding the non-democratic states. Therefore, this article addresses two different strategic asymmetries – one due to capability gaps and the other due to regime type difference. Building on research discussing the importance of time inconsistency and incomplete information in international relations (e.g. Fearon, 1995; Fearon, 1997; Powell, 1999), this article explains how different types of actors have asymmetric strategic problems and why the asymmetry is important.

Power asymmetry and information asymmetry affect the two sides involved in nuclear disarmament negotiations differently. For a weak, non-democratic state dealing with a powerful democratic adversary, cooperation is risky because the weaker state will be more vulnerable when cooperation breaks down (Sechser, 2010). In other words, the time inconsistency of the stronger actor’s preference presents a serious problem for the weaker actor. The incomplete information problem, however, is less serious for the weak non-democracy because it has various sources of information about the intentions of the strong democracy, which has relatively open political processes (e.g. Schultz, 2001; Hollyer *et al.*, 2011). In contrast, for the strong democratic state dealing with a weak non-democracy, the incomplete information problem is severe because of the closed political system of the non-democracy. The time inconsistency problem, however, is less serious because the powerful state is more secure even if the weaker state reneges on its promises. As I explain later, these problems are further exacerbated by the nature of recent challenges in nonproliferation.

It is important to understand the asymmetry of cooperation problems because different strategic problems require different remedies and priorities. A standard remedy for the time inconsistency problem is a commitment mechanism that imposes a cost when an agreement is violated. That is, the prospect of an *ex post* cost (imposed *after* cooperation is disrupted) makes a commitment credible. The incomplete information problem, on the other hand, is often resolved by a signal for which the sender pays an upfront cost. An *ex ante* cost (paid *before* cooperation) makes a signal credible by making it less attractive to offer cooperation when an actor is not actually willing to cooperate. Whereas an *ex post* cost makes it difficult to go back on a promise, an *ex ante* cost makes deception in the present time less likely (Fearon, 1997).

In other words, key questions and requirements for cooperation are different for each type of actor. For the United States, the most important question is whether the aspiring nuclear state actually suspends and dismantles its nuclear weapons program. To convince Washington of its will to cooperate, an aspiring nuclear state needs to pay an *ex ante* cost to show its trustworthiness for the present time. For such a state, the most important question is whether the United States will uphold the cooperative agreement after the aspiring nuclear state abandons its nuclear weapons programs. To alleviate such a concern, Washington needs to create a commitment mechanism that imposes an *ex post* cost on the United States if it reneges in the future.

Unfortunately, these remedies are difficult to implement, even when the two types of actors can benefit from cooperation. The most important remedy for the incomplete information problem – compulsory inspections and monitoring of nuclear programs – is problematic: it imposes on an aspiring nuclear state both *ex ante* and *ex post* costs that the state perceives as too risky to accept without a credible guarantee of continued cooperation from the United States. The late Libyan dictator Muammar al-Gaddafi took the risk and raised the hope of cooperative nuclear disarmament by achieving rapprochement with the United States in 2003, but he was overthrown with the Western intervention in 2011, leaving bitter lessons for other nuclear aspirants (Cigar, 2012).

The remainder of this article first explains the nature of the strategic problems and remedies discussed earlier. The following sections then examine the interactions of the United States with North Korea, Iran, and Libya to illustrate the importance of these asymmetric strategic problems.

These three examples are selected because they are the most important cases of nuclear nonproliferation efforts in the recent period, and they provide good examples of dual asymmetries. The focus is on negotiations between hostile states, because power asymmetry and information asymmetry foster more distrust in such relationships.¹ Finally, the conclusion discusses how the chance of cooperation can be increased, taking into account the asymmetry of the strategic problems.

1 The time inconsistency problem

Actors' preferences change over time, creating a problem known as time inconsistency or dynamic inconsistency. An actor with incentives to cooperate at one point in time does not necessarily have incentives to cooperate at another point in time. For instance, a country that willingly signs an international environmental agreement might later abandon the pact as political and economic situations change.

The problem is severe in negotiations for nuclear nonproliferation, for two reasons. First, the most important interactions over nuclear nonproliferation in the post-Cold War era have taken place in the context of power asymmetry: nonproliferation is advocated by the United States and other major powers of the international system, whereas aspiring nuclear states are generally weak and isolated (see [Betts, 1977](#) and [Clarke, 2013](#), on pariah states and nuclear weapons). Second, abandoning nuclear weapons programs alters the incentives for the states involved. By giving up nuclear weapons, one state loses a powerful tool to punish the other state. The other state may signal that it will not take advantage of the vulnerability caused by such nuclear disarmament (and may be sincere about this), but the issue under debate is not the veracity of the communication at the present time but the time inconsistency. The weaker party is uneasy about the future prospect of cooperation, especially when the cooperation weakens its ability to punish the more powerful actor's betrayal.

Because of these two reasons, long-term commitment of the United States to an agreement is more important for the prospect of cooperation than is the commitment of an aspiring nuclear state. If a cooperative agreement breaks down at a certain future time, an aspiring nuclear state,

1 Strategic problems discussed later are present in other nuclear negotiations as well, but they may be more manageable in less confrontational relationships (e.g., the United States and its allies).

already the weaker party, will be in an even weaker bargaining position. If the United States reneges on the agreement, the aspiring nuclear state will be left in a helpless position. The aspiring nuclear state can go back to pursuing nuclear weapons, but it will incur a higher risk of a preventive attack than before the agreement.

As long as an aspiring nuclear state does indeed give up nuclear weapons at the present time (an issue complicated by the incomplete information problem), the United States need not worry excessively about the future preference of the regime. If the leaders of the aspiring nuclear state change their mind and restart their nuclear programs in the future, they do so only after they have abandoned nuclear weapons programs, which had been one of their greatest bargaining chips. The aspiring nuclear state will be in a more vulnerable position and will face punishment by the United States. Even when the United States lacks the power to enforce a cooperative agreement over time, having such an agreement will give the superpower advantage in international public opinion and will put the aspiring nuclear state at a disadvantage. There is good reason to worry about cheating (as opposed to public renegeing) by the aspiring nuclear state in the future as well as in the present, but that is a problem of incomplete information. Thus, the time inconsistency problem is much more important for aspiring nuclear states, although the problem exists on both sides, especially for domestic political purposes.

While the shifts in an aspiring nuclear state's preference are less important than those of the United States, US policymakers in reality will continue to worry about renegeing by their adversaries. North Korea, for example, has repeatedly changed its position and broken its promises. While public renegeing by an aspiring nuclear state after a disarmament deal will not make the United States any worse off than without such a deal, individual policymakers responsible for the deal will suffer from the 'failure' of their policy.

Theoretically, there are remedies for the time inconsistency problem. To ensure continued cooperation in the face of shifting preferences, states can devise a commitment mechanism that affects their future incentives in favor of cooperation. As Fearon (1997) explains, states can tie their hands and commit to an agreement by creating an *ex post* cost that would be imposed upon them if they break the promise. To a certain extent, such a cost is present even without states deliberately creating it, but the credibility of promises can be enhanced by increasing the cost of renegeing. *Ex post*

costs can be created through multiple channels. When a leader reneges on a commitment, he or she is punished by domestic political audiences (Fearon, 1994; Tomz, 2007; McGillivray and Smith, 2008). The entire nation can be punished for renegeing in terms of the country's international reputation (see Miller, 2003; Gibler, 2008; Crescenzi *et al.*, 2012; but also skeptics such as Mercer, 1996, and Press, 2005), although different administrations of the same state (e.g. Republicans vs. Democrats) might carry their own international reputation (Park and Hirose, 2013). Finally, *ex post* costs can take the form of losing hostages, human or otherwise (Williamson, 1983; Williamson, 1996, p.91). When the victims of betrayal are leaders of unpopular non-democratic regimes, however, it is not clear how much reputation cost the United States will suffer. For instance, concerns about reputation costs did not prevent the United States from reversing its policy toward Gaddafi's regime in 2011.

2 The incomplete information problem

The difficulty of identifying the preferences and strategies of other actors is another major problem for international cooperation. In addition to worrying about the future preference of the other party (that is, time inconsistency problem), a state is anxious to know that the other state is currently sincere about cooperation. When there is information asymmetry, an actor has opportunities to avoid the cost of cooperation by deception. For instance, a country that signs an environmental agreement might cheat and continue to pollute the environment.

In the context of nuclear nonproliferation, the most important informational issue is whether the target state actually suspends – and eventually abandons – its nuclear weapons programs. An aspiring nuclear state also wants to know whether the United States is currently willing to follow through with the deal (for example, lifting sanctions and providing economic side payments), but the incomplete information regarding the United States is less serious because of its more transparent political system. Aspiring nuclear states have access to many policy debates that take place within the United States, and the power relationships among US policymakers are more or less public knowledge.

Unlike the problem of time inconsistency, deception at the present time is a serious problem for the United States: the betrayal might not be detected and punished until the target regime decides to use the nuclear

threat at the most advantageous timing for itself. Development of nuclear weapons is a secretive process even for democratic states such as Israel and India, and the closed political system of non-democracies makes it even more difficult for outside observers to gather information about the status of the nuclear programs of non-democracies. Inspectors from the International Atomic Energy Agency (IAEA) have had frustrating experiences in countries such as Iraq, North Korea, and Iran.

As noted earlier, the incomplete information problem is relatively mild for states facing the United States, because the intention and actions of the US government are more transparent than its opponents. While identifying another actor's intention is always difficult, there is a clear difference between information available about democratic leaders such as the US president Barack Obama and information available about non-democratic leaders such as the North Korean leader Kim Jong-un. Some scholars also argue that democracies are better at signaling their intention because of open political competition (Fearon, 1994; Schultz, 2001).

One remedy for the problem of incomplete information is for the aspiring nuclear state to send costly signals that distinguish it from other, less trustworthy states. For those states that are merely pretending to be cooperative, certain signaling actions are too costly to pursue. By 'sinking costs,' that is, taking some measures that are costly *ex ante*, a state can signal its serious intention (Fearon, 1997). For instance, it is politically costly and conducive to cooperation for the leaders of North Korea and Iran in their negotiations to make conciliatory gestures toward the United States – and, for that matter toward their other opponent states, South Korea and Israel, respectively. The regimes in Pyongyang and Tehran derive their political legitimacy domestically in part from their constant struggles against these external enemies, and it is therefore politically costly for regime leaders to acknowledge a compromise with these adversaries. Incidentally, acceptance of *ex post* costs can also have *ex ante* signaling effects (Williamson, 1983, p.521), but this might be less assuring to the opponent because a cheating aspiring nuclear state will not have to pay *ex post* costs until its betrayal is revealed.

More importantly for these states in the context of nuclear nonproliferation, the international inspections and monitoring of their nuclear programs demanded of them are costly *ex post* as well as *ex ante*. Thus, although these measures are the most direct ways of increasing the transparency of a cooperative nuclear disarmament, they are also costly and

high-risk for an aspiring nuclear state. In addition to the political cost of yielding to pressure, international inspections put the state in a militarily vulnerable position. It is disadvantageous for a state to communicate to its adversaries such important information as how far along its nuclear weapons program has progressed and where the nation's nuclear facilities are located. Further, robust inspections are likely to expose non-nuclear aspects of the country's military posture. The risk is even higher for the regimes of aspiring nuclear states such as North Korea and Iran: they fear domestic challenges against them, as well as being in a hostile international environment.

Unlike the cases for both North Korea and Iran, the incomplete information problem is expected to be minor when both parties to nuclear negotiations are democratic, although that alone does not prevent nuclear proliferation. For instance, during nuclear negotiations between the United States and India, 'Americans watched what was going on in New Delhi – people opposed to the deal leaking negative stories from inside the government, political adversaries using the issues to score points on unrelated matters – and found it all very familiar. Similar things happen every day in Washington' (Zakaria, 2008, p.151). Quantitative research on proliferation has found that democracy is not a significant predictor of proliferation (Fuhrmann, 2009) or even that democracies are more likely to acquire nuclear weapons (Singh and Way, 2004; Jo and Gartzke, 2007; Kroenig, 2009). As Sagan (2011, p.238) notes, however, it is an important finding that no democracy has covertly started a nuclear weapons program after its national government ratified the Nuclear Non-Proliferation Treaty (NPT), whereas at least eight non-democratic states had a covert nuclear program after ratifying the NPT.

In the following sections, I apply the concepts discussed earlier to the cooperation problems found in the interactions of the United States with North Korea, Iran, and Libya. Both parties in nuclear negotiations have both time inconsistency and incomplete information problems, but their relative importance varies for different types of actors. The time inconsistency of the United States' preference makes aspiring nuclear states reluctant to abandon nuclear weapons programs. Even if such states were willing to give up their programs, addressing the incomplete information problem of nuclear disarmament will be complicated by the time inconsistency problem, because international inspections make them militarily vulnerable.

3 The United States and North Korea

The nuclear standoff between the United States and North Korea illustrates the asymmetric strategic problems well. There has been no binding commitment to solve the time inconsistency of the United States; neither has there been much information about the North Korean nuclear programs and the intentions of North Korean leaders.

In 1985, North Korea signed the NPT in exchange for the Soviet Union's assistance with nuclear technology. Yet Pyongyang did not conclude the NPT-required safeguards agreement with the IAEA until April 1992. The IAEA soon found evidence that North Korea was cheating on its obligations under the NPT, and in March 1993, North Korea declared its intention to withdraw from the NPT, although it suspended that decision in June 1993. Various countermeasures from economic sanctions to military actions were proposed by those opposed to the North Korean move, and tensions between North Korea and the United States heightened.

After former US president Jimmy Carter's visit to Pyongyang in June 1994, the two sides entered a negotiation process and reached a bilateral agreement, the 'Agreed Framework,' in October 1994. The United States, South Korea and Japan, acting as the primary financial providers, created the Korean Peninsula Energy Development Organization (KEDO) in 1995. The organization's purpose was essentially to bribe North Korea to abandon its nuclear weapons program and, importantly from the North Korean perspective, to pave the way for the normalization of North Korea's relationship with the United States.

The Agreed Framework signed by the Clinton administration, however, was fragile from the beginning. A non-binding political agreement, it was neither a treaty subject to Senate ratification nor a legally binding executive agreement: 'the United States wanted the flexibility to respond to North Korea's policies and actions in implementing the Agreed Framework – flexibility that binding international agreements, such as a treaty, would not have provided' (United States General Accounting Office, 1996, p.7). In other words, the Agreed Framework was designed to impose as little *ex post* cost as possible. The Republican Party gained majorities in the House and Senate in the November 1994 election, and there was little that kept the Republican-dominated Congress from impeding the implementation

of the agreement.² After George W. Bush was sworn in as president in 2001, the executive branch was also not eager to continue cooperation with North Korea. In fact, the early years of the Bush administration's North Korea policy were characterized as an 'Anything but Clinton' approach (Kristof, 2005). Bush's State of the Union Address in January 2002 included North Korea in the 'Axis of Evil', and the president told the Washington Post reporter Bob Woodward in an August 2002 interview that he loathed the North Korean leader Kim Jong-il (Woodward, 2002, p.340).

North Korea froze the plutonium-based bomb program in accordance with the Agreed Framework, but it continued suspicious activities, arousing concerns about a previously unnoticed program with highly enriched uranium technology. During his visit to Pyongyang in October 2002, US Assistant Secretary of State for East Asian and Pacific Affairs, James Kelly, informed the North Koreans that the United States was aware of the uranium-based program, and the North Korean negotiators are said to have admitted the existence of the program, albeit in an ambiguous manner (Kessler, 2007; Sanger and Broad, 2007; Choe, 2010). This resulted in a total collapse of the Agreed Framework. The Bush administration suspended shipments of oil promised under the agreement, and North Korea restarted its plutonium program. On 10 January 2003, North Korea declared its withdrawal from the NPT, stating that the withdrawal would be effective on the next day (Preez and Potter, 2003). Incidentally, given that the Republicans had opposed the Agreed Framework long before the discovery of the uranium-based program, the policy differences between the Clinton and Bush administrations should not be attributed to the information they had.

Nuclear disarmament talks continued intermittently, but North Korea did not stop its nuclear development. In April 2003, trilateral talks involving the United States, North Korea and China were held, and from August 2003, the talks expanded to include South Korea, Japan, and Russia – the Six-Party Talks. These talks, however, did not lead to concrete agreement. In February 2005, North Korea officially declared that it had produced nuclear weapons, and it conducted underground nuclear tests in 2006, 2009, and 2013.

2 Moreover, from early on, there was a notion that the Clinton administration agreed to the plan because it expected the North Korean regime to collapse soon (Smith, 1994; Hoagland, 1995).

When we focus on the strategic problems that the United States and North Korea face, respectively, the failure of the nuclear disarmament talks seems natural. Even when the two states were in a cooperative agreement during the Clinton administration, the United States did not offer a credible commitment to cooperation, and North Korea refused to increase transparency. The reversal of the Clinton administration's engagement policy by President George W. Bush must have magnified the time inconsistency problem of the superpower in the North Korean leaders' minds, and North Korea's deceitful tactics exacerbated the American distrust of the dictatorship.

Neither the Agreed Framework nor the Six-Party Talks were designed in such a way that the asymmetric cooperation problems could be mitigated. By paying for the KEDO, the United States and its allies sank costs and signaled their cooperative intention (that is, ameliorated the incomplete information problem by paying *ex ante* costs), but there was little *ex post* cost embedded in the Agreed Framework. Therefore, the time inconsistency problem of the US policy, which is more important for an aspiring nuclear state, was not adequately addressed. Until the time inconsistency problem is alleviated – for example, through a security guarantee from the United States – the North Korean regime is unlikely to dismantle its nuclear weapons program. Some question whether security guarantee is what the regime really wants, but the time inconsistency problem is important for whatever the regime's goal is, as long as that goal requires long-term cooperation by the United States.³

In contrast to the seriousness of the time inconsistency problem, incomplete information about the present intention of the United States did not make a significant difference in the collapse of the Agreed Framework. In fact, when the US government had little intention of cooperating, as during the early years of the Bush administration, its malign intention toward North Korea was fairly transparent. The Bush administration nullified the October 2000 US–North Korea joint communiqué, in which the

3 For instance, Byman and Lind (2010, pp. 44–46) argue that 'security guarantees or other inducements that try to reduce Pyongyang's external threat environment will be of only limited effectiveness' because the purpose of the nuclear program is 'to win the support of key constituents'. Cha (2009) argues that the North Korean regime wants 'a positive security assurance' that the United States 'will not allow the House of Kim' to collapse. Cha may well be right on this point, but the United States has not offered North Korea even a negative security guarantee (i.e. the promise of not attacking North Korea) that comes *before* North Korea's abandonment of its nuclear weapons program.

two governments agreed that neither would have hostile intent toward the other. This policy reversal clearly illustrates the magnitude of the time inconsistency problem that North Korean leaders face.

North Korea, in turn, refused to disclose the nature of its nuclear ambition, although it was willing to be bound formally by an agreement with more powerful states and suspended its plutonium program in the process of the Six-Party Talks. Making a commitment through the Six-Party Talks would be costly *ex post* if the regime should later want to reverse the policy and pursue a confrontation with the United States: if North Korea breaks a promise made in multilateral talks, the United States will consequently have more support for a hardline policy. This was the rationale behind the ‘hawk engagement’ of the Bush administration (Cha, 2002a; Cha, 2002b).

However, what the United States really needs from North Korea is transparency and a benign and costly signal from the dictatorship. The time inconsistency problem is not serious for the United States, because its bargaining power will not decline as a result of cooperation. As long as North Korea actually suspends its nuclear program – the confirmation of which requires solving the incomplete information problem – the United States does not lose much even if North Korea goes back on its promises later. North Korea, however, has been reluctant to make efforts to solve the incomplete information problem; instead, the revelation of the parallel nuclear program based on uranium enrichment confirmed American distrust of North Korea. The Agreed Framework effectively collapsed, and the United States and North Korea blamed each other for violating the agreement.

4 The United States and Iran

As in the US–North Korea relations, the United States and Iran also face the asymmetry of the strategic problems.⁴ On one hand, the United States has not offered a credible, long-term commitment to cooperation by creating a mechanism that will impose costs on the superpower if it reneges on its promise. Iran, on the other hand, has not signaled its intention to cooperate, and the United States has doubts about the transparency of Iran’s

4 Sebenius and Singh (2012) point out that there may be no mutually acceptable deal between the United States and Iran at present. Even if they are correct, however, strategic problems discussed in this article are important, because actors’ preferences change over time.

nuclear programs. Although many experts (e.g. Sagan, 2006; Litwak, 2008 and Leverett, 2009) have recognized the necessity of an American security guarantee as a prerequisite for Iran's dismantling of its nuclear programs, mutual distrust between the two countries has not been analyzed in terms of these asymmetric strategic problems.

Iran's nuclear program began in the 1950s with assistance from the United States. As a US ally at the time, Iran signed the NPT in 1968 and ratified it in 1970. The Iranian nuclear program was rather limited until the late 1980s, because of the Islamic Revolution in 1979 and the burden of the Iran–Iraq War (1980–88).⁵ Iran maintains that its nuclear program is peaceful and for civilian purposes, but the Iranian government 'has carried out activities that are relevant to the development of a nuclear explosive device' (IAEA, 2013, p.10). The Iranian leaders seem to be divided on the merit of direct talks with the United States. The United States has also been reluctant to build bilateral channels, perhaps because the Iranian policy has not been as provocative as the brinkmanship of North Korea. Iran's negotiation strategy might be changing under Hassan Rouhani, a former chief negotiator for nuclear negotiations, who assumed the presidential office in August 2013, but the Supreme Leader Ayatollah Ali Khamenei is still expected to make the final decision.

As this article has argued, the incomplete information of the US intention has been not nearly as serious as that of the Iranian policy. In fact, the transparency, rather than the obscurity, of American hostility damaged the bilateral relationship during the administration of President George W. Bush. After the US invasion of Iraq, a senior US official hinted that Iran would be the next target of regime change. When asked whether the administration was considering preventive nuclear strikes against Iranian nuclear facilities, President Bush answered that 'All options are on the table' (Sagan, 2006, 56). Iran, along with North Korea, is still a target for US nuclear strikes in the current US nuclear targeting blueprint, 'Operations Plan (OPLAN) 8010-08 Strategic Deterrence and Global Strike' (Kristensen, 2010). Fortunately, the transparency of the American political system can also help conciliation once the United States decides to take a cooperative approach. Compared with the difficulty Tehran would face if it chose to signal cooperative intentions, Washington should

5 The Nuclear Threat Initiative, Country Profiles, Iran. <http://www.nti.org/country-profiles/iran/nuclear/> (15 July 2013, date last accessed).

find it relatively easy to solve the incomplete information problem – that is, to convince the Iranian regime that the American government, at least for the moment, is willing to cooperate with Iran, if that is actually the case.

The incomplete information problem is serious with respect to Iranian preferences and strategies. Iran has not openly pursued weaponization of its nuclear program, but its policy has aroused suspicions. Iran has clearly tried to mislead the United States and the international society about its nuclear program by failing ‘to meet its obligations under its [NPT] Safeguards Agreement with respect to the reporting of nuclear material and its processing and use, as well as the declaration of facilities where such material has been processed and stored’ (IAEA, 2003, p.9). Even if Iran begins to take a more conciliatory posture toward the United States, a strong suspicion would remain about Tehran’s intention.

The time inconsistency of the US preference is a significant obstacle to US–Iranian cooperation. Given the level of hostility between them, the United States needs to provide Iran with a credible security guarantee to alleviate the time inconsistency problem. In fact, this is important even if the United States chooses to take a more coercive approach toward Iran. Threats of punishment are not effective unless the United States credibly communicates that it will not harm Iran when Tehran complies with US demands. The Iranian regime will cooperate only ‘if it is confident that other international parties will follow through on their commitments and that cooperation with those parties will not leave the Islamic Republic more vulnerable to international pressure’ (Leverett, 2009, n.p.). Despite the centrality of such a commitment, as former Secretary of State Condoleezza Rice stated clearly, security assurances have not been on the table of US–Iranian negotiations (Litwak, 2008, p.104).

Iranian commitment to cooperation in the future is not as important as the American commitment. As long as Iran actually suspends its nuclear program – an issue related to incomplete information but not to time inconsistency – the United States does not take much risk, even if Iran later reneges on a nuclear disarmament agreement. If Iran goes back on its promises, the United States could also withhold rewards or impose punishment, and international public opinion would be more supportive of sanctions against Iran.

As in the North Korean case, it would be difficult to clear American suspicions over Iranian nuclear programs without a strict and intrusive inspection that weakens the regime’s security. Accepting intrusive inspections

is humiliating (creating *ex ante* costs for Iran), and inspections could also reveal military vulnerabilities (creating *ex post* costs for Iran). In order to encourage Iran to reduce the incomplete information problem, therefore, the United States needs to commit to long-term cooperation before Iran adopts a conciliatory policy. Once the United States provides the Iranian regime with a guarantee of long-term cooperation, the American negotiators can then focus on what Iran is currently doing to increase transparency rather than worry about future changes in Iran's nuclear policy.

Theoretically, the United States can create a self-imposed restraint against its own betrayal by formalizing its cooperative arrangement with Iran. Formalization through treaty ratification and other means matters, because it increases the *ex post* cost (which was absent in the 1994 Agreed Framework between the United States and North Korea). International reputation costs and domestic audience costs make policy change more costly, and a formalized agreement will protect doves in the United States from political pressure. It is, however, not clear whether such a measure is politically feasible in US domestic politics and, as discussed later, the collapse of the Libyan model of nuclear disarmament reduced the credibility of US security assurance.

5 The United States and Libya

Libya's nuclear dismantlement was initially a success story for nuclear diplomacy, but the fate of Muammar al-Gaddafi shows the risk of cooperation for aspiring nuclear states. In retrospect, Gaddafi underestimated the seriousness of the time inconsistency problem, but some factors led him to discount the risk of US policy reversal. Even after the NATO air campaign against his regime had begun, Gaddafi appealed to the European Parliament and to the US Congress for an end to the attack, citing his earlier decision to cancel nuclear programs voluntarily (Cigar, 2012, pp. 5–6). Because Gaddafi underestimated the risk of the time inconsistency problem, he boldly reduced the incomplete information problem about the Libyan nuclear program. The Libyan case also shows that the time inconsistency problem is not serious for the United States. Gaddafi became sour about the slow progress of the normalization process and attempted to exert leverage by temporarily suspending shipments of enriched uranium in November 2009 (Cigar, 2012, p.5). Unfortunately for

him, his earlier cancelation of the nuclear program had already reduced his bargaining leverage.

Libya is believed to have begun its pursuit of nuclear weapons shortly after Muammar al-Gaddafi took power in 1969. It acquired some fuel cycle capabilities from the Soviet Union in the 1980s, and in the 1990s it purchased enrichment technology and weapons design plans from the clandestine network established by the Pakistani nuclear scientist Abdul Qadeer Khan.⁶ Gaddafi, however, was interested in improving relationships with the West as well. As early as 1992, Libyan leaders had contacted the American government through former Colorado Senator Gary Hart, telling him that they were willing to turn over the two suspects of Pan Am Flight 103 bombing and to discuss abandonment of unconventional weapons in exchange for talks regarding a lifting of sanctions and normalization of bilateral relations (Hart, 2004; St John, 2004, p.388). These early contacts did not lead to cooperation because of American reluctance to engage the Libyans. Only in 1999, during the Clinton administration, did the US government move toward negotiation – negotiations which subsequently led to Libya's announcement of voluntary nuclear disarmament in December 2003 (Indyk, 2004; Leverett, 2004; Jentleson and Whytock, 2005; Bowen, 2006; Schwartz, 2007; and Litwak, 2008).

Libya renounced weapons of mass destruction (WMD) in 2003 as a result of a *quid pro quo*. It demanded the lifting of economic sanctions and normalization of its relationships with the West, while the United States and the United Kingdom demanded cooperation against terrorism, compensation for Libya's past terrorist activities, and renunciation of WMD. Saiful Islam al-Gaddafi, the son of the Libyan leader Muammar al-Gaddafi, claimed that Libya was promised economic and military gains for WMD disarmament (Agence France-Presse, 2004). Changes in Libyan domestic politics and the international environment were important as well, but evidence indicates that the compromise was possible only after the United States gave up the option of regime change in Libya: 'what sealed the deal for Libya was an American assurance of non-intervention' (Litwak, 2008, p.99).

The assurance of regime survival was not formalized, but Gaddafi was led to believe that the American promise was credible. Since sanctions

6 The Nuclear Threat Initiative, Country Profiles, Libya. <http://www.nti.org/country-profiles/libya/> (15 July 2013, date last accessed).

against Libya had been actively debated in the United Nations, the entire international society was there to witness how the United States would respond to cooperative actions by Libya. The United Kingdom played a particularly important role: British Prime Minister Tony Blair persuaded President Bush not to seek regime change and assured Gaddafi that the deal on WMD would normalize Libya's relations with the West (Fidler *et al.*, 2004; Jentleson and Whytock, 2005, p.73). Reportedly, hardliners within the Bush administration such as Donald Rumsfeld and John Bolton wanted to push Libya harder, but British pressure kept them in check (Hirsh, 2005). The U.N. Secretary-General Kofi Annan also assured Libyans that Libya's concessions in the settlement of the Pan Am Flight 103 bombing would not be used to undermine the Libyan regime. The US and British officials repeatedly explained that the acceptance of civil responsibility in the Pan Am settlement and concessions in the WMD agreement would not be used against the Libyan government (Jentleson and Whytock, 2005, p.76).

Following these implicit assurances of the Libyan regime's survival, Gaddafi made costly signals that demonstrated his seriousness. The Libyan government publicly renounced its WMD programs and invited inspectors to verify the dismantling of the programs. Schwartz explains how risky and costly it was for the Libyan government to make this compromise with the West:

Libya's WMD and missile programs were presumably intended primarily as a deterrent against threats from countries like the United States, yet it was to the United States and the United Kingdom that the programs were being disclosed. Moreover, the equipment, facilities, and materials in these programs were being dismantled and in some cases removed from the country altogether. This step not only made Libya more vulnerable militarily, including to its neighbors, but also risked appearing to the Libyan public and the region as a capitulation (Schwartz, 2007, p.574).

The *ex ante* costs involved in the agreement reduced the incomplete information problem about the Libyan regime's intention, and the outsiders could subsequently confirm the dismantlement of the Libyan nuclear program. Unfortunately for Gaddafi, the *ex post* costs that resulted from the disruption of this US–Libya cooperation were far higher for him than for the US government.

Clearly demonstrating the time inconsistency problem, the United States and its allies intervened in the 2011 Libyan civil war. The ousting of Gaddafi revealed that an improved relationship with the West was no safeguard against internal challenges. Giving up nuclear weapons probably looks even less attractive now for leaders of Iran and North Korea, and the lessons of the Libyan case do not seem conducive to cooperation. Commenting on the Western intervention in Libya, Iran's Supreme Leader, Ayatollah Ali Khamenei, declared that Iran had increased its efforts in nuclear development and would not follow Libya's path (Cigar, 2012, p.8). A North Korean Foreign Ministry spokesman accused the United States of using 'sweet words' to mislead Libya about the 'guarantee of security' and 'swallowing it up by force' after Libya was disarmed (Cigar, 2012, p.10). Currently, cross-national learning as well as self-learning from their own experience exacerbates the fundamental strategic problems analyzed in this article.

6 Conclusion

This article has explained how the time inconsistency and incomplete information problems, two concepts widely studied in international relations literature, complicate negotiations between asymmetric adversaries over nuclear disarmament. To solve the time inconsistency problem, the United States needs to adopt policies that will impose *ex post* costs on its policy reversal. Probably for domestic political reasons, however, US policymakers have been reluctant to create significant *ex post* costs for their country. Furthermore, given the huge power advantage of the United States and the lack of international support for North Korea and Iran, any security guarantee coming from the United States may lack credibility. This, in turn, means that aspiring nuclear states are unlikely to accept robust international inspections, which are important for addressing the incomplete information problem but which also make them vulnerable.

The overall implications of this article leave us pessimistic about the possibility of negotiated nuclear disarmament, but the theoretical analysis may help the negotiation strategy of the United States. The argument presented in this article suggests that pursuit of strict reciprocity is inefficient in negotiations for nuclear disarmament. Reciprocity plays an important role in international cooperation (Axelrod, 1984; Keohane, 1986), but demanding measures for solving both types of problems discussed earlier

is not efficient when different problems are more important for different actors. Nevertheless, in the Six-Party Talks over North Korea's nuclear program, for instance, the principle of 'commitment for commitment, action for action' has been emphasized, without distinguishing the different strategic incentives these actors face (United States Department of State, 2005).

This article has argued that an aspiring nuclear state is unlikely to accept a robust inspection unless its leaders are first assured of their survival. With respect to North Korea, however, the position of US negotiators has been that a peace treaty is possible only *after* North Korea dismantles its nuclear weapons program (Cheong, 2005). Aspiring nuclear states' policy reversal after a nuclear disarmament deal will not make the United States any worse off than without the deal. Therefore, the United States might benefit from making a bold move (e.g. offering a security guarantee conditional on, but before, the actual disarmament) to encourage these states to address the incomplete information problem. Given that both nuclear proliferation and preventive war are unattractive, it is worthwhile for the United States to offer a formal agreement that entails higher *ex post* costs. For instance, the United States could officially end the Korean War by replacing the armistice with a peace treaty or design a non-aggression treaty explicitly linked to North Korea's abandonment of nuclear weapons.⁷

Ex post costs can be created in the economic field as well, but Western countries have thus far spent their resources on *ex ante* costs. Long-term investments are more important than economic aid for alleviating the time inconsistency problem, although it is also important to address urgent humanitarian concerns such as malnutrition and starvation. Economic aid is costly *ex ante* but imposes little *ex post* cost. In implementing the 1994 Agreed Framework, for example, the United States and its allies paid large *ex ante* costs for the construction of two light water reactors and for the provision of heavy oil, but North Koreans witnessed the United States reverse its policy after billions of dollars had been spent. In contrast, long-

7 This process should not be unilateral or bilateral, because the Korean War involved multiple states. In addition to the three parties to the 1953 Korean War Armistice (the United States, China, and North Korea), South Korea should participate in the discussion. Mattes and Vonnahme (2010) argue that nonaggression pacts raise domestic and international audience costs for aggressions (*ex post* costs), and their statistical analysis shows that nonaggression pacts reduce conflict between signatories.

term investments that are difficult to withdraw impose *ex post* costs on the investors if the United States and its allies deviate from cooperation. Western governments can perhaps create a financial hostage by encouraging large government-sponsored investments in the North Korean economy, in the style of the Kaesong industrial complex.

The initiatives suggested earlier may not work, and a compromise on nuclear disarmament will be difficult to achieve. If the United States is willing to try, however, time is of the essence in this process. Compromise is likely to become more difficult as the nuclear programs of these states develop.

Acknowledgements

For their helpful comments on earlier drafts of this paper, the author thanks Hun Joon Kim, Carolin Liss, Andrew O'Neil, Jason Sharman, Atsushi Tago, Alexander Thompson, Daniel Verdier, Vlado Vivoda, Patrick Weller, Wesley Widmaier, and the editors and anonymous reviewers.

References

- Agence France-Presse. (2004) 'Qadhafi's Son Says Libya Was Promised Economic, Military Gains for WMD Disarmament' (Nuclear Threat Initiative, March 10, 2004).
- Axelrod, Robert. (1984) *The Evolution of Cooperation*. New York: Basic Books.
- Betts, Richard K. (1977) 'Paranooids, Pygmies, Pariahs & Nonproliferation', *Foreign Policy*, 26, 157–183.
- Bowen, Wyn. (2006) *Libya and Nuclear Proliferation: Stepping Back From the Brink*. Abingdon, UK: Routledge.
- Byman, Daniel and Lind, Jennifer (2010) 'Pyongyang's Survival Strategy: Tools of Authoritarian Control in North Korea', *International Security*, 35(1), 44–74.
- Cha, Victor D. (2002a) 'Hawk Engagement and Preventive Defense on the Korean Peninsula', *International Security*, 27(1), 40–78.
- Cha, Victor D. (2002b) 'Korea's Place in the Axis', *Foreign Affairs*, 81(3), 79–92.
- Cha, Victor D. (2009) 'What Do They Really Want? Obama's North Korea Conundrum', *Washington Quarterly*, 32(4), 119–138.
- Cheong, Wook-sik. (2005) Interview with Christopher Hill. *Special Report 05–48A*: June 9, 2005, Nautilus Institute.
- Choe, Sang-Hun. (2010) 'North Korea Started Uranium Program in 1990s, South Says', *New York Times*, New York, NY, 7 January.

- Cigar, Norman. (2012) 'Libya's Nuclear Disarmament: Lessons and Implications for Nuclear Proliferation', *Middle East Studies Monographs at the Marine Corps University*, 2, 1–22.
- Clarke, Michael. (2013) 'Iran as a 'Pariah' Nuclear Aspirant', *Australian Journal of International Affairs*, 67(4), 491–510.
- Crescenzi, Mark J. C., Kathman, Jacob D., Kleinberg, Katja B. and Wood, Reed M.. (2012) 'Reliability, Reputation, and Alliance Formation', *International Studies Quarterly*, 56(2), 259–274.
- Fearon, James D. (1994) 'Domestic Political Audiences and the Escalation of International Disputes', *American Political Science Review*, 88(3), 577–592.
- Fearon, James D. (1995) 'Rationalist Explanations for War', *International Organization*, 49(3), 379–414.
- Fearon, James D. (1997) 'Signaling Foreign Policy Interests – Tying Hands Versus Sinking Costs', *Journal of Conflict Resolution*, 41(1), 68–90.
- Fidler, Stephen, Huband, Mark and Khalaf, Roula. (2004) 'Return to the Fold: How Gaddafi Was Persuaded to Give up His Nuclear Goals', *Financial Times*, London, UK, 27 January.
- Fuhrmann, Matthew. (2009) 'Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements', *International Security*, 34(1), 7–41.
- Gibler, Douglas. (2008) 'The Costs of Reneging: Reputation and Alliance Formation', *Journal of Conflict Resolution*, 52(3), 426–454.
- Hart, Gary. (2004) 'My Secret Talks with Libya, and Why They Went Nowhere', *Washington Post*, Washington, DC, 18 January.
- Hassig, Ralph and Kongdan, Oh. (2009) *The Hidden People of North Korea: Everyday Life in the Hermit Kingdom*. Lanham, MD: Rowman & Littlefield Pub Incorporated.
- Hirsh, Michael. (2005) 'Bolton's British Problem', *Newsweek*, New York, NY, 2 May.
- Hoagland, Jim. (1995) 'The Trojan Horse at North Korea's Gate', *Washington Post*, Washington, DC, August 2. A25.
- Hollyer, James R., Rosendorff, B. Peter and Vreeland, James Raymond. (2011) 'Democracy and Transparency', *The Journal of Politics*, 73(4), 1191–1205.
- IAEA. (2003) 'Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran,' GOV/2003/75. Vienna, Austria: International Atomic Energy Agency.
- IAEA. (2013) 'Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions in the Islamic Republic of Iran,' GOV/2013/27. Vienna, Austria: International Atomic Energy Agency.
- Indyk, Martin. (2004) 'The Iraq War Did Not Force Gaddafi's Hand', *Financial Times*, London, UK, 9 March.

- Jentleson, Bruce W. and Whytock, Christopher A.. (2005) 'Who 'Won' Libya?: The Force-Diplomacy Debate and Its Implications for Theory and Policy', *International Security*, 30(3), 47–86.
- Jo, Dong-Joon and Gartzke, Erik. (2007) 'Determinants of Nuclear Weapons Proliferation', *Journal of Conflict Resolution*, 51(1), 167–194.
- Keohane, Robert. (1986) 'Reciprocity in International Relations', *International Organization*, 40(1), 1–27.
- Kessler, Glenn. (2007) 'New Doubts on Nuclear Efforts by North Korea', *Washington Post*, Washington, DC, 1 March.
- Kristensen, Hans. (2010) 'Obama and the Nuclear War Plan', Washington, DC: Federation of the American Scientists Issue Brief.
- Kristof, Nicholas. (2005) '*N. Korea, 6, and Bush, 0*', New York Times, New York, NY, 26 April.
- Kroenig, Matthew. (2009) 'Importing the Bomb: Sensitive Nuclear Assistance and Nuclear Proliferation', *Journal of Conflict Resolution*, 53(2), 161–180.
- Leverett, Flynt. (2004) '*Why Libya Gave up on the Bomb*', New York Times, New York, NY, 23 January.
- Leverett, Hillary Mann. (2009) '*Pragmatists in Tehran*', Foreign Policy, Washington, DC, 28 October.
- Litwak, Robert. (2008) 'Living with Ambiguity: Nuclear Deals with Iran and North Korea', *Survival*, 50(1), 91–118.
- Mattes, Michaela and Vonnahme, Greg. (2010) 'Contracting for Peace: Do Nonaggression Pacts Reduce Conflict?', *Journal of Politics*, 72(4), 925–938.
- McGillivray, Fiona and Smith, Alastair. (2008) *Punishing the Prince: A Theory of Interstate Relations, Political Institutions, and Leader Change*. Princeton, NJ: Princeton University Press.
- Mercer, Jonathan. (1996) *Reputation and International Politics*. Ithaca, NY: Cornell University Press.
- Miller, Gregory. (2003) 'Hypotheses on Reputation: Alliance Choices and Shadow of the Past', *Security Studies*, 12(3), 40–78.
- Park, Jong Hee and Hirose, Kentaro. (2013) 'Domestic Politics, Reputational Sanctions, and International Compliance', *International Theory*, 5(2), 300–320.
- Powell, Robert. (1999) *In the Shadow of Power: States and Strategies in International Politics*. Princeton, NJ: Princeton University Press.
- Preez, Jean du and Potter, William. (2003) 'North Korea's Withdrawal from the NPT: A Reality Check'.
- Press, Daryl. (2005) *Calculating Credibility: How Leaders Assess Military Threats*. Ithaca, NY: Cornell University Press.
- Sagan, Scott D. (2006) 'How to Keep the Bomb from Iran', *Foreign Affairs*, 85(5), 45–59.

- Sagan, Scott D. (2011) 'The Causes of Nuclear Weapons Proliferation', *Annual Review of Political Science*, 14, 225–244.
- Sanger, David and Broad, William. (2007) 'U.S. Had Doubts on North Korean Uranium Drive', *New York Times*, New York, NY, 1 March.
- Schultz, Kenneth. (2001) *Democracy and Coercive Diplomacy*. New York: Cambridge University Press.
- Schwartz, Jonathan B. (2007) 'Dealing with a 'Rogue State': The Libya Precedent', *American Journal of International Law*, 101(3), 553–580.
- Sebenius, James K and Singh, Michael K. (2012) 'Is a Nuclear Deal with Iran Possible? An Analytical Framework for the Iran Nuclear Negotiations', *International Security*, 37(3), 52–91.
- Sechser, Todd S. (2010) 'Goliath's Curse: Coercive Threats and Asymmetric Power', *International Organization*, 64(4), 627–660.
- Singh, Sonali and Christopher, R. Way. (2004) 'The Correlates of Nuclear Proliferation: A Quantitative Test', *Journal of Conflict Resolution*, 48(6), 859–885.
- Smith, Jeffrey. (1994) 'U.S. Accord with North Korea May Open Country to Change', *Washington Post*, Washington, DC, October 23. A36.
- St John, Ronald Bruce. (2004) 'Libya Is Not Iraq': Preemptive Strikes, WMD and Diplomacy', *Middle East Journal*, 58(3), 386–402.
- Tomz, Michael. (2007) 'Domestic Audience Costs in International Relations: An Experimental Approach', *International Organization*, 61(4), 821–840.
- United States Department of State. (2005) 'Joint Statement of the Fourth Round of the Six-Party Talks, Beijing 19 September 2005', <http://www.state.gov/p/eap/regional/c15455.htm> (1 July 2013, date last accessed).
- United States General Accounting Office. (1996) 'Nuclear Nonproliferation: Implications of the U.S./North Korean Agreement on Nuclear Issues'. Washington, DC: United States General Accounting Office. GAO/RCED/NSIAD-97-8.
- Williamson, Oliver E. (1983) 'Credible Commitments: Using Hostages to Support Exchange', *American Economic Review*, 73(4), 519–540.
- Williamson, Oliver E. (1996) *The Mechanisms of Governance*. New York: Oxford University Press.
- Woodward, Bob. (2002) *Bush at War*. New York: Simon & Schuster.
- Zakaria, Fareed. (2008) *The Post-American World*. New York: W.W. Norton.