The Politics of Delay in Crisis Negotiation *

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Abstract

States often intentionally stall crisis negotiations, hoping to build arms or attract allies to achieve a more favorable bargaining position. Why do their adversaries tolerate delay in some cases, but attack upon delay in others? I argue that this is because states cannot perfectly distinguish between intentional and unavoidable delays. This presents a strategic tension: a state prefers to attack preventively if the delay is intentional, but prefers to avoid costly war otherwise. To study this tension, I build a formal model of crisis bargaining with delay tactics, showing that rising states may mask bargaining delays behind natural exogenous delays to complete a peaceful power shift. I find that uncertainty over the source of delay may decrease the risk of war. However, this effect only holds in the short term. As the length of delay increases, opponents infer that it is likely intentional, and preventive war occurs.

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1 Introduction

In August 1903, Japan and Russia entered negotiations over control of Manchuria. Displeased with Russia's refusal to remove troops from southern Manchuria, Japanese diplomats sought to locate a compromise. However, negotiations stalled. Blaming bureaucratic procedure, illness among the royal family, and the Emperor's holiday plans, Russian diplomats were slow to produce responses and counter-proposals. The Japanese initially tolerated these delays, but as the months dragged on, they became convinced that the excuses were a mere pretense for Russia to increase its military power in the region, allowing Russia to bargain from a strengthened position. Fed up with the delays and convinced their opponents were no longer negotiating in good faith, Japan terminated negotiations and formally declared war on Russia in 1904.

Just over a decade later, in January 1915, Japan again found itself locked in delayed negotiations. This time, Japan sought to consolidate and expand its position and solidify dominance over China by delivering a list of twenty-one demands in an attempt to establish effective control over vital functions of the Chinese government. Chinese foreign minister Lu Tseng-Tsiang drew out the negotiations, citing his own ailing health and need to consult with President Yuan Shih-Kai. Instructing his staff to serve tea and cigarettes to placate Japanese diplomats during the weeks of three-hour meetings, Lu secretly worked with other Chinese diplomats outside the meetings to rally international support for China. Unlike in the previous decade's negotiations with Russia, Japanese diplomats did not believe that the delay tactics were intended to buy time for China to improve its position. Consequently, Japan took a conciliatory stance, continuing to negotiate instead of using military force. However, by May 1915 it became clear that China had secretly rallied the West to its aid, having disclosed the most onerous demands to Britain. In the face of widespread international support for China, Japan was left with no choice but to scale back its demands, eventually agreeing to a settlement that left it worse off than at the outset.

These historical negotiations highlight variation in how states respond to bargaining delays. In some cases, delay is met with aggression, as in the Russo-Japanese War. In others, delay is tolerated and negotiations continue, as in the Twenty-One Demands Negotiation. What accounts for this difference? I argue that the answer arises from an important and previously unacknowledged type of uncertainty: a negotiator's *uncertainty over the reason for delay.* Diplomats cannot always distinguish whether these delays are genuine, or simply a pretense for stalling negotiations so that an opponent can improve its position. How does the strategic tension created by this uncertainty impact decisions to negotiate or fight?

To answer this question, I develop a game-theoretic model of crisis bargaining with delay tactics. There are many exogenous reasons why real-world bargaining might be drawn-out. Domestic turmoil and external intervention delayed the Sino-Belgium Treaty negotiation (1927) and the Northeast Flag Replacement in China (1928) respectively; bureaucratic obstruction delayed U.S.' trade agreements with Panama, Colombia and South Korea; limited communication and transportation delayed the Treaty of Nerchinsk (1689) and Franco-Russian alliance (1894). This paper contributes to a long-standing literature on crisis bargaining by modeling such delay and studying its effects on the conflict process.

My model formalizes the idea that delay may be either an unintentional circumstance out of a state's control, or an intentional ploy to bring about a favorable shift in bargaining power. Uncertainty about the reason for delay allows opportunistic states to mask intentional delay behind a commonplace reality. In the Marshall Mission (1946), the Chinese Communist Party intentionally delayed peace talks but blamed delays on the lack of communication and transportation tools; in the Twenty-One Demands (1915), the Chinese government delayed the negotiation to buy time to garner international support but framed delays as an innocuous result of shared cultural routines and plausibly exogenous factors. Thus, it is reasonable to assume that states cannot distinguish the sources of delay that are genuine and unavoidable from the sources of delay that are purposeful and intentional.

The equilibrium analysis yields three main findings. First, when there is uncertainty about the source of delay, the opponent may tolerate delays that allow large power shifts. In the model, there are two types of the state that may potentially cause a delay—a *rising* type whose power will increase in the future and who would thus benefit from a delay, and a *static* type that has no incentive to cause an intentional delay per se. When the opponent believes they are unlikely to be facing a rising type, the rising type maintains plausible deniability about intentional stalling. Consequently, the opponent may erroneously perceive intentional delays caused by the rising type as exogenous delays caused by the static type and tolerate delays that are subjectively unintentional. Under some conditions, adding uncertainty over the sources of delay has the unexpected effect of making peaceful power shifts more likely while weakly decreasing the probability of preventive wars.

Second, I find that initial beliefs about the reason for delay are key to understanding why delay is met with aggression in some cases but not others. When the opponent knows that delays are intentional, it infers that delays are specious and in turn employs a "bluff calling" strategy, attacking with some positive probability at least after observing intentional delay. When the reasons for delays are unknown, the opponent's responses to delays critically depends on ascertaining whether the delay is intentional. If the delay is an uncontrollable circumstance that will not lead to an underlying shift in bargaining power, costly military action is undesirable and the opponent prefers to engage peacefully. Conversely, if the delay is likely a pretense for secret arming or solicitation of external support and designed to bring about a shift in power, then the other side prefers to attack to forestall those adverse events.

Third, the effectiveness of delay tactics is limited by the time needed to bring about a favorable power shift. In an infinite-horizon extension of the baseline model, I find that an opponent becomes more and more suspicious after repeated periods of delay. Long-term delay undermines plausible deniability, as multiple sequential delays are relatively unlikely to be the product of exogenous circumstances. So while delay tactics can allow a rising state to avoid a preventive strike, they generate risk as time goes on. In particular, a rising state faces a tradeoff when employing delay tactics: delay may allow for a peaceful and favorable power shift, but as time passes, each additional attempt to delay raises the risk of preventive war. The negotiating process of Russo-Japanese War follows the pattern here: the Japanese initially tolerated delays but eventually attacked as they became more suspicious about Russia's motive after observing recurring delays.

My theory of crisis negotiations with delay tactics advances several literatures in international relations. By examining strategic responses to bargaining delay, I bring a new perspective to the literature on dynamic, shifting-power commitment problems as a cause of war. Prior theoretical models have shown that large power shifts are either forestalled by preventive attacks (Powell 2004, 2006; Fearon 1995), or bargained away peacefully (Chadefaux 2011; Coe 2018; Spaniel 2019). Meanwhile, empirical studies have found mixed results about the relationship between power shifts and war (Lemke 2003; Bell and Johnson 2015). I contribute to the theoretical literature by highlighting delay tactics as an important tool for states to accomplish a power rise without being the target of preventive conflicts, as long as their adversaries cannot completely distinguish these tactical delays from unavoidable exogenous ones. On the empirical side, my model shows that given the real world messiness, it may make sense that the relationship between power shifts and war is mixed in the empirical literature.

My theory also enriches our understanding of endogenous power shifts, arming, and alliance formation. As in the present study, earlier work on these topics focuses on costly or risky attempts to alter the balance of power. In particular, scholars have highlighted delay as an important factor in the politics of arming and alliance formation. Bas and Coe (2016) and Coe (2018) assume that the military investment of weak states may not yield immediate success, which causes delay in possessing unconventional arms. Benson and Smith (2022) assume that an alliance may fail to be implemented immediately, which causes delay in altering the balance of relative power. In their work, the delay is assumed to be caused by some exogenous difficulties in the progress of power rise, such as technological trial and error, imperfect intelligence gathering, unexpected contract disruption, and slow coordination of joint military effectiveness. Unlike these studies, which take delay as an exogenous impediment to arming, I focus on *delay as a bargaining tactic*. In my setting, delay may arise endogenously as a means to bring about a power shift. This new perspective on delay thus serves to complement existing work on shifting-power commitment problems.

Finally, my theory contributes to the literature on uncertainty and war by identifying a novel source of asymmetric information that drives bargaining and conflict outcomes. The existing literature has focused on asymmetric information concerning the distribution of power, the cost of fighting, or both as a cause of war (Fearon 1995; Fey and Ramsay 2011; Powell 2012; Wolford, Reiter and Carrubba 2011; Debs and Monteiro 2014). I focus on a novel source of uncertainty: asymmetric information about whether an opponent is negotiating "in good faith". Earlier studies argue that rising states will be either weakened or contained (McCormack and Pascoe 2017; Schram 2021). I find that when there is uncertainty about the source of delay, significant power shifts may occur peacefully. Thus, uncertainty of this type can, under some conditions, make peaceful power shifts more likely. As such, the results are related to those of Debs and Monteiro (2014), who show that unobserved investment in military capabilities can lead to peaceful power shifts. Like their work, I consider a setting in which there is uncertainty over whether a power rise will occur. However, I introduce a novel mechanism—uncertainty over the source of delay in negotiations, demonstrating that this additional source of uncertainty makes peace more likely under some conditions, but makes war more likely under others.

2 Model

I model bargaining across two stages between State 1 and State 2. At the outset of the game, Nature determines whether State 1 is a *R*ising or *S*tatic type, $T_1 \in \{R, S\}$. The prior probability of a rising type is $r \equiv Pr(T_1 = R)$. This prior distribution is common knowledge, but State 2 does not learn State 1's type realization until the second stage. The rising type of State 1 could potentially achieve a power rise in the second stage, whereas the static type of State 1 will not have a power increase.

In each stage of the game, the two states bargain over a prize whose value is normalized to 1. In the first stage, State 1 makes the first move, choosing delay or no delay in the negotiation. If State 1 chooses no delay, then Nature causes a delay with probability α. I label the delay caused by State 1 as *intentional delay*, and the delay caused by Nature as *exogenous delay*.

If either type of delay occurs, State 2 chooses to fight or wait. If State 2 fights, then the game ends, and the players receive their war payoffs (w_1, w_2) in each period. If State 2 waits, then players receive the status quo payoff $(q, 1-q)$ in the first stage, and the game proceeds to the second stage (see below).

If instead there is no bargaining delay in the first stage, then State 2 makes an offer $x_1 \in [0, 1]$. If State 1 accepts, players receive $(x_1, 1-x_1)$ from the settlement in the first period, and the game moves to the second stage. If State 1 rejects, then players receive their war payoffs w_i in both stages of the game [1]

In the second stage, State 2 first learns State 1's type, then makes an offer $x_2 \in [0, 1]$ that State 1 again may accept or reject. Either way, the game ends at this point. If State 1 accepts, then players receive $(x_2, 1-x_2)$ in this period. If State 1 rejects, they receive their war payoffs, which now depend on State 1's type. If it is the static type, then war payoffs are the same as in the first period: (w_1, w_2). Otherwise, if State 1 is the rising type, then war payoffs are now (w'_1, w'_2). The rising type of State 1 will become stronger in the second period only if there was delay in the first period.

The states have common discount factor, $\delta \in (0, 1)$. In each state's final utility, its first–period payoff is multiplied by $1-\delta$ and its second–period payoff is multiplied by δ, so that δ captures the weight states place on long–run outcomes.

[1] I do not exclude the possibility that RS1 can reach a bargaining settlement in Period One and tries to complete its power rise thereafter. The underlying assumption is that RS1 is more likely to complete its power rise with more time. So the power shift should be less likely if delay does not occur. In the Appendix A.4, I study the extension with a positive probability of power shifts $\beta > 0$ after no-delay. I identify an upper bound $\bar{\beta} < 1$ such that all substantive results still holds as long as $\beta < \bar{\beta}$, which reflects the underlying assumption.

To model the inefficiency of war, I assume $w_1 + w_2 < 1$ and $w_1' + w_2' < 1$. To capture how power shifts in favor of a rising type of State 1, I assume that $w_1 < w_1'$ and $w_2 > w_2'$. Finally, I assume the static type of State 1 is dissatisfied with the status quo: $q < w_1$. This assumption implies that the static type seeks an immediate revision of the status quo that fairly reflects the distribution of power, while the rising type of State 1 aims to delay the bargaining to buy time for its power rise to complete. To illustrate the sequence of play, Figure 1 shows the extensive form game when State 2 faces a rising type of State 1. After analyzing the main model below, I extend it to an infinite–horizon interaction in section 3.3.

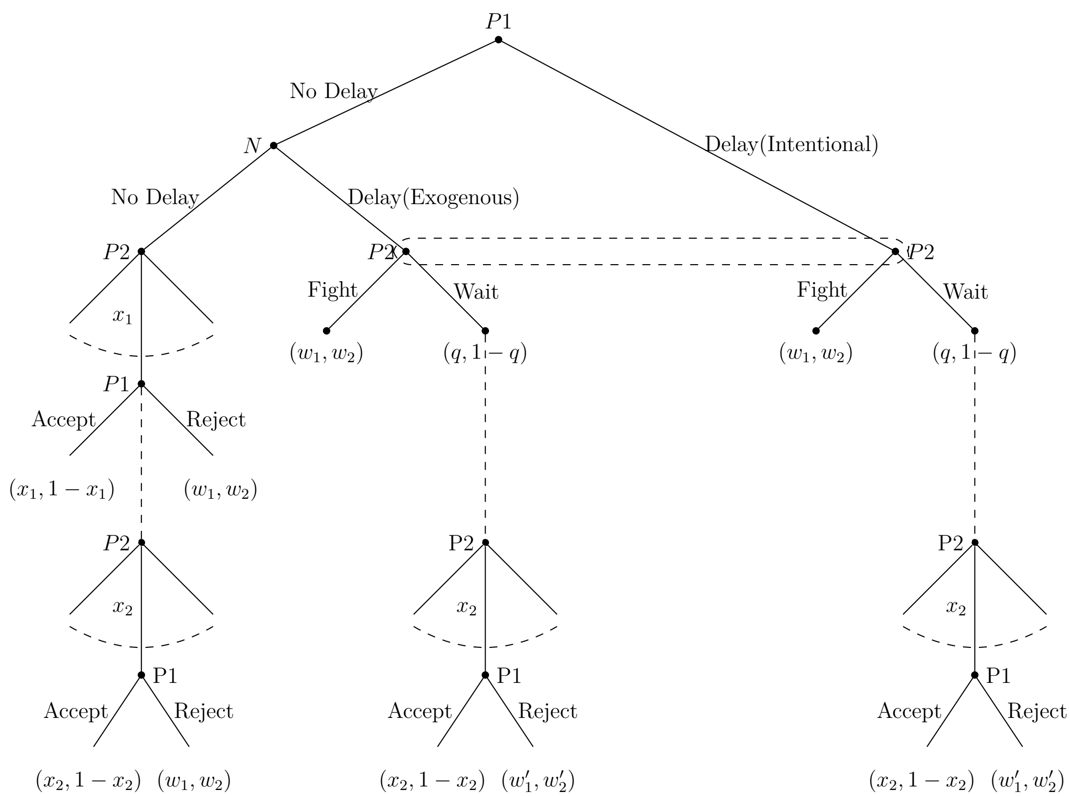


Figure 1. Game tree for the interaction, assuming State 1 is a rising type.

2.1 Key Features of the Model

The model incorporates the essential feature of existing theoretical work on the commitment problem—that the expectation of a future power shift could induce the declining state to fight before it is completed (Fearon 1995; Powell 2004,2006). I innovate by modeling two important features of bargaining that are overlooked by previous shifting-power models: bargaining may be delayed for various reasons, and states may be uncertain about the sources of the delay. In fact, the limiting case of my model with no uncertainty about State 1's type or the source of delay is a standard shifting-power model.

I extend earlier theories by recognizing that factors outside of a state's control may delay negotiations. Two primary categories of exogenous factors are (1) obstacles that arise to bargaining itself and (2) unexpected interruptions from home and abroad. As an example of the first category, communication over the Amur River took two years between China and Russia, and the long-distance travel to Russia cost Qing China representatives two months. Limitations on communication and transportation were key to delays in reaching the 1689 Treaty of Nerchinsk between Russia and China. Likewise, disagreements on the terms of negotiation and long-distance travel were responsible for delays in the negotiations of the 1894 Franco-Russian alliance and the 1955 U.S.-Republic of China defense pact (Benson and Smith 2022).

External factors such as domestic turmoil, bureaucratic obstruction and external intervention may also result in bargaining delays. In the Sino-Belgium Treaty negotiations of 1927, the success of the Northern Expedition led by the Nationalist government intensified the uncertainty in Chinese politics, and China's domestic turmoil delayed the negotiation between the Peking government and Belgium (Martin 1980, 133). The U.S. negotiated and signed free trade agreements with Panama, Colombia, and South Korea, but all three agreements were delayed in Congress due to the opposition from labor, environmental groups and import-competing industries (Haftel and Thompson 2013). In July 1928, Japan disrupted negotiations over the unity of China between Zhang Xueliang and the Chinese Nationalist government for three months. Neither the warlord nor the central government anticipated the explosive reaction of Japan (Taylor 2009, 84).

Delay may also be a tactical choice by a state to gain bargaining power in the interim. For example, in 1996, the Peruvian government intentionally stalled negotiations with the Tupac Amaru Revolutionary Movement in a hostage event, to gain time and collect information for a raid (Schemo 1997). In the fifth and sixth rounds of the Six-Party Talks, North Korea used many delaying tactics to exhaust South Korea and the United States until they were ready to concede (Zhou and van Wyk 2021). In the Marshall Mission of 1946, the Chinese Communist Party intentionally delayed peace talks with the Chinese Nationalist Party in order to consolidate its power and foothold in Northeast China.[2]

Importantly, it is difficult for states to distinguish whether any given delay is caused by exogenous circumstances or tactical decisions. There are many potential sources of exogenous delay, and states that seek a tactical delay could fabricate plausibly exogenous factors to mislead its adversary about the underlying causes, making attribution difficult. For instance, in the negotiations over the Twenty-One Demands, China framed its delays as an innocuous result of shared cultural routines. Japan was not suspicious about China's motive because the delay seemed understandable. In the Marshall Mission, the Communist representatives stalled peace talks but demonstrated apparent sincerity by giving every assurance to the U.S. and to Nationalist representatives. They could not tell the delay was intentional, because the Communist representatives blamed widely dispersed personnel, poor communications equipment, and lack of transportation tools.[3]

If the delay is caused by objective hardships, it may serve no premeditated purpose and indicate no underlying power shift. Conversely, if the delay is caused by a rising state, it may serve the rising state with more time to secretly mobilize, arm, seek external support or form alliances to improve its power. In many circumstances, exogenous causes of delay

[2] *Foreign Relations of the United States* 1945–1952, Volume IX, China, ed. Ralph R. Goodwin, (Washington: Government Printing Office, 2013), Document 377.

[3] *Foreign Relations of the United States* 1945–1952, Volume IX, China, ed. Ralph R. Goodwin, (Washington: Government Printing Office, 2013), Document 132.

offer a natural cover for the rising state to stall bargaining. A state that is unable to discern the source of delay will therefore also be uncertain whether a power shift is afoot.

To formalize the ambiguous sources of delay, I model the occurrence of delay as a move that is unobservable to State 2. To capture the resulting uncertainty over shifts in relative power, I assume that only the rising type of State 1 could achieve a power rise after bargaining delay.

3 Analysis

I solve the model for Perfect Bayesian Equilibrium (PBE). Perfect Bayesian Equilibrium requires that players act optimally at each information set in the game and that players update their beliefs using Bayes Rule whenever possible, given their knowledge about the strategies of other players. When multiple equilibria exist, I select the Pareto dominant one for purposes of comparative statics.

As a baseline, I first show that a large power shift never takes place peacefully in equilibrium when State 2 could distinguish whether delays are exogenous or intentional. I then characterize the equilibrium behavior when the source of delay is unknown, first in the two-stage model and then in an infinite-horizon extension. I show that a large power shift can take place peacefully in equilibrium when State 2 cannot distinguish the true source of delays.

3.1 Distinguishable Sources of Delay

Throughout the analysis, I focus on conditions under which the rising type of State 1 would gain enough power to provoke war in a standard commitment problem model, as this is where my model yields the most starkly novel results. Assumption 1 formalizes this condition.

Assumption 1. $w_1' > \bar{w_1} = \frac{1-w_2-(1-\delta)q}{\delta}$.

If Assumption 1 fails to hold, then the magnitude of power shifts is inconsequential to State 2's decision-making: State 2 would tolerate a slight power rise of State 1 rather than prevent it with fighting. Assumption 1 is essentially the same as the condition for preventive wars in Fearon (1995). It is also related to the general condition for wars in infinite horizon models. In Powell(2004; 2006), the inefficiency condition requires the size of the per-period shift in relative power to be sufficiently large, which is a straightforward extension of Assumption 1 in my two-stage model.

State 2's inability to discern the source of delay is important for the possibility of a peaceful power shift. Suppose instead that State 2 could discern between the two possible sources of delay. If the prior probability of a rising type of State 1 is high enough, then State 2 will start a preventive war rather than allow bargaining to be delayed, as shown in Proposition 1.

Proposition 1. *Assume that State 2 always observes the source of delay. If* $r > r^* = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)}$*, then in all equilibria, State 2 fights after both types of delay.*

This proposition shows that the rising type of State 1 cannot complete its power rise peacefully when State 2 believes a power shift is likely to occur. To begin with, the rising type cannot exploit a separating strategy to delay bargaining. If the rising type chooses to delay and the static type chooses not to, then State 2 will infer that State 1 is rising upon observing an intentional delay. This leads State 2 to fight a preventive war instead of allowing the delay. Nor can the rising type achieve a peaceful power rise by imitating the static type's bargaining behavior. When State 2 has a high prior belief that State 1 is rising, it fears the risk of an adverse power shift that follows both exogenous delay and intentional delay, and will choose to fight even without learning State 1's realized type. Thus, the only equilibrium outcome is a preventive war that forestalls the power shift.

The result in Proposition 1 is analogous to existing models where it is known that the opponent will rise significantly and war ensues. In Fearon (1995), the declining state will attack in the first period if its expected decline in military power is too large in the second period. Powell (2004) and Powell (2006) show that there is no peaceful outcome when the per-period shift in the distribution of relative power is larger than the bargaining surplus. Krainin

(2017) shows that even relatively slow shifts in relative power could cause preventive wars if the accumulated shifts over time are sufficiently large. Thus, the model with discernible sources of delay and a high prior chance of a power shift is closely related to the standard way of modeling shifting-power commitment problems.

I now consider the case when prior beliefs fall below the threshold established in Proposition 1. If State 2 thinks it is relatively unlikely for State 1 to be the rising type, can a rising type successfully complete a power rise by delaying bargaining? Proposition 2 shows that the rising type can partially obtain a power rise through delay in this case.

Proposition 2. *Assume that State 2 always observes the source of delay. If* $r < r^* = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)}$*, then all equilibria are equivalent in outcome distribution to the equilibrium behavior below:*

- *Both the rising and the static type of State 1 choose the action Not Delay.*
- *State 2 fights after the intentional delay at probability* $1-\alpha$*, and waits after the exogenous delay.*

The proposition shows that State 1 cannot achieve a power rise through intentional delay without provoking a positive probability of war. Proposition 2 implies two ways in which a rising type of State 1 may obtain a *partial* power rise: it can make some attempts on intentional delay but bears the risk of preventive attacks, or it can gamble on an exogenous window of opportunity when Nature accidentally disrupts the bargaining. Either way, the rising type of State 1 suffers some limitation in its ability to complete a power rise. Intentional delay raises the risk of war, while not delaying means losing some control over the rising process.

Figure 2 illustrates the equilibrium outcomes as a function of prior beliefs and the size of the power shift when State 2 can discern between sources of delay. The solid line represents $\hat{r}$, the cutoff on prior beliefs for State 2 to prefer preventive war when its updated belief upon observing delay is equal to the prior.

The shape of the solid line shows that $\hat{r}$ decreases with the magnitude of the power shift.

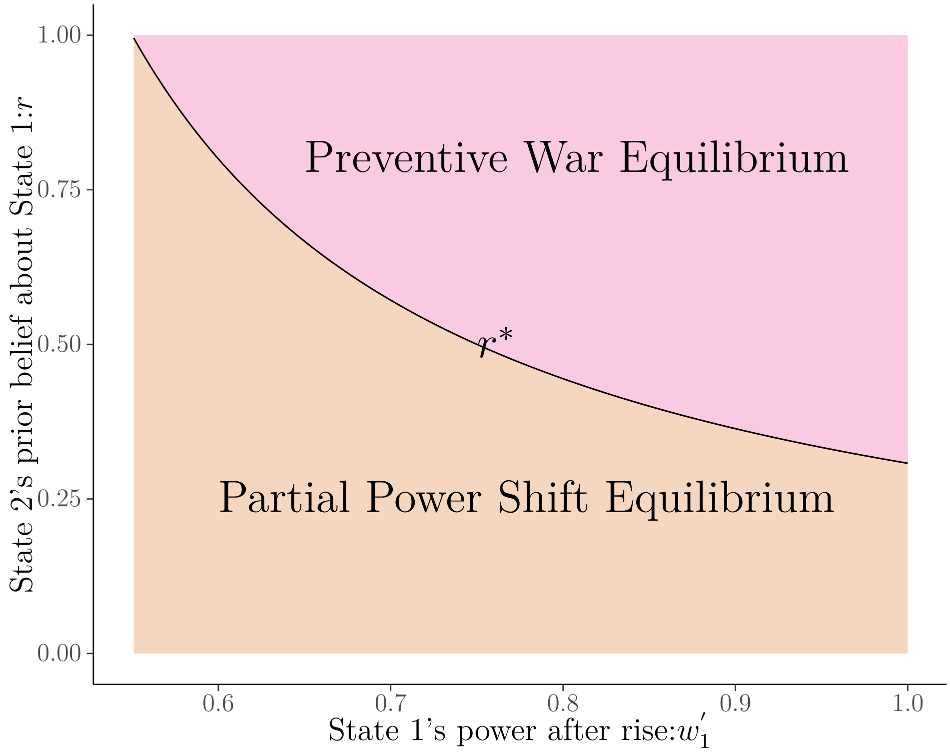


Figure 2. Types of equilibrium in the model where State 2 can distinguish between sources of delay.$w_1 = 0.35, w_2 = 0.5, q = 0.3, \delta = 0.8, \alpha = 0.45, \bar{w_1} = 0.55$

As the magnitude of the potential power shift increases, State 2 will have a weaker position in bargaining once that power shift becomes a reality. It implies that, all else being equal, State 2 has a stronger incentive to launch preventive attacks. The preventive motivation could be dampened with a lower prior belief about facing a rising type of State 1. Thus, for State 2 to remain indifferent between fighting and bargaining, the cutoff on State 2's prior beliefs must be lower when the magnitude of the power shift is larger.

3.2 Indistinguishable Sources of Delay

I now analyze the main model, in which State 2 cannot discern delay caused by State 1's actions from exogenous delay caused by Nature. In contrast to the case analyzed above in which the source of delay was known to State 2, it is now possible for State 1's power to rise peacefully through intentional delay. This occurs in equilibrium when the prior probability of a rising type is low enough, as stated below in Proposition 3.

Proposition 3. *Assume that State 2 cannot observe the source of delay. If* $r < r_* = \frac{\alpha[1-w_2-q-\delta(w_1-q)]}{\delta(w_1'-q)-(1-w_2-q)+\alpha[1-w_2-q-\delta(w_1-q)]}$, *the rising type of State 1 could achieve a power rise peacefully and completely in a unique Perfect Bayesian equilibrium in which:*

- *The rising type of State 1 chooses to delay the bargaining, the static type of State 1 chooses not to delay the bargaining.*
- *State 2 waits after delay with unknown sources.*

When intentional and unintentional delay are indistinguishable, the rising type can exploit State 2's uncertainty to stall negotiations and accomplish a power shift. Because State 2 cannot independently verify the source of delay, it will be uncertain about the consequences of delay for the future balance of bargaining power. State 2 relies on its prior beliefs and the strategy profile to assess the underlying cause of delay, from which State 2 could infer the type of State 1 behind the scene.

In order for intentional delay to function as a window for a peaceful power shift, State 2 must place a low prior probability on State 1 being a rising type. The intuition is that the rising type of State 1 could fabricate some exogenous factors and blame them for causing the delay. In the equilibrium of interest, two types of State 1 take separating actions, and State 2 knows that the delay would be intentional if it is caused by the rising type of State 1. Thus, State 2's updated belief about intentional delay crucially depends on r—its prior beliefs about State 1.

Lower r means that State 2 places more weight on unintentional delay in its updated belief. When r is low enough, State 2's updated belief about exogenous delays is high enough, making State 2 almost certain that State 1 is a static type who would not achieve a power rise following bargaining delays. This updating process decreases State 2's incentive to start a preventive war upon observing delay. In contrast, when State 2 could discern an intentional delay, it is certain about facing a rising type of State 1, and definitely responds with preventive attacks.

When State 2 chooses to negotiate rather than fight, each type of State 1 obtains its ideal outcome and has no incentive to deviate to a different action. For the static type of State 1, it has the best chance of revising the status quo to fairly reflect what its power deserves through peaceful bargaining. For the rising type of State 1, it avoids preventive attacks while it is still weak, completes its power rise peacefully by delaying the bargaining, and could make use of its improved power when negotiations resume.

When State 2's belief is below r_*, there exists a *Peaceful Power Shift* equilibrium in which the rising type of State 1 could achieve an endogenous power rise with zero probability of war. Previous work suggests that when there is uncertainty about shifts in relative power, power shifts usually involve a positive probability of war (Debs and Monteiro 2014), or power shifts will be disrupted or limited by containment measure such as fighting or sanctioning (Yoder 2019a; McCormack and Pascoe 2017; Bas and Coe 2016). My model offers a novel finding: power shifts could realize peacefully and completely even when there is uncertainty about them.

Proposition 3 shows that rising types accomplish peaceful power shifts when the prior probability of a rising type is relatively low. When that prior probability is higher, we again observe a preventive war equilibrium, much like when the source of delay is public (Proposition 1 above).

Proposition 4. *If $r > r_*$, then in all equilibria, State 2 fights after delay with unknown sources.*

As illustrated in Figure 3, the conditions for a preventive war equilibrium are looser when State 2 cannot discern the source of delays in bargaining (i.e., $r_* < r^*$). A peaceful response by State 2 is no longer sustainable in the "middle" cases ($r_* < r < r^*$) once the sources of delay are not discernible. The intuition is that State 2's inability to identify intentional delays induces rising types of State 1 to intentionally delay, which aggravates State 2's concern about power shifts following delays at moderate beliefs about rising types. In all equilibria in the "middle" cases, the rising type of State 1 would intentionally delay with a positive probability at least. Anticipating that rising types would exploit its uncertainty, State 2 fights more intensively upon observing delays to alleviate the risk of power shifts.

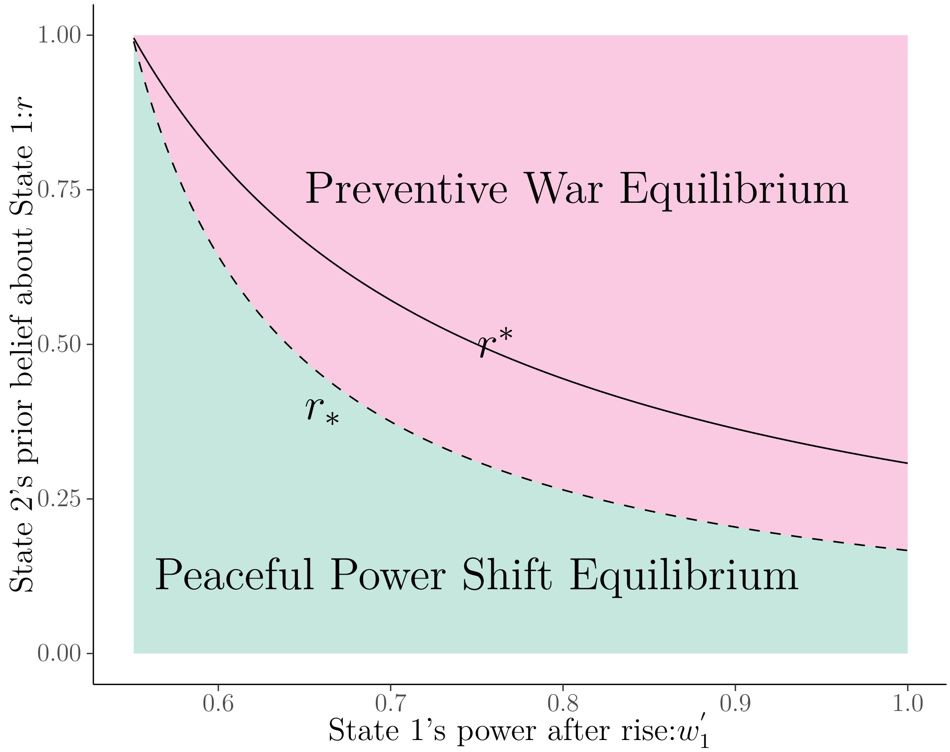
Proposition 4 shows that rising types could no longer accomplish peaceful power shifts when the prior probability of a rising type is not low enough. Proposition 2-4 imply that uncertainty over the sources of delay has differentiating effects on the probability of war and the probability of peaceful power shifts, depending upon State 2's prior uncertainty about rising types.

Proposition 5. *Adding uncertainty over the sources of delay*

- *When $r < r_*$: weakly decreases the probability of war while increases the probability of peaceful power shifts .*
- *When $r_* < r < r^*$: increases the probability of war while decreases the probability of peaceful power shifts .*

When State 2 can discern the sources of delay, the rising type of State 1 is deterred from intentional stalling since delays potentially signal its types to State 2. In the Pareto dominant equilibrium when $r < r^*$, rising types of State 1 eschews intentional delay and State 2 waits upon exogenous delay. The rising type of State 1 can complete its power rise with some probability (when Nature causes exogenous delays) and the probability of war is zero on the path of play. When State 2 cannot discern the sources of delay, rising types of State 1 attempt to delay intentionally since delays are not informative about its types. State 2 stills waits upon delay with unknown sources if its prior belief is sufficiently low—$r < r_*$, but it would mistake intentional delays caused by rising types as exogenous delays caused by static types. Therefore rising types of State 1 can complete its power rise *with certainty* by intentionally stalling. The probability of war is still zero on the path of play, but the probability of peaceful power shifts increases.

Uncertainty over the sources of delay generates a risk of war as State 2's prior belief about rising types increases above r_*. When the probability of facing rising types is higher, State 2 has more incentive to fight due to an increasing concern about power shifts following



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delay. In equilibrium, State 2 fights upon delay *with certainty* even when it holds moderate beliefs about rising types—$r_* < r < r^*$. The probability of peaceful power shifts reduces to zero, and there is now a positive probability of war on the path of play.

3.3 The Infinite Horizon Game

The baseline model makes the simplifying assumption that the power shift will occur for sure in the second stage if State 1 is the rising type. However, when the power shift may take longer to complete, can the rising type delay bargaining indefinitely? To investigate this question, I study an infinite-horizon extension of the baseline model.

In the extended model, the interaction takes place over an infinite number of discrete periods, indexed $t = 1, 2, 3, ...$ At the beginning of each period, if State 1 is a rising type and has not yet accomplished its power rise, it does so with probability $\gamma < 1$. Let $R_t \in \{0, 1\}$

be a commonly observed state-variable indicating whether State 1 has accomplished a power rise on or before period t. Additionally, let μ'_t denote State 2's posterior belief that State 1 is a rising type as of period t. For this extension, I maintain the assumption that State 2 cannot distinguish between types of delay.

In each period t, the following stage game is played. In a period in which State 1 has been revealed as a rising type ($R_t = 1$), State 2 makes an offer x_t, which State 1 may accept or reject. If State 1 accepts, the players receive $(x_t, 1 - x_t)$ in the current period, and the game continues. If State 1 rejects, the game ends, and the players receive the war payoffs (w'_1, w'_2) in this and all subsequent periods. In a period in which a power shift has not taken place ($R_t = 0$), the stage game is the same as the first stage of the baseline model, with the exception that delay results in the game continuing to period $t + 1$.

3.3.1 Analysis

I solve for stationary Markov perfect equilibria (Maskin and Tirole 2001), treating State 2's posterior belief as part of the state space. Let $\omega_t = (R_t, \mu'_t)$ denote the state-variable. Equivalent to Assumption 1, here I assume that the rising type of State 1 would obtain a power rise that is sufficiently large to provoke war in a standard commitment problem model, $w'_1 > \overline{w_1}$.

In the equilibrium I study, State 2 follows a cutpoint strategy: it fights after delay if it has a high enough belief that State 1 is the rising type, and otherwise waits after delay. As my interest in the dynamic game is to investigate whether and for how long the rising type of State 1 could delay bargaining to wait for the power shift to complete, I construct a separating equilibrium in which the rising type delays and the static type does not.

After observing delay but no power shift in period t, how does State 2 update its belief about State 1's type? The following result demonstrates that delays move State 2 toward believing State 1 is the rising type as long as the probability of exogenous delay is not too great.

Lemma 1. *If $\alpha < 1 - \gamma$, the probability of exogenous delay is lower than the probability of observing no power shift in each period, then State 2's belief about State 1 being a rising type increases with the time of observing delay.*

Lemma 1 holds because observing a delay and observing no power shift have countervailing effects on State 2's beliefs. In the equilibrium of interest, State 2 has to rely on the prior probability of exogenous delay and power shifts to infer the type of State 1. A lower probability of exogenous delay increases State 2's updated belief that State 1 is the rising type, since the observed delay is more likely to be intentional which could have been caused only by the rising type. A lower per-period probability of no power shift decreases State 2's updated belief that State 1 is the rising type: upon observing no power shift, State 2 is inclined to believe that the observed delay is an exogenous one which could have been caused by the static type. When the probability of observing exogenous delay is lower than that of observing no power shift, observing delays drives State 2 to believe that State 1 tends to be a rising type.

Given State 2's use of a cutpoint strategy, is intentional delay still in the best interest of the rising type of State 1? The following proposition shows that the rising type still prefers to exploit State 2's uncertainty over the sources of delay in order to extend bargaining, and it could achieve its power rise while State 2's belief remains below the cutpoint.

Proposition 6. *If $\alpha + \gamma < 1$ and $w_1' > \overline{w_1}$, then there exists a stationary Markov perfect equilibrium in which players use the following behaviors:*

- *The static type State 1 chooses not to delay the bargaining, the rising type State 1 chooses to delay the bargaining in each period in which $R_t = 0$,*
- *State 2 fights after delay in each period in which $\mu_t' > \bar{\mu}$, State 2 waits after delay otherwise.*

Proposition 6 demonstrates that the key strategic features of the baseline model are still operative in an infinite-horizon setting. The rising type of State 1 may delay bargaining to buy time for its power rise to complete, but it faces a closing window of opportunity. Over time, as State 2 keeps observing delay, it becomes increasingly concerned about the adverse shift in relative power in future periods. Eventually, State 2 becomes convinced enough that State 1 is the rising type, making State 2 unwilling to tolerate further delay rather than start a preventive war. Consequently, the rising type of State 1 cannot delay the bargaining for infinitely long and it faces a limited amount of time to rise peacefully.

The length of the window for a peaceful power shift depends on State 2's tolerance for delay. The extent of State 2's patience is shaped by factors concerning State 1's power rise, including the size of the expected power shift and the prior belief about facing rising types of State 1. State 2 will wait for a shorter period of time if the expected power shift following delay is larger or the probability of accomplishing a power shift is higher, because State 2 has a stronger incentive to fight preventively if the power shift is more adverse or more likely.

4 Historical Evidence

My theoretical results allow us to better understand historical examples of war that take place during power shifts. In this section, I demonstrate how uncertainty over the sources of bargaining delay resulted in a peaceful power shift in the Twenty-One Demands (1915) negotiation between China and Japan but produced preventive war in the Russo-Japanese War (1904). In the former case, there was a peaceful power shift because Japan did not think it was likely that China's power was rising and, therefore, did not recognize that the delay was intentional. In the latter, there was a preventive war because Japan realized that Russia was intentionally delaying the negotiation to buy more time, leading it to believe Russia's power would rise if delay continued. In analyzing these historical cases, my theory helps account for the reasons why power shifts might occur in some circumstances whereas they might instead result in preventive wars under different circumstances. I refer to evidence from both primary and secondary sources to track the strategic thinking of key decision-makers when possible (Goemans and Spaniel 2016; Lorentzen, Fravel and Paine 2017).

4.1 The Negotiation of Twenty-One Demands (1915)

The negotiations over the Twenty-One Demands illustrate how uncertainty over the sources of delay could result in peaceful power shifts. In January 1915, China was aware that the demands could create frictions between Japan and Western countries. Thus, China's strategy was to intentionally delay the negotiation while seeking international support, namely by leaking the details of the demands to Britain and the U.S. Japan consistently believed it was unlikely China's power would rise and did not recognize that China was intentionally stalling the talks. The resulting uncertainty allowed Japan to tolerate bargaining delay and provided a window of opportunity for China to garner external support. By the time Britain and the U.S expressed strong opposition, Japan had to accept the *fait accompli* that world opinion had shifted in China's favor. Consequently, Japan dropped the most objectionable demands. Consistent with my theoretical analysis, Japan's uncertainty over the rise of China and the use of delaying tactics led to a rapid and significant power shift in China's favor.

The core features of my model are present in the negotiations over the Twenty-One Demands. China was certain that disclosing those demands would invite international opposition to Japan, leading to an increase in Chinese bargaining power. Japan could have easily used military means to coerce China into accepting the demands, but did not anticipate that China would exploit bargaining delays to endanger the Anglo-Japanese Alliance and the U.S-Japan relationship. Thus, China and Japan respectively played the roles of a rising State 1 and a declining State 2.

This case is closely related to Proposition 3, which shows when a state can delay bargaining in order to achieve a power rise without preventive war. Two crucial conditions are (1) the declining state cannot distinguish whether the delay is intentional or exogenous, and (2) the declining state must believe its adversary is relatively unlikely to be rising. When these hold, the rising state can intentionally delay bargaining, but fabricate exogenous reasons to cover its use of delaying tactics and pretend there will be no shift in power. Evidence from primary and secondary sources substantiate the mechanism of my model—Japan failed to ascertain that China employed delaying tactics and did not believe Chinese power would increase.

In the eyes of Japanese elites, 1915 was a unique opportunity to realize complete mastery over China. First, European countries were completely absorbed in World War I, and Japan believed that no Western country could spare any effort for affairs in the Far East (Gowen 1971). Second, Britain did not explicitly oppose Japan prior to or in the early stages of negotiations with China.[4] Until early March, British politicians still held a relatively favorable view of Japan and suggested that none of the demands were particularly problematic.[5] Third, other Western governments' initial reactions to the demands seemed weaker than Japan had expected. The U.S., Russia, and France did not raise strong objections to all of the items in Group V, giving Japan the impression that the Western countries had retreated from Far East affairs (Best 2016; Nish 2002, 99). It is plausible that these initial attitudes by Western powers led Japan to disregard the possibility of external intervention in favor of China.

Upon seeing the initial Twenty-One Demands in January 1915, the Chinese government was aware that practically every item in Group V conflicted with treaty engagements between China and Western nations. Lu Tseng-Tsiang, the Chinese foreign minister, tried every means to delay the bargaining process, which would give the Chinese government time to stoke international objections and solicit outside support. Meanwhile, Lu fabricated exogenous reasons to relax Japan's suspicion about the true cause of delay. Consequently, Japan was not certain that the delay was due to stalling tactics by the Chinese government.

For instance, Lu persuaded the Japanese minister in Peking to meet three times a week rather than on a daily basis, claiming that he needed sufficient time to study the demands in

[4]Kato Biography, Vol.II pp.136-37; NGM Minute on Kato's interview with Greene, 22 Feb. 1915, pp. 587–590

[5]NGM Inoue to Kato, 8 Mar. 1915, pp. 606–607

their entirety, that his personal health could not withstand a higher frequency of meetings, and that his work schedule had been fully filled. At each three-hour meeting, Lu instructed the Chinese staff to serve tea and cigarettes in excessively polite and careful manners that usually took an hour, leaving only two hours for formal discussion. The Japanese diplomats did not complain about these gestures, which appeared to be rooted in the cultural routines of Asian countries (Koo 1976, 33). During the formal discussions, Lu sought to appear either vaguely agreeable or evasive about any agreement by demanding that he had to first consult President Yuan Shih-kai. The Japanese diplomats could not push too hard because it seemed reasonable that any substantive agreement had to be permitted by President Yuan in the first place (Shi 1999, 163–164).

Consistent with the implications of Proposition 3, Japan underestimated the risk of a power shift and chose to avoid preventive war by waiting after delay. Had Japan realized that China was deliberately stalling to empower itself, would Japan have resorted to military coercion instead of peaceful negotiation? Predictions from formal models are well-suited for considering such counterfactual outcomes (Fearon 1991; De Mesquita 1996; Levy 2008). Proposition 2 makes a prediction in the hypothetical counterfactual: the declining state would have a positive probability of fighting after observing an intentional delay. This suggests that those Japanese politicians who recognized that China was stalling should have advocated for the use of force. There was indeed a different voice within the Japanese government: a section of the Japanese military authority was exasperated by the delay and demanded the use of military force instead (Blumenthal and Chi 1970, 42). However, the Japanese government resisted the use of force and insisted to push through all 21 demands via negotiation (Dull 1950; Takeuchi 2010). Given this, it is plausible that Japan would have used military force had the key decision-makers identified the real cause of delay.

Proposition 3 predicts that if states respond to delay by waiting, then rising states will intentionally delay bargaining in order to complete a power shift. Then, after the power shift is complete, the declining state will make additional concessions in future negotiations.

Below I provide direct evidence that China obtained international support and sympathy while delaying negotiations, and that Japan was compelled to scale back its demands because world opinion had shifted in China's favor.

While negotiations were stalled, President Yuan Shih-kai instructed Chinese diplomats to secretly leak the demands that threatened Western concerns, including China's independence and equal opportunity of trade. By mid-February, Western countries had learned enough about the full list of demands (Reinsch 1922, 129–132). In April, the Chinese representatives in the Legislative Council of Britain adopted an emergency measure asking the British government to support China on the grounds of upholding the equal opportunity of trade.[6] Meanwhile, more British politicians had learned about the techniques that Japan had employed in negotiations about the Yangtze Railways with China (Gowen 1971).

As Japan's ambitions gradually came to light, Western countries changed their tune and grew increasingly distrustful of Japan, and the Chinese government was able to shift world opinion. More critical and sensational press about Japan began to appear in March and April (Lowe 1969, 244). Britain decided to support China in late April, indicating that "perseverance in the Group V demands could destroy the Anglo-Japanese alliance."[7] In early May, Britain and the United States explicitly requested that Japan remove Group V.[8] Diplomatic pressure and the threat of intervention by Britain and the U.S. effectively persuaded Japan to moderate its demands. Japan modified the final list of demands to mollify many objections the Chinese government had raised. The final demands were much lighter than the initial Twenty-One Demands (Dull 1950).

Consistent with Proposition 3, China's intentional delay brought about a peaceful power shift, allowing China to reduce the scope of Japan's demands. This was possible because Japan did not recognize the underlying cause of delay and did not expect Chinese power to shift over the course of negotiations. Some historical accounts of the Twenty-One Demands

[6] TNA FO371/2323 Colonial Office to Nicolson, 7 Apr. 1915, No. 41009

[7] FO371/2324 minute by Alston, May 5, 1915 No. 550751; Grey to Greene, May 5, 1915, No. 549873

[8] TNA FO371/2324 Grey to Greene 3 May 1915, tel. 119.

credit the effectiveness of China's delaying strategy (Blumenthal and Chi 1970, 41–42; Craft 2014, 36–37). Others point to the ineptitude of Japanese diplomacy and Japan's inability to recognize the intentional delay. For instance, Best (2016) states that Japan did not predict China's strategy because China had agreed not to leak information, and no outside countries intervened the Sino-Japanese negotiations immediately after the Russo-Japanese War.

4.2 The Russo-Japanese War (1904)

My theory predicts that a declining state will start a preventive war if it strongly suspects that its adversary is deliberately delaying negotiations and anticipates an adverse power shift following the delay. The Russo-Japanese War illustrates this strategic dynamic. War broke out because of Russia and Japan's failure to peacefully settle the territorial control of Manchuria and Korea. Russia was confident in its gradually growing power in Manchuria and was not interested in reaching a hasty agreement with Japan. Thus, Russia's strategy was to delay negotiations as much as possible until its improving power naturally solved the issue in its favor. Japan initially aimed to reach a peaceful settlement, but later lost its patience with Russia after realizing that the recurring delay was intended to tilt the balance of power toward Russia. Japan became determined to fight as fast as possible to prevent Russia from becoming dominant in Manchuria during prolonged talks.

Negotiations between Russia and Japan lasted from August 1903 to February 1904. The conditions of their talks reflect the essential components of my theoretical model. Russia was confident that the advancement and completion of Trans-Siberian railroads would help Russia gradually annex Manchuria (Kowner 1998, 215). By the same token, Japan stood to lose its existing advantages in Manchuria and Korea if Russia were given more time to grow without check (White 2015, 95). Russia and Japan respectively played the roles of a rising type of State 1 and a declining State 2.

For negotiations with a long time horizon, Proposition 6 shows that a state will not immediately attack upon observing delay unless it had a strong prior belief that its adversary was a rising type. Meanwhile, a rising state has an incentive to intentionally delay bargaining to maximize its chances of a successful power shift. Below, I provide direct evidence that Russia purposely stalled negotiations to enhance its military establishment in Manchuria. Additionally, I show that Japan initially doubted Russia's excuses and explanations for delay, but did not contemplate using military force to settle the question until the stalemate lasted more than four months.

The Russian Emperor was convinced that Russia's power in the Far East stood to increase enormously with every year of peace (Kowner 1998, 217), and had passively approached negotiations with Japan by waiting for Japan to take initiative (White 2015, 53). After formal exchanges began, Russia delegated some bargaining power from the highest level of authority in St. Petersburg to Port Arthur (White 2015, 72–73). The dual management of negotiations considerably delayed Russia's diplomatic replies to Japan, as each reply had to go through a cumbersome and dispersed administrative process before it could be formulated and transmitted (Gurko 1939, 281–284; White 2015, 110). Russia's first counter-proposal had a delay of 52 days, and its second counter-proposal in December came after six weeks (White 2015, 106, 110). Furthermore, Russia's reply to Japan's ultimatum had a three-week delay even though Russia was repeatedly warned to give an early reply (Nish 2014, 210).

When Japan asked for explanations for the delay, Russia claimed that "the emperor is taking a holiday; then that the Empress is ill; finally that the Viceroy (at Port Arthur) must be consulted."[9] Japanese foreign minister Komura Jutarō told the American minister in late September: "...they were making no progress at all, the only desire of the Russian government seems to be to delay matters..."[10] Since the Japanese never fully understood Western attitudes toward family issues and regular holidays, they certainly found the behavior of the Russian government at the peak of the negotiation mysterious and unserious (Nish 2014, 189). Japan was not certain whether the Russian Emperor refused to attend to state business

[9]Spring-Rice to Mrs Roosevelt, 9 Dec, 1903, in S. Gwynn (ed.), The Letters and Friendships of Sir Cecil Spring-Rice, vol. 1, p. 373.

[10]MacDonald to Lansdowne, Sept. 4, 1903, British Documents on the Origins of War 1898–1914, vol.2, 214

because the Empress fell seriously ill, or if the delay was caused by bureaucratic procedures inside the Russian government (White 2015, 103; Nish 2014, 189).

We now know that Russia was intentionally delaying the bargaining process. In late December 1903, the Russian Emperor explicitly said that time was on the side of Russia and that its position would be strengthened each year (White 2015, 114). The supposed bureaucratic reasons for delay are dubious, as the Russia viceroy at Port Arthur, Yevgeni Alekseiev, suggested that the negotiation should be prolonged to allow Russia time to reinforce Manchuria (White 2015, 111). A memorandum of Alekseiev's was published in the *North China Herald* on January 22, 1904, stating that "Russia's geographical position and military strength must in the course of time secure for her status she claims. No artificial barriers can prevent the natural course of things, but her land forces, which are Russia's main strength, are at the present moment insufficiently represented in the Far East. This once remedied, the question will gradually solve itself in Russia's favor"(White 2015, 126).

Consistent with Proposition 6, Russia delayed bargaining, while Japan tolerated some delay in the early stages as it initially did not regard Russia's power rise as imminent. However, Proposition 6 also demonstrates that the declining state is not willing to allow the other side to stall for too long, because each instance of delay increases the declining state's concern about an adverse power shift in the future. Comparative statics of the infinite horizon model point out that State 2's tolerance for delays is shaped by the size of expected power shifts and the prior belief about rising types of opponents. In the negotiation of Twenty-One Demands, Japan thought China was unlikely to rise in the first place. In this case, by contrast, Japanese decision-makers both expected Russia to rise and thought the rise would create a significant shift in relative power.

In April 1904, Russia refused to proceed with a promised evacuation of troops from Manchuria (White 2015, 95). By mid-1903, there appeared to be ample reasons to suspect Russia's true motives: Russia allowed the ongoing construction of railways to two strategic ports in the Far East, and continued the permanent establishment of civilian and military bases in northern Korea under the guide of protecting its economic interests (White 2015, 99; Malozemoff 2020). Shortly after the begin of formal talks, Russia pressured China and Korea to revise existing treaties and lease new territories in Manchuria and the north of Korea (White 2015, 104). These aggressive acts made it difficult for Japan to reconcile the bargaining delay with entirely peaceful aims (White 2015, 104; Nish 2014, 212).

Comparative statics of the infinite-horizon model show that State 2 will be less patient about bargaining delay if it anticipates that the size of expected power shifts is larger, or the prior probability of accomplishing power shifts is higher. Consistent with the prediction of comparative statics, whereas it slowly updated beliefs about the power rise of China and kept waiting upon delays, Japan timely updated its beliefs about the power rise of Russia and decided to attack. Below, I provide direct evidence showing that the lack of diplomatic progress or Russian concessions in the first four months of talks exhausted Japan's patience. Eventually, Japan decided to fight when it realized that the delay was a tactic to secure more time to improve Russia's military power.

As time passed, Japan began to doubt Russian excuses for the delay. In late 1903, Japan realized that Russia was purposely stalling for time to increase its power. In January 1904, Japanese politicians unanimously agreed that Russia refused to enter into negotiations over Manchuria, while simultaneously trying to build up its military strength there.[11] The Japanese sentiments are explained by a memorandum that Itō Hirobumi wrote in retrospect in February: "There is no question but that Russia's aim was from the start to increase her military and naval forces and then reject Japan's demands. In this way she could fulfill her ambitions in Manchuria and Korea without interference. This being so, if Japan does not now go to war and defend her threatened interests, she will eventually have to kowtow to the Russian governor of one of her frontier provinces." (Nish 2014, 207)

While some time would be required to finish the power shift, it was obvious that further delay would only play into Russia's hands (Romanov 1947, 241). Japanese statesmen agreed

[11] Japan, Navy Ministry, Yamamoto Gombei to Kaigun, pp. 189–201

that if Japan had to go to war, it should do so immediately. Japan began to contemplate war against Russia in January 1904 (White 2015, 115). In February 1904, Japan ended diplomatic talks and formally declared war on Russia.

Consistent with Proposition 6, Russia's slow responses gradually convinced Japan that the negotiation was merely an instrumental tactic to help Russia become militarily stronger (Nish 2014, 211). By the time that Japan believed that there would be an adverse power shift after delay, Russia had lost its chance to accomplish a power shift peacefully. With a close examination of Russia's delay tactics in negotiations, I show that war followed a preventive logic on the part of Japan. My conclusion concurs with previous historical studies pointing out Japan's concern about the growing economic and military power of Russia prior to the Russo-Japanese War (Langer 1960, 172), and my model highlights the consequences of intentional delay tactics as a key mechanism underpinning the causes of the war.

5 Conclusion

This paper identifies a puzzle in international bargaining: why would states tolerate extensive delay in some crisis negotiations, but not others? My answer is that rising states often try to delay bargaining to buy time to complete a power shift, but claim that exogenous forces are in fact responsible for the delay. Thus, the sources of delay are ambiguous to the declining states. This information asymmetry provides a window of opportunity for a rising state to avoid preventive war, specifically when declining states misperceive the true causes of delay and end up tolerating stalling tactics. Especially, rising states are more likely to succeed in rising peacefully via delaying tactics when declining states hold lower prior beliefs about power shifts and there is a higher probability of exogenous delay.

The model extends our theoretical understanding of why states accomplish power shifts without being the targets of preventive wars. I identify conditions under which a state can achieve a power rise peacefully and completely (Proposition 3). Previous work suggests that rapid and significant power shifts would not be peaceful or complete, either because other states take preventive measures like war and containment (Fearon 1995; Powell 2004, 2006; McCormack and Pascoe 2017; Yoder 2019a), or because power shifts are bargained away peacefully with compensation (Chadefaux 2011; Coe 2018; Spaniel 2019). My model yields clean results, in the sense that the peaceful power shift does not depend on sophisticated assumptions about power dynamics (Bas and Schub 2017), nor does it involve noisy signals (Debs and Monteiro 2014; Bas and Coe 2016).

My findings suggest avenues for future research about strategic and exogenous delay in crisis bargaining. On the empirical side, although I have demonstrated that the mechanism of my model operates in two prominent historical cases, a larger body of cases need to be collected and investigated to see if indeterminacy over the source of delay facilitates peaceful power shifts. In conducting process tracing, we should particularly pay attention to actors' beliefs about the sources of delay and how much power would shift if a delay took place. How was the delay generated, what was the perceived source of delay in the eyes of the declining power, and what was the declining power's expectation about shifting power? Answering these questions is important for building a novel database on bargaining tactics and outcomes, and conducting hypothesis tests of my model. On the theoretical side, although I assumed that the static state has no incentive to cause delay *per se*, a natural extension would be to relax the assumption that the static type has no possible incentive to stall talks, and then investigate the conditions under which static type states can successfully extract concession from adversaries by causing intentional delaying as a "bluffing" bargaining strategy.

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Appendix

Contents

A Proofs

I prove the propositions in the main text through showing a set of preliminary results. I first prove Proposition 1 2 regarding to the equilibria when delays are distinguishable, and then prove Proposition 3, 4 5 regarding to the equilibria when delays are indistinguishable, and finally prove the separating equilibrium in the infinite–horizon game.

A.1 Proofs of Propositions 1 & 2

All lemmas and propositions in this section are geared towards proving Proposition 1 and Proposition 2. Instead of exhausting all equilibria of the baseline model in detail, I summarize key thresholds in State 2's beliefs that determine its best responses, and check State 1's incentive to deviate given State 2's action.

When the sources of delay are distinguishable, I demonstrate that if its prior belief is higher than a threshold, State 2 always fights after both types of delay in the equilibrium, thus no power shift would occur on the path of play. If its prior belief is lower than the threshold, State 2 always waits after exogenous delay but fights after intentional delay at a positive probability, thus only a partial power shift would occur on the path of play.

How would State 2 respond after observing an intentional or exogenous delay? Lemma 1 summarizes State 2's best response given its posterior belief that State 1 is the rising type.

First, consider the pooling equilibrium in which both types of State 1 choose not to delay, State 2 holds a high belief about State 1 being a rising type, thus fights upon both intentional delay and exogenous delay.

Lemma A.1. *Define* $r^* = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)}$*. State 2 fights after delay if its posterior belief* $\mu_{R|D}$ *is higher than* r^**, State 2 waits after delay if its posterior belief* $\mu_{R|D}$ *is lower than* r^**, State 2 is indifferent between fighting and waiting if* $\mu_{R|D} = r^*$*, regardless the delay is exogenous or intentional.*

Proof. After either type of delay, denote State 2's posterior belief about State 1 being a rising type as $\mu_{R|D}$, which is derived via Bayes rule. State 2 can fight or wait. If State 2 fights, it receives

$$EU_2^f = (1-\delta)w_2 + \delta w_2 = w_2$$

If State 2 waits, it receives

$$EU_2^w = (1-\delta)(1-q) + \delta[\mu_{R|D}(1-w_1') + (1-\mu_{R|D})(1-w_1)]$$

State 2 prefers to fight if and only if

$$EU_2^f > EU_2^w \to \mu_{R|D} > \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)} \equiv r^*$$

State 2 prefers to waits if and only if $\mu_{R|D} < r^*$, State 2 is indifferent if and only if $\mu_{R|D} = r^*$. □

Given State 2's posterior belief about State 1 and State 2's action after delay, will State 1 deviate? State 1's incentive for deviation depends on the payoff it receives on-the-path-of-play versus off-the-path-of-play. Lemma 2 summarizes the lower and upper bounds of payoff that State 1 could possibly receive from both of its actions.

Lemma A.2. *Given State 2's posterior beliefs and best responses:*

- *After delay, the rising type State 1's payoff* $U_{RS1}^d \in [w_1, (1-\delta)q + \delta w_1']$*, the static type State 1's payoff* $U_{SS1}^d \in [(1-\delta)q + \delta w_1, w_1]$*; after no-delay, both types of State 1's payoff is* $U_{RS1}^{nd} = U_{SS1}^{nd} = w_1$
- *The rising type State 1's payoff from the action Delay* $U_{RS1}^D \in [w_1, (1-\delta)q + \delta w_1']$*, its payoff from the action Not Delay* $U_{RS1}^{ND} \in [w_1, (1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1')]$.
- *The static type State 1's payoff from the action Delay* $U_{SS1}^D \in [(1-\delta)q + \delta w_1, w_1]$*, its payoff from the action Not Delay* $U_{SS1}^{ND} \in [(1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1), w_1]$.

Proof. As to the rising type State 1, suppose State 2 fights in a pure strategy after delay, the rising type State 1 would receive $\underline{U_{RS1}^d} = (1-\delta)w_1 + \delta w_1 = w_1$ after both exogenous delay and intentional delay; suppose State 2 waits in a pure strategy after delay, the rising type State 1 would receive $\overline{U^d_{RS1}} = (1-\delta)q + \delta w'_1$. Under Assumption 1 that $w'_1 > \overline{w'_1}$, it is easy to verify that $(1-\delta)q + \delta w'_1 > w_1$. Lastly, if State 2 uses a mixing strategy after delay, the rising type State 1's payoff is a convex combination of $\underline{U^d_{RS1}}$ and $\overline{U^d_{RS1}}$, thus is bounded in $[w_1, (1-\delta)q + \delta w'_1]$.

As to the static type State 1, suppose State 2 fights in a pure strategy after delay, the static type State 1 would receive $\overline{U^d_{SS1}} = (1-\delta)w_1 + \delta w_1 = w_1$ after both exogenous delay and intentional delay; suppose State 2 waits in a pure strategy after delay, the static type State 1 would receive $\underline{U^d_{SS1}} = (1-\delta)q + \delta w_1$. Under the assumption $q < w_1$, it is easy to verify that $(1-\delta)q + \delta w_1 < w_1$. Lastly, if State 2 uses a mixing strategy after delay, the static type State 1's payoff is a convex combination of $\underline{U^d_{SS1}}$ and $\overline{U^d_{SS1}}$, thus is bounded in $[(1-\delta)q + \delta w_1, w_1]$.

If delay does not occur, then there is no power shift in the second stage, State 2 offers what makes State 1 indifferent between bargaining and fighting, which is State 1's war payoff in the first stage. Both types of State 1 receive $(1-\delta)w_1 + \delta w_1 = w_1$.

Then, the lower and upper bound of State 1's payoff from Delay and Not Delay naturally follow from previous results. Denote the rising type State 1's payoff from choosing the action Delay and the action Not Delay as U^D_{RS1} and U^{ND}_{RS1} respectively; denote the counterparts of the static type State 1 as U^D_{SS1} and U^D_{RS1} respectively.

Suppose that the rising type State 1 chooses the action Delay. The lowest payoff it can potentially receive is w_1, that is when State 2 believes that State 1 is a rising type and responds with fighting after intentional delay; the highest payoff it can potentially receive is $(1-\delta)q + \delta w'_1$, that is when State 2 believes that State 1 is a static type and responds with waiting after intentional delay. If State 2 is indifferent between fighting and waiting and uses a mixing strategy after intentional delay, the rising type State 1's payoff in all mixing-strategy equilibria is a convex function of its lowest and highest payoff, thus is bounded between w_1 and $(1-\delta)q + \delta w'_1$.

Suppose that the rising type State 1 chooses the action Not Delay. The lowest payoff it can potentially receive is $(1-\alpha)w_1 + \alpha w_1 = w_1$, that is when State 2 believes that State 1 is the rising type and responds with fighting after exogenous delay; the highest payoff it can potentially receive is $(1-\alpha)w_1 + \alpha((1-\delta)q + \delta w'_1)$, that is when State 2 believes that State 1 is the static type and responds with waiting after exogenous delay. If State 2 is indifferent between fighting and waiting and uses a mixing strategy after exogenous delay, the rising type State 1's payoff in all mixing-strategy equilibria is a convex function of its lowest and highest payoff, thus is bounded between w_1 and $(1-\alpha)w_1 + \alpha((1-\delta)q + \delta w'_1)$.

The the same logic produces the proof for the static type State 1. □

Now, I investigate the equilibrium distribution as a function of State 2's posterior beliefs, given that both players' strategies are sequentially rational.

Lemma A.3. *Denote State 2's prior belief that State 1 is the rising type as r, in all Perfect Bayesian equilibria of the game:*

- *If $r > r^*$, State 2 will fight after both types of delay .*
- *If $r \leq r^*$, State 2 fights after intentional delay at the probability κ_{ID}, and State 2 fights after exogenous delay at the probability κ_{ED} such that $\frac{1-\kappa_{ID}}{1-\kappa_{ED}} = \alpha$, $\kappa_{ID} > 0$ and $\kappa_{ED} \geq 0$.*

Proof. From Lemma A.2, define $\underline{U_{RS1}^{D}} = w_1$ and $\overline{U_{RS1}^{D}} = (1-\delta)q + \delta w_1'$, $\underline{U_{RS1}^{ND}} = w_1$ and $\overline{U_{RS1}^{ND}} = (1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1')$; $\underline{U_{SS1}^{D}} = (1-\delta)q + \delta w_1$ and $\overline{U_{SS1}^{D}} = w_1$, $\underline{U_{SS1}^{ND}} = (1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1)$ and $\overline{U_{SS1}^{ND}} = w_1$. It is easy to verify that $\underline{U_{RS1}^{D}} = \underline{U_{RS1}^{ND}} < \overline{U_{RS1}^{ND}} < \overline{U_{RS1}^{D}}$, and $\underline{U_{SS1}^{D}} < \underline{U_{SS1}^{ND}} < \overline{U_{SS1}^{D}} = \overline{U_{SS1}^{ND}}$. I prove the results by considering three types of equilibrium: (1) the pure-strategy equilibrium; (2) the semi-pooling (separating) equilibrium where one type of State 1 uses a mixing-strategy; (3) the full-mixing equilibrium where both types of State 1 use a mixing-strategy.

I first investigate the Perfect Bayesian equilibrium where State 1 uses a pure strategy. Consider the pontential pooling equilibrium, State 2's posterior belief $\mu_{R|D}$ remains to be its prior belief r, regardless of the type of delay. Regardless of the action State 1 chooses on the path, State 1 will deviate if it always receives a strictly higher payoff off the path. By Lemma 2, if State 2 uses a pure strategy, then State 1's payoff must be the endpoints of U_{RS1}^{a} and U_{SS1}^{a}, where $a \in \{D, ND\}$; if State 2 uses a mixing-strategy, then State 1's payoff must be a convex function of its endpoints payoffs.

If State 2 holds a high posterior belief and fights after delay, the rising type State 1 would receive its lowest payoff from both actions, $\underline{U_{RS1}^{D}}$ or $\underline{U_{RS1}^{ND}}$. Since $\underline{U_{RS1}^{D}} = \underline{U_{RS1}^{ND}}$, if State 2's off-path belief is also high enough, the rising type State 1 will not deviate to a different pure strategy. The static type State 1 would receive its highest payoff from both actions, $\overline{U_{SS1}^{D}}$ or $\overline{U_{SS1}^{ND}}$. Since $\overline{U_{SS1}^{D}} = \overline{U_{SS1}^{ND}}$, if State 2's off-path belief is also high enough, the static type State 1 will not deviate to a different pure strategy as well. Thus, to both types of State 1, whichever the action they choose, there always exists off-path beliefs that ensure they will receive the same payoff after deviation. By Lemma A.1, this implies when $r > r^*$, there exists pure-strategy PBE where State 2 fights after both types of delay.

If State 2 holds a low posterior belief and waits after delay, the static type State 1 would receive its lowest payoff of both actions, $\underline{U_{SS1}^{D}}$ or $\underline{U_{SS1}^{ND}}$. By previous analysis, $\underline{U_{SS1}^{D}} < \underline{U_{SS1}^{ND}} < \overline{U_{SS1}^{D}} = \overline{U_{SS1}^{ND}}$. Assuming the static type State 1 chooses Delay, there does not exists off-path beliefs that ensure it will receive a weakly lower payoff after deviation, because any off-path belief yields a strictly higher payoff. Thus, the static type State 1 strictly prefers Not Delay. Then the rising type State 1 receives $\overline{U_{RS1}^{ND}}$. Since $\underline{U_{RS1}^{D}} < \overline{U_{RS1}^{ND}} < \overline{U_{RS1}^{D}}$, and there exists off-path beliefs that ensure it will receive the same payoff after deviation to Delay. This implies that when $r < r^*$, there only exists pure-strategy PBE where State 2 waits after exogenous delay.

If State 2 is indifferent and mixes fighting and waiting after delay. Denote State 2's probability of fighting after intentional delay as κ_{ID} and the counterpart after exogenous delay as κ_{ED}. By Lemma A.2, the rising type State 1 would receive $\kappa_{ID}\underline{U^D_{RS1}} + (1-\kappa_{ID})\overline{U^D_{RS1}}$ from the action Delay and $\kappa_{ED}\underline{U^{ND}_{RS1}} + (1-\kappa_{ED})\overline{U^{ND}_{RS1}}$ from the action Not Delay; the static type State 1 would receive $\kappa_{ID}\overline{U^D_{SS1}} + (1-\kappa_{ID})\underline{U^D_{SS1}}$ from the action Delay and $\kappa_{ED}\overline{U^{ND}_{SS1}} + (1-\kappa_{ED})\underline{U^{ND}_{SS1}}$ from the action Not Delay. A pure-strategy profile constitutes an equilibrium if and only if both types of State 1 have no incentive to deviate, which requires that $\forall \kappa_{ID}$ there must exist off-path belief that makes κ_{ED} sequentially rational such that

$$\kappa_{ID}w_1 + (1-\kappa_{ID})[(1-\delta)q + \delta w^i_1] = \kappa_{ED}w_1 + (1-\kappa_{ED})[(1-\alpha)w_1 + \alpha((1-\delta)q + \delta w^i_1)]$$

where $w^i_1 = w'_1$ for the rising type State 1 and $w^i_1 = w_1$ for the static type State 1, and vice versa. Solving for the equation yields

$$[(1-\kappa_{ED})\alpha - (1-\kappa_{ID})]w_1 = [(1-\kappa_{ED})\alpha - (1-\kappa_{ID})][(1-\delta)q + \delta w^i_1]$$

which holds if and only if $\frac{1-\kappa_{ID}}{1-\kappa_{ED}} = \alpha$. Thus, there exists pure-strategy PBE when $r = r^*$ where State 2 mixes fight and waiting after delay.

Consider the potential separating equilibrium. Given the strategy profile, State 2's posterior belief $\mu_{R|D} = 1$, thus State 2 is certain about whether State 1 is the rising type after either type of delay. State 2 will wait after the delay caused by the static type State 1 and fight after the delay caused by the rising type State 1. The rising type State 1 receives its lowest payoff of both action, $\underline{U^D_{RS1}}$ or $\underline{U^{ND}_{RS1}}$, but it would receive $\overline{U^D_{RS1}}$ or $\overline{U^{ND}_{RS1}}$ after deviation to a different pure strategy. Since $\overline{U^a_{RS1}} > \underline{U^a_{RS1}}$, this implies that there does not exist pure-strategy PBE where State 1 uses a separating strategy.

I second investigate the Perfect Bayesian equilibrium where one type of State 1 uses a mixing-strategy. Suppose the rising type State 1 uses a mixing-strategy while the static type State 1 uses a pure strategy. By Lemma A.1, State 2 fights after the delay caused only by the rising type State 1 because its posterior belief is one. The rising type State 1 will be indifferent and uses a mixing-strategy if and only if it receives the same payoff from both actions. By Lemma A.2, this can hold if and only if $U^D_{RS1} = U^{ND}_{RS1} = w_1$, which implies State 2 must fight after both types of delay. State 2's strategy after the delay caused by both types of State 1 depends on its posterior belief $\mu_{R|D}$ which is derived via Bayes rule. It is easy to verify that $\mu_{R|D} < r \ \forall r \in [0,1]$, thus $\exists \ \bar{r} > r^*$ such that $\mu_{R|D} > r^* \ \forall r > \bar{r}$. State 2 fights both types of delay when $r > \bar{r}$, then the static type State 1 receives $\overline{U^D_{SS1}} = \overline{U^{ND}_{SS1}} = w_1$ from both action and thus has no incentive to deviate. This implies there exists a PBE when $r > \bar{r} > r^*$ where State 2 fights after both types of delay.

Suppose the static type State 1 uses a mixing-strategy while the rising type State 1 uses a pure strategy. By Lemma 1, State 2 waits after the delay caused only by the static type State 1 because its posterior belief is zero. The static type State 1 will be indifferent and uses a mixing-strategy if and only if it receives the same payoff from both actions. By Lemma 2, this can hold if and only if $U^{ND}_{SS1} = \underline{U^{ND}_{SS1}} = \kappa_{ID}\overline{U^D_{SS1}} + (1-\kappa_{ID})\underline{U^D_{SS1}}$, which implies State 2 must wait after exogenous delay and use a mixing-strategy after intentional delay, so the rising type State 1 must choose the action Delay. State 2's posterior belief after intentional delay $\mu_{R|D}$ is derived via Bayes rule. It is easy to verify that $\mu_{R|D} > r \ \forall r \in [0,1]$, thus $\exists\ \underline{r} < r^*$ such that $\mu_{R|D} > r^* \ \forall r > \underline{r}$. State 2 is indifferent after intentional delay when $r = \underline{r}$. The rising type State 1 receives $U^D_{RS1} = \kappa_{ID}\underline{U^D_{RS1}} + (1-\kappa_{ID})\overline{U^D_{RS1}}$, and would receive $U^{ND}_{RS1} = \overline{U^{ND}_{RS1}}$ after deviation. The rising type State 1 has no incentive to deviate if and only if $\kappa_{ID} = 1 - \alpha$. This implies there exists PBE when $r = \underline{r} < r^*$ where State 2 waits after exogenous delay and fights probabilistically after intentional delay.

I third investigate the Perfect Bayesian equilibrium where both types of State 1 use a mixing-strategy. Both types of State 1 are indifferent if and only if they receive the same payoff from both actions. By Lemma 2, the static type State 1 is indifferent between Delay and Not Delay if $U^{ND}_{SS1} = \kappa_{ED}\overline{U^{ND}_{SS1}} + (1-\kappa_{ED})\underline{U^{ND}_{SS1}}$, $U^D_{SS1} = \kappa_{ID}\overline{U^D_{SS1}} + (1-\kappa_{ID})\underline{U^D_{SS1}}$, and $U^{ND}_{SS1} = U^D_{SS1}$, noting $\overline{U^D_{SS1}} = \overline{U^{ND}_{SS1}}$ and $\underline{U^{ND}_{SS1}} > \underline{U^D_{SS1}}$.

If $\kappa_{RD} = \kappa_{ED} = 1$, then $U^{ND}_{SS1} = U^D_{SS1}$ holds, which implies State 2 fights after both types of delay. The rising type State 1 receives $\underline{U^{ND}_{RS1}} = \underline{U^D_{RS1}} = w_1$, thus is also indifferent between Delay and Not Delay. State 2's posterior beliefs must satisfy $\mu_{R|ID} > r^*$ and $\mu_{R|ED} > r^*$. Solving for the prior belief, $\mu_{R|ID} > r^*$ iff $r > r'$, $\mu_{R|ED} > r^*$ iff $r > r''$, thus $r > \max\{r', r''\}$. It is easy to verify that regardless of the mixing-strategy used by State 1, $\max\{r', r''\} > r^*$. Thus, there exists a PBE when $r > r^*$ where State 2 fights after both types of delay.

If $\kappa_{ID} < 1$ and $\kappa_{ED} < 1$, then $U^{ND}_{SS1} = U^D_{SS1}$ holds if and only if $\frac{1-\kappa_{ID}}{1-\kappa_{ED}} = \alpha$, which also renders $U^D_{RS1} = U^{ND}_{RS1}$, thus both types of State 1 are indifferent and use a mixing-strategy. Noting $\frac{1-\kappa_{ID}}{1-\kappa_{ED}} = \alpha$ holds only if $\kappa_{ID} > 0$. State 2' posterior beliefs must satisfy $\mu_{R|ID} = r^*$ and $\mu_{R|ED} \leq r^*$. It is easy to verify that $\mu_{R|ID} = \mu_{R|ED} = r^*$ when $r = r^*$ and both types of State 1 mix at the same probability, $\mu_{R|ED} < \mu_{R|ID} = r^*$ when $r = r' < r^* < r''$ and the rising type State 1 mixes Delay at a higher probability than the static type State 1. Thus there exists PBE when $r \leq r^*$ where State 2 mixes fighting and waiting after both types of delay.

This completes the proof. □

Now, I prove the Proposition 1 and Proposition 2.

Proposition 1. *Assume that State 2 always observes the source of delay. If* $r > r^* = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)}$*, then in all equilibria, State 2 fights after both types of delay.*

Proof. Proposition 1 naturally follows the results of pure-strategy and mixing-strategy equilibria in Lemma A.3. In all types of equilibria of the baseline model, State 2 fights after both type of delay if its posterior belief $\mu_{R|D}$ is greater than r^*. $r > r^*$ is the sufficient condition for $\mu_{R|D} > r^*$. □

Proposition 2. *Assume that State 2 always observes the source of delay. If* $r < r^* = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)}$*, then all equilibria are equivalent in outcome distribution to the equilibrium behavior below:*

- *Both the rising and the static type of State 1 choose the action Not Delay.*
- *State 2 fights after the intentional delay at probability* $1-\alpha$*, and waits after the exogenous delay.*

Proof. Proposition 2 naturally follows the results of previous lemmas. In all types of equilibria of the baseline model, if its posterior belief $\mu_{R|D}$ is equal to or lower than r^*, State 2 fights after exogenous delay at a weakly positive probability $\kappa_{ED} \geq 0$, and must fight after intentional delay at a strictly positive probability $\kappa_{ID} > 0$ in order for both types of State 1 to not deviate. In equilibrium, κ_{ED} and κ_{ID} must equate both type State 1's payoff from the action Not Delay and the action Delay, and satisfy $\frac{1-\kappa_{ID}}{1-\kappa_{ED}} = \alpha$. □

A.2 Proofs of Proposition 3, 4 & 5

All lemmas and propositions in this section are geared towards proving Proposition 3, 4 and 5. I build on proofs of the previous section, adding the distinction that the sources of delay are indistinguishable. I demonstrate that the main finding is that if State 2's prior belief is lower than a threshold $r_* < r^*$, State 2 can wait after delay in the equilibrium, thus the rising type State 1 can achieve a complete and peaceful power rise; if State 2's prior belief is higher than r_*, State 2 always fight after delay in all equilibria, thus no power shift would occur on the path of play.

In the previous scenario where State 2 can distinguish the sources of delay, there does not exist a separating equilibrium where two types of State 1 choose different actions because State 2 is certain about whether State 1 is a rising type after delay, $\mu_{R|D} = 1$. In contrast, I show when State 2 can not distinguish the sources of delay, there exists a separating equilibrium where the rising type State 1 chooses the action Delay and the static type State

1 chooses the action Not Delay because uncertainty about the reasons for delay decreases State 2's posterior belief about facing a rising type State 1 after delay, $\mu_{R|D} < 1$.

Lemma A.4. *When State 2 can not distinguish the sources of delay, there exists a separating equilibrium in which:*

- *The rising type State 1 chooses the action Delay; the static type State 1 chooses the action Not Delay*
- *State 2's posterior belief $\mu_{R|D} = \frac{r}{r+(1-r)\alpha}$ is derived via Bayes rule, State 2 fights after delay if $\mu_{R|D} < r^*$, and waits after delay if $\mu_{R|D} > r^*$, and mixes fighting and waiting if $\mu_{R|D} = r^*$.*

Proof. Now, State 2 can not differentiate the type of delay, its posterior belief $\mu_{R|D}$ is derived via Bayes rule given the strategy profile. Suppose the rising type State 1 chooses the action Delay, and the static type State 1 chooses the action Not Delay. State 2's posterior belief after delay $\mu_{R|D} = \frac{r}{r+(1-r)\alpha} < 1$. It is easy to verify that $\mu_{R|D} > r \; \forall r \in [0,1]$, thus $\exists \; r_* < r^*$ such that $\mu_{R|D} > r^* \; \forall r > r_*$.

If $r > r_*$, by Lemma A.1, State 2 fights after delay. Then the static type State 1 receives $\overline{U_{SS1}^{ND}} = \overline{U_{SS1}^{D}}$, thus has no incentive to deviate; the rising type State 1 receives $\underline{U_{RS1}^{D}} = \underline{U_{RS1}^{ND}}$, thus has no incentive to deviate as well. This implies that when $r > r_*$, there exists a presumed separating equilibrium where State 2 fights after delay.

If $r \leq r_*$, by Lemma A.1, State 2 waits after delay with a positive probability. Denote the probability that State 2 waits after delay as $0 < 1-\kappa_D \leq 1$. To the rising type State 1, it would receive $\kappa_D \underline{U_{RS1}^{D}} + (1-\kappa_D)\overline{U_{RS1}^{D}}$ from the action Delay and $\kappa_D \underline{U_{RS1}^{ND}} + (1-\kappa_D)\overline{U_{RS1}^{ND}}$ from the action Not Delay; Since $\underline{U_{RS1}^{D}} = \underline{U_{RS1}^{ND}}$ and $\overline{U_{RS1}^{D}} > \overline{U_{RS1}^{ND}}$, the rising type State 1 strictly prefers the action Delay. To the static type State 1, it would receive $\kappa_D \overline{U_{SS1}^{D}} + (1-\kappa_D)\underline{U_{SS1}^{D}}$ from the action Delay and $\kappa_D \overline{U_{SS1}^{ND}} + (1-\kappa_D)\underline{U_{SS1}^{ND}}$ from the action Not Delay; since $\overline{U_{SS1}^{D}} = \overline{U_{SS1}^{ND}}$ and $\underline{U_{SS1}^{ND}} > \underline{U_{SS1}^{D}}$, the static type State 1 strictly prefers the action Not Delay. Thus, when State 2 imposes a positive probability of waiting after delay, neither type of State 1 will deviate from the presumed strategy. This implies that when $r \leq r_*$, there exists a presumed separating equilibrium where State 2 either waits or mixes waiting and fighting after delay.

Specifically, denote State 2's posterior belief in this pure-strategy separating equilibrium as $\overline{\mu_{R|D}}$. It will be clear in the following analysis that $\overline{\mu_{R|D}}$ is the highest posterior belief that State 2 can hold in any equilibrium of the game. □

Then I check the rest equilibria of the game, and find that State 2 fights after delay as long as its prior belief is greater than r_*.

Lemma A.5. *Denote State 2's prior belief that State 1 is a rising type as r, in all Perfect Bayesian equilibria of the game:*

- *If $r < r_*$, State 2 waits after delay (unknown sources)*
- *If $r > r_*$, State 2 fights after delay (unknown sources)*

Proof. Lemma A.4 implies the results of Lemma A.5. I prove that Lemma A.5 is not violated in all other equilibria of the game. Again, I prove by considering three general types of equilibrium: (1) the pure-strategy equilibrium; (2) the semi-pooling equilibrium where one type of State 1 uses a mixing-strategy; (3) the full-mixing equilibrium where both types of State 1 use a mixing-strategy.

I first investigate the Perfect Bayesian equilibrium where State 1 uses a pure strategy. Consider the potential pooling equilibrium. State 2's posterior belief $\mu_{R|D}$ after delay remains to be its prior belief r. Regardless of the action State 1 chooses on the path, either type of State 1 will deviate if it always receives a strictly higher payoff after deviation. The difference here is that State 2 can not differentiate between two types of delay, thus can not hold any off-path belief.

If State 2 holds a high posterior belief $\mu_{R|D} = r > r^*$ and fights after delay, the rising type State 1 would receive its lowest payoff from both actions, $\underline{U^D_{RS1}}$ and $\underline{U^{ND}_{RS1}}$; the static type State 1 would receive its highest payoff from both actions, $\overline{U^D_{SS1}}$and $\overline{U^{ND}_{SS1}}$. Since $\underline{U^D_{RS1}} = \underline{U^{ND}_{RS1}}$ and $\overline{U^D_{SS1}} = \overline{U^{ND}_{SS1}}$, by the same analysis as in Lemma A.3, both types of State 1 would receive the same off after deviation, thus have no incentive to deviate to a different action. By Lemma A.1, this implies that when $r > r^*$, there exists pooling PBE where State 2 fights after delay.

If State 2 holds a posterior belief $\mu_{R|D} = r \leq r^*$. By Lemma A.1, State 2 waits after delay with a positive probability. Denote the probability that State 2 poses on waiting as $0 < 1 - \kappa_D \leq 1$. By the analysis in Lemma A.4, two types of State 1 prefer different actions when State 2 imposes a positive probability of waiting after delay. This implies that when $r \leq r^*$, there does not exist a pooling equilibrium in which both types of State 1 choose the same action.

Consider the potential separating equilibrium in which the rising type State 1 chooses the action Not Delay, and the static type State 1 chooses the action Delay. Now, State 2 can not differentiate the type of delay, its posterior belief $\mu_{R|D}$ is derived via Bayes rule given the strategy profile. State 2's posterior belief after delay is $\mu_{R|D} = \frac{r\alpha}{r\alpha+1-r} < 1$. It is easy to verify that $\mu_{R|D} < r \ \forall r \in [0, 1]$, thus $\exists \ r' > r^*$ such that $\mu_{R|D} > r^* \ \forall r > r'$.

If $r > r'$, by Lemma A.1, State 2 fights after delay. Then the static type State 1 receives $\overline{U^D_{SS1}} = \overline{U^{ND}_{SS1}}$, thus has no incentive to deviate; the rising type State 1 receives $\underline{U^{ND}_{RS1}} = \underline{U^D_{RS1}}$, thus has no incentive to deviate as well. This implies that when $r > r'$, there exists a presumed separating equilibrium where State 2 fights after delay.

If $r \leq r'$, by Lemma A.1, State 2 waits after delay with a positive probability. Denote the probability that State 2 waits after delay as $0 < 1 - \kappa_D \leq 1$. By the analysis in Lemma A.4, when State 2 imposes a positive probability of waiting after delay, the rising type State 1 strictly prefers the action Delay; the static type State 1 strictly prefers the action Not Delay. This implies that when $r \leq r^{'}$, there does not exist a presumed separating equilibrium where the rising type State 1 chooses the action Not Delay and the static type State 1 chooses the action Delay.

I second investigate the Perfect Bayesian equilibrium where one type of State 1 uses a mixing-strategy. Suppose the rising type State 1 uses a mixing-strategy while the static type State 1 uses a pure strategy. Denote the probability that the rising type State 1 chooses the action Delay as $d > 0$. State 2's posterior belief $\mu_{R|D}$ is derived via Bayes rule given the strategy profile. By Lemma 1, State 2 fights after delay if $\mu_{R|D} > r^{*}$, and solve for the prior belief sufficient to trigger fighting after delay, denoting as $\hat{r} > 0$. Regardless of the pure strategy of the static type State 1, it is easy to verify that $\mu_{R|D} < \overline{\mu_{R|D}}\ \forall r[0,1],\ \forall d \in (0,1)$, which indicates that $\hat{r} > r_{*}$.

If $r > \hat{r}$, by Lemma A.1, State 2 fights after delay. Then the rising type State 1 receives $\underline{U^{D}_{RS1}} = \underline{U^{ND}_{RS1}} = w_1$, thus it is indifferent between the action Delay and the action Not Delay and has no incentive to deviate from the prescribed strategy. The static type State 1 receives $\overline{U^{ND}_{SS1}} = \overline{U^{D}_{SS1}} = w_1$, thus will has no incentive to deviate as well. This implies that when $r > \hat{r} > r_{*}$, there exists a presumed PBE where State 2 fights after delay.

If $r \leq \hat{r}$, by Lemma A.1, State 2 waits after delay with a positive probability. Denote the probability that State 2 waits after delay as $0 < 1 - \kappa_D \leq 1$. By the analysis in Lemma 4, when State 2 imposes a positive probability of waiting after delay, the rising type State 1 strictly prefers the action Delay, thus the rising type State 1 will deviate to the pure strategy of Delay and not use a mixing-strategy. This implies that when $r \leq \hat{r}$, there does not exist a PBE where the rising type State 1 uses a mixing-strategy.

Suppose the rising type State 1 uses a pure-strategy while the static type State 1 uses a mixing-strategy. Denote the probability that the static type State 1 chooses the action Not Delay as $s > 0$. State 2's posterior belief $\mu_{R|D}$ is derived via Bayes rule given the strategy profile. By Lemma A.1, State 2 fights after delay if $\mu_{R|D} > r^{*}$, and solve for the prior belief sufficient to trigger fighting after delay, denoting as $\tilde{r} > 0$. Regardless of the pure strategy of the rising type State 1, it is easy to verify that $\mu_{R|D} < \overline{\mu_{R|D}}\ \forall r \in [0,1],\ \forall s \in (0,1)$, which indicates that $\tilde{r} > r_{*}$.

If $r > \tilde{r}$, by Lemma A.1, State 2 fights after delay. Then the rising type State 1 receives $\underline{U^{ND}_{RS1}} = \underline{U^{D}_{RS1}} = w_1$, thus it has no incentive to deviate from the prescribed strategy. The static type State 1 receives $\overline{U^{D}_{SS1}} = \overline{U^{ND}_{SS1}} = w_1$, thus it is indifferent between the action Delay and the action Not Delay and has no incentive to deviate from the prescribed strategy as well. This implies that when $r > \tilde{r}$, there exists a presumed PBE where State 2 fights after delay.

If $r \leq \tilde{r}$, by Lemma A.1, State 2 waits after delay with a positive probability. Denote the probability that State 2 waits after delay as $0 < 1 - \kappa_D \leq 1$. By the analysis in Lemma A.4, when State 2 imposes a positive probability of waiting after delay, the static type State 1 strictly prefers the action Not Delay, thus the static type State 1 will deviate to the pure strategy of Not Delay and not use a mixing-strategy. This implies that when $r \leq \tilde{r}$, there does not exist a PBE where the static type State 1 uses a mixing-strategy.

I third investigate the Perfect Bayesian equilibrium where both types of State 1 use a mixing-strategy. Denote the probability that the rising type State 1 chooses the action Delay as $d > 0$, and the counterpart of the static type State 1 as $s > 0$. State 2's posterior belief is derived via Bayes rule, $\mu_{R|D} = \frac{rd+r(1-d)\alpha}{rd+r(1-d)\alpha+(1-r)s+(1-r)(1-s)\alpha}$. By Lemma A.1, State 2 fights after delay if $\mu_{R|D} > r^*$, and solve for the prior belief sufficient to trigger fighting after delay, denoting as $r_{s,d}$. It is easy to verify that $\mu_{R|D} < \overline{U_{R|D}}$ $\forall r \in [0,1]$, $\forall s, d \in (0,1)$, which indicates that $r_{s,d} > r_*$.

If $r > r_{s,d}$, by Lemma A.1, State 2 fights after delay. Then the rising type State 1 receives $\underline{U_{RS1}^{ND}} = \underline{U_{RS1}^{D}} = w_1$, thus it is indifferent between the action Delay and the action Not Delay and has no incentive to deviate from the prescribed strategy. The static type State 1 receives $\overline{U_{SS1}^{D}} = \overline{U_{SS1}^{ND}} = w_1$, thus it is indifferent between the action Delay and the action Not Delay and has no incentive to deviate from the prescribed strategy as well. This implies that when $r > r_{s,d}$, there exists a presumed PBE where State 2 fights after delay.

If $r \leq r_{s,d}$, by Lemma A.1, State 2 waits after delay with a positive probability. Denote the probability that State 2 waits after delay as $0 < 1 - \kappa_D \leq 1$. By the analysis in Lemma A.4, when State 2 imposes a positive probability of waiting after delay, the static type State 1 strictly prefers the action Not Delay, thus the static type State 1 will deviate to the pure strategy of Not Delay and not use a mixing-strategy; the rising type State 1 strictly prefers the action Delay, thus the rising type State 1 will deviate to the pure strategy of Delay and not use a mixing-strategy. This implies that when $r \leq r_{s,d}$, there does not exist a PBE where both types of State 1 use a mixing-strategy.

This completes the proof. □

Now, I prove Proposition 3 and Proposition 4.

Proposition 3. *Assume that State 2 cannot observe the source of delay. If* $r < r_* = \frac{\alpha[1-w_2-q-\delta(w_1-q)]}{\delta(w_1'-q)-(1-w_2-q)+\alpha[1-w_2-q-\delta(w_1-q)]}$, *the rising type of State 1 could achieve a power rise peacefully and completely in a unique Perfect Bayesian equilibrium in which:*

- *The rising type of State 1 chooses to delay the bargaining, the static type of State 1 chooses not to delay the bargaining.*

- *State 2 waits after delay with unknown sources.*

Proof. Proposition 3 naturally follows from the results of Lemma A.4. Given the strategy profile that the rising type State 1 chooses the action Delay, the static type State 1 chooses the action Not Delay, State 2's posterior belief $\mu_{R|D}$ is derived via Bayes rule. Solve for

$$\mu_{R|D} \equiv \frac{r}{r+(1-r)\alpha} = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)} \equiv r^*$$

yields $r = \frac{\alpha[1-w_2-q-\delta(w_1-q)]}{\delta(w_1'-q)-(1-w_2-q)+\alpha[1-w_2-q-\delta(w_1-q)]} \equiv r_*$. It is easy to verify that $r_* < r^*$ $\forall r \in [0,1]$. Thus, when $r > r_*$, State 2 fights after delay; when $r < r_*$, State 2 waits after delay and the rising type State 1 can achieve a complete and peaceful power rise by choosing the action Delay; when $r = r_*$, State 2 is indifferent and uses a mixing-strategy after delay. □

Proposition 4. *If $r > r_*$, then in all equilibria, State 2 fights after delay with unknown sources.*

Proof. Proposition 4 naturally follows from the results of Lemma A.5. By previous analysis, there is a unique equilibrium when $r < r_*$, that is the Peaceful Power Shift equilibrium described in Proposition 3. When $r > r_*$, there are multiple equilibria all featuring State 2 fights after delay with unknown sources. □

Then, I summarize the probability of war and the probability of peaceful power shift in the baseline model and the main model.

Lemma A.6. *When the sources of delay are distinguishable:*

- *When $r < r^*$, the lowest probability of war is 0, and the highest probability of peaceful power shift is $r\alpha$.*

Proof. From Lemma A.3, there are multiple equilibria when $r < r^*$ and State 2 waits after exogenous delay. Those include when (1) both types of State 1 pool on the action Not Delay, (2) the rising type State 1 chooses the action Delay at a higher probability than the static type State 1 does. In all those equilibria, State 2 must fight at a positive probability after intentional delay.

In the equilibrium of (1), State 2 waits after exogenous delay and fights at probability $1-\alpha$ off-path after intentional delay. The probability of war on the path of play is thus zero. The power shift occurs peacefully only if State 1 is the rising type and Nature causes exogenous delay, its probability on the path of play is thus $r\alpha$.

In the equilibrium of (2), there must be a positive probability of war on the path of play since State 2 will fight at probability $1-\alpha$ after intentional delay, and the probability of peaceful power shift is less than $r\alpha$ since the rising type State 1 encounters some risk of preventive war after intentional delay.

It is easy to verify that the pooling equilibrium Pareto Dominates the mixing equilibrium. Thus, in the Pareto Dominant sense, we expect the equilibrium (1) on occur, which yields the lowest probability of war—0, and the highest probability of peaceful power shift—$r\alpha$. This completes the proof. □

Lemma A.7. *When the sources of delay are indistinguishable:*

- *When $r < r_*$, the probability of war is 0, and the probability of peaceful power shift is r.*
- *When $r_* < r < r^*$, the probability of war is $1 - (1-\alpha)[(1-r) + r(1-d)]$, and the probability of peaceful power shift is 0.*

Proof. From Lemma A.4 and Lemma A.5, there is a unique Perfect Bayesian equilibrium when $r < r_*$: the rising type State 1 chooses the action Delay and the static type State 1 chooses the action Not Delay, and State 2 waits after delay, so the rising type State 1 can achieve a peaceful power rise with certainty. The probability of war on the path of play is 0, and the probability of peaceful power shift on the path of play is r.

When $r_* < r < r^*$, there are multiple equilibria. Those include (1) the separating equilibrium, (2) the mixing equilibria where either type or both types of State 1 use a mixing-strategy. In all those equilibria, State 2 fights after delay with unknown sources.

The probability of peaceful power shift is 0 on the path of play in any equilibrium aforementioned, this is because State 2 fights after delay. So there is no chance for the rising type State 1 to complete its power rise.

The probability of war must be positive on the path of play in any equilibrium aforementioned, this is because State 2 fights after delay. War does not occur only when State 1 chooses the action Not Delay and Nature does not cause exogenous delay.

It is easy to verify that the Pareto Dominant equilibrium across (1) and (2) is the equilibrium in which the rising type State 1 mixes the action Delay and the action Not Delay, the static type State 1 chooses the action Not Delay. Thus, in the Pareto Dominant sense, we expect the probability of war is $1-(1-\alpha)[(1-r)+r(1-d)]$ where d represents the probability that the rising type State 1 chooses the action Delay. This completes the proof. □

Now, I prove Proposition 5

Proposition 5. *Adding uncertainty over the sources of delay*

- *When $r < r_*$: weakly decreases the probability of war while increases the probability of peaceful power shifts .*

- *When $r_* < r < r^*$: increases the probability of war while decreases the probability of peaceful power shifts .*

Proof. Proposition 5 naturally follows from Lemma A.6 and Lemma A.7. Compare the effect of adding uncertainty about reasons for delay subject to $r < r_*$, the probability of war weakly decreases while the probability of peaceful power shifts strictly increase. The probability of war remains the same, which is 0, after adding uncertainty about reasons for delay only if we focus on the Pareto Dominant equilibrium. However, the probability of war strictly decreases after adding uncertainty about reasons for delay in other non-Pareto Dominant equilibria that involves a positive probability of war on the path of play. The probability of peaceful power shifts strictly increases after adding uncertainty about reasons for delay even if we focus on the Pareto Dominant equilibrium which yields the highest possible chance of peaceful power shift before adding uncertainty about reasons for delay.

Compare the effect of adding uncertainty about reasons for delay subject to $r_* < r < r^*$, the probability of war strictly increases while the probability of peaceful power shifts strictly decrease. The probability of peaceful power shifts must be positive in equilibrium before adding uncertainty about reasons for delay because State 2 waits after exogenous delay and fights after intentional delay probabilistically, but the probability of peaceful power shifts is 0 in equilibrium after adding uncertainty about reasons for delay because State 2 fights after delay. The probability of war is 0 in the Pareto Dominant equilibrium before adding uncertainty about reasons for delay, but that probability becomes positive in the Pareto Dominant equilibrium after adding uncertainty about reasons for delay. In other non-Pareto Dominant equilibria, the impact on the probability of war is equilibrium-specific and dependent upon the strategy profile. □

A.3 Proofs of the Infinite Horizon Model

I construct a separating equilibrium in which the rising type State 1 chooses to delay, the static type State 1 chooses not to delay, State 2 adopts a cut–off strategy that she fights upon delay if its belief about State 1 being a rising type is above a threshold, she waits upon delay if its belief about State 1 being a rising type is below a threshold.

Denote State 2's posterior belief upon observing delay in period t as μ'_t, and State 2's posterior belief upon observing no power shift at the beginning of period $t+1$ as μ_{t+1}, and State 2's belief upon observing delay in period $t+1$ as μ'_{t+1}. The equilibrium by construction requires I prove that there exists a $\bar{\mu} < 1$ such that State 2 fights upon delay if $\mu'_t > \bar{\mu}$, State 2 waits upon delay if $\mu'_t < \bar{\mu}$, and State 2 is indifferent between fight and wait if $\mu'_t = \bar{\mu}$. Assuming that State 2's prior belief r is sufficiently low, the following Lemma shows the condition under which State 2's posterior belief would evolve upward—$\mu'_{t+1} > \mu'_t$.

Lemma A.8. *If $\alpha + \gamma < 1$, then State 2's belief about State 1 being a rising type upon observing delay increases with every period.*

Proof: At the beginning of period $t+1$, upon observing no power shift, State 2's posterior belief about State 1 being a rising type is $\mu_{t+1} = \frac{\mu'_t(1-\gamma)}{\mu'_t(1-\gamma)+1-\mu'_t}$. Upon observing a delay in $t+1$, State 2's posterior belief is $\mu'_{t+1} = \frac{\mu_{t+1}}{\mu_{t+1}+(1-\mu_{t+1})\alpha}$. Let $\mu'_{t+1} > \mu'_t$, then

$$\mu'_{t+1} = \frac{\mu_{t+1}}{\mu_{t+1} + (1-\mu_{t+1})\alpha} = \frac{\mu'_t}{\mu'_t + \frac{(1-\mu'_t)\alpha}{1-\gamma}} > \mu'_t \to 1-\gamma-\alpha > \mu'_t(1-\gamma-\alpha)$$

Since $\mu'_t < 1$, it implies that $1-\gamma-\alpha > 0 \to \gamma+\alpha < 1$.

If $\mu'_{t+1} < \mu'_t$, it implies that $1-\gamma-\alpha < 0 \to \gamma+\alpha > 1$.

If $\mu'_{t+1} = \mu'_t$, it implies that $1-\gamma-\alpha = 0 \to \gamma+\alpha = 1$.

From now on, I assume that $\gamma+\alpha < 1$, such that State 2's belief about State 1 upon observing delay increases with every period.

Assumption 2. *a) $\alpha < 1-\gamma$, in each period the probability of observing exogenous delay is less than the probability of observing no power shift, b) $q < w_1$, the status quo payoff for State 1 is less than its reservation payoff of bargaining without power shift.*

To find $\bar{\mu}$, it suffices to find a period t in which State 2 is indifferent between fight and wait at belief μ'_t, assuming that in period $t+1$ State 2 would fight upon delay with belief $\mu'_{t+1} > \mu'_t$. The following Lemma shows the condition under which there exists a valid $\bar{\mu} < 1$ that makes State 2 indifferent between fight and wait in period t.

Lemma A.9. *If $w'_1 > 1 - w_2 + \frac{(1-\delta)(1-w_2-q)}{\delta\gamma} = \overline{w_1}$, there exists a threshold of Sate 2's belief $\bar{\mu}$, such that State 2 is indifferent between fight and wait in period t if $\bar{\mu} = \mu'_t$.*

Proof: At period t, define State 2's continuation payoff of wait

$$\begin{aligned} V_2^t &= (1-\delta)(1-q) + \delta[\mu'_t\gamma(1-w'_1) + (1-\mu'_t\gamma)((1-\mu_{t+1})(1-\alpha)(1-w_1) + ((1-\mu_{t+1})\alpha + \mu_{t+1})w_2)] \\ &= (1-\delta)(1-q) + \delta\mu'_t\gamma(1-w'_1) + \delta(1-\mu'_t\gamma)[\frac{(1-\mu'_t)(1-\alpha)}{\mu'_t(1-\gamma)+1-\mu'_t}(1-w_1) + \frac{(1-\mu'_t)\alpha + \mu'_t(1-\gamma)}{\mu'_t(1-\gamma)+1-\mu'_t}w_2] \end{aligned}$$

Let $V_2^t = w_2$, then

$$\mu'_t = \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-w_2)}{\delta(1-\alpha)(1-w_1-w_2)-\delta\gamma(1-w'_1-w_2)} \equiv \bar{\mu}$$

$\bar{\mu}$ is a valid probability if

$$1 - w_2 - q - \delta(w_1 - q) - \delta\alpha(1 - w_1 - w_2) < \delta(1-\alpha)(1 - w_1 - w_2) - \delta\gamma(1 - w_1' - w_2)$$
$$1 - w_2 + \frac{(1-\delta)(1 - w_2 - q)}{\delta\gamma} < w_1' \equiv \overline{w_1}$$

Assumption 3. $w_1' > \overline{w_1} = 1 - w_2 + \frac{(1-\delta)(1-w_2-q)}{\delta\gamma}$*, the power rise of rising type State 1 is sufficiently large, ensuring that* $\bar{\mu}$ *is a valid probability.*

The constructed equilibrium implies that if $\mu_t' = \bar{\mu} < \mu_{t+1}'$, then State 2 is indifferent between fight and wait in period t, and State 2 will fight in period $t+1$. The following Lemma shows that State 2 would fight upon delay in any period t with $\mu_t' > \bar{\mu}$.

Lemma A.10. *In period t with* $\mu_t' > \bar{\mu}$*, State 2 would fight upon delay in bargaining with State 1.*

Proof: Define State 2's continuation payoff of waiting upon delay in period t

$$V_2^t = (1-\delta)(1-q) + \delta\mu_t'\gamma(1-w_1') + \delta(1-\mu_t'\gamma)[\frac{(1-\mu_t')(1-\alpha)}{\mu_t'(1-\gamma)+1-\mu_t'}(1-w_1) + \frac{(1-\mu_t')\alpha + \mu_t'(1-\gamma)}{\mu_t'(1-\gamma)+1-\mu_t'}w_2]$$

State 2's continuation payoff of fighting upon delay in period t is w_2. Let $V_2^t < w_2$, then

$$\mu_t' > \frac{1 - w_2 - q - \delta(w_1 - q) - \delta\alpha(1 - w_1 - w_2)}{\delta(1-\alpha)(1 - w_1 - w_2) - \delta\gamma(1 - w_1' - w_2)} = \bar{\mu}$$

which is consistent with the assumption. Since fight is state–absorbing, it concludes that State 2 will fight in any period t such that $\mu_t' > \bar{\mu}$.

The next Lemma shows that State 2 would wait upon delay in any period t with $\mu_t' < \bar{\mu}$.

Lemma A.11. *In period t with* $\mu_t' < \bar{\mu}$*, State 2 would wait upon delay in bargaining with State 1.*

Proof: I first show that State 2 would wait upon delay in period t if $\mu_t' < \bar{\mu} < \mu_{t+1}'$. Define State 2's continuation payoff of waiting in period t

$$V_2^t = (1-\delta)(1-q) + \delta\mu_t'\gamma(1-w_1') + \delta(1-\mu_t'\gamma)[\frac{(1-\mu_t')(1-\alpha)}{\mu_t'(1-\gamma)+1-\mu_t'}(1-w_1) + \frac{(1-\mu_t')\alpha + \mu_t'(1-\gamma)}{\mu_t'(1-\gamma)+1-\mu_t'}w_2]$$

Let $V_2^t > w_2$, then

$$\mu_t' < \frac{1 - w_2 - q - \delta(w_1 - q) - \delta\alpha(1 - w_1 - w_2)}{\delta(1-\alpha)(1 - w_1 - w_2) - \delta\gamma(1 - w_1' - w_2)} = \bar{\mu}$$

which is consistent with the assumption. Thus, State 2 would wait upon delay in period t if $\mu'_t < \bar{\mu} < \mu'_{t+1}$.

I second prove that State 2 would wait upon delay in any period t such that $\mu'_t < \bar{\mu}$. Consider period $t-1$ such that $\mu'_{t-1} < \mu'_t < \bar{\mu} < \mu'_{t+1}$. Define State 2's continuation payoff of waiting in period $t-1$

$$V_2^{t-1} = (1-\delta)(1-q) + \delta\mu'_{t-1}\gamma(1-w'_1) + \delta(1-\mu'_{t-1}\gamma)[\frac{(1-\mu'_{t-1})(1-\alpha)}{\mu'_{t-1}(1-\gamma)+1-\mu'_{t-1}}(1-w_1) + \frac{(1-\mu'_{t-1})\alpha + \mu'_{t-1}(1-\gamma)}{\mu'_{t-1}(1-\gamma)+1-\mu'_{t-1}}V_2^t]$$

Let $V_2^{t-1} > w_2$, then

$$\mu'_{t-1} < \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-V_2^t)}{\delta(1-\alpha)(1-w_1-V_2^t)-\delta\gamma(1-w'_1-V_2^t)} = G(V_2^t)$$

Define

$$G(V_2) = \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-V_2)}{\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)}$$

$V_2^t \geq w_2$ from previous analysis, the numerator is increasing in V_2^t, and its minimum at $V_2^t = w_2$ is greater than zero. It is sufficient to show that $G(V_2)$ is increasing in V_2. Take the FOC of $G(V_2)$ w.r.t V_2

$$\begin{aligned}
G'(V_2) &= \frac{\alpha\delta[\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)] + \delta(1-\alpha-\gamma)[1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-V_2)]}{[\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)]^2} \\
&= \frac{\alpha\delta[\delta(1-\alpha)(1-w_1)-\delta(1-\alpha-\gamma)V_2-\delta\gamma(1-w'_1)] + \delta(1-\alpha-\gamma)[1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1)+\delta\alpha V_2]}{[\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)]^2} \\
&= \frac{\alpha\delta[\delta(1-\alpha)(1-w_1)-\delta\gamma(1-w'_1)] + \delta(1-\alpha-\gamma)[1-w_2-q-\delta(w_1-q)] - \delta(1-\alpha-\gamma)\delta\alpha(1-w_1)}{[\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)]^2} \\
&= \frac{\alpha\delta(1-\alpha)\delta(1-w_1)-\delta\alpha\delta\gamma(1-w'_1)-\delta(1-\alpha)\delta\alpha(1-w_1)+\delta\gamma\delta\alpha(1-w_1)+\delta(1-\alpha-\gamma)[1-w_2-q-\delta(w_1-q)]}{[\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)]^2} \\
&= \frac{\delta\alpha\delta\gamma(w'_1-w_1)+\delta(1-\alpha-\gamma)[1-w_2-q-\delta(w_1-q)]}{[\delta(1-\alpha)(1-w_1-V_2)-\delta\gamma(1-w'_1-V_2)]^2} > 0
\end{aligned}$$

So $G(V_2^t) > G(w_2) = \bar{\mu}$. Given $\mu'_{t-1} < \mu_t < \bar{\mu} < G(V_2^t)$, $V_2^{t-1} > w_2$ obviously holds. Thus, State 2 would wait upon delay in period $t-1$ when $\mu'_{t-1} < \mu'_t < \bar{\mu} < \mu'_{t+1}$.

Then, I use the method of induction to prove that State 2 would wait in any k period prior to period t with $\mu'_t \leq \bar{\mu}$.

Suppose that State 2 would wait upon delay in $t-k$, $t-k+1$, ..., t, and fight in period $t+1$, I prove that State 2 would wait upon delay in period $t-k-1$. State 2's continuation payoff of waiting at $t-k-1$ is $V_2^{t-k-1} =$

$$(1-\delta)(1-q)+\delta\mu'_{t-k-1}\gamma(1-w'_1)+\delta(1-\mu'_{t-k-1}\gamma)[\frac{(1-\mu'_{t-k-1})(1-\alpha)}{\mu'_{t-k-1}(1-\gamma)+1-\mu'_{t-k-1}}(1-w_1)+\frac{(1-\mu'_{t-k-1})\alpha+\mu'_{t-k-1}(1-\gamma)}{\mu'_{t-k-1}(1-\gamma)+1-\mu'_{t-k-1}}V_2^{t-k}]$$

State 2's continuation payoff of fighting at $t-k-1$ is w_2. Let $V_2^{t-k-1} > w_2$, then

$$\mu'_{t-k-1} < \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-V_2^{t-k})}{\delta(1-\alpha)(1-w_1-V_2^{t-k})-\delta\gamma(1-w'_1-V_2^{t-k})} = G(V_2^{t-k})$$

since assuming State 2 would wait upon delay in all k periods prior t, it implies that $V_2^{t-k} \geq w_2$. Thus, $G(V_2^{t-k}) > \bar{\mu} = G(w_2)$, and $\mu'_{t-k-1} < \bar{\mu} < G(V_2^{t-k})$ obviously holds, State 2 would wait upon delay in period $t-k-1$. Since k is arbitrary, this completes the proof that State 2 would wait upon delay in any period prior t with $\mu'_t \leq \bar{\mu}$.

Given State 2 using a cut–off strategy, I proceed by showing that the rising type State 1 and the static type State 1 have no incentive to deviate from the separating strategy. The following Lemma shows that both types of State 1 have no incentive to deviate from the prescribed separating strategy in any period t with $\mu'_t > \bar{\mu}$.

Lemma A.12. *In any period t with $\mu'_t > \bar{\mu}$, the rising type State 1 has no incentive to deviate to not to delay, and the static type State 1 has no incentive to deviate to delay.*

Proof: From previous analysis, State 2 would fight in period t. The rising type State 1 receives $V^t_{R1,D} = w_1$ when choosing to delay, and would receive $V^t_{R1,ND} = (1-\alpha)w_1 + \alpha w_1$ if deviates to not to delay. The rising type State 1 has no incentive to deviate if and only if

$$V^t_{R1,D} \geq V^t_{R1,ND} \to w_1 \geq w_1$$

which obviously holds. Thus, the rising type State 1 has no incentive to deviate to not to delay in any period t with $\mu'_t > \bar{\mu}$.

The static type State 1 receives $V^t_{S1,ND} = (1-\alpha)w_1 + \alpha w_1$ when choosing not to delay, and would receive $V^t_{S1.D} = w_1$ if deviates to delay. The static type State 1 has no incentive to deviate if and only if

$$V^t_{S1,ND} \geq V^t_{S1.D} \to w_1 \geq w_1$$

which obviously holds. Thus, the static type State 1 has no incentive to deviate to delay in any period t with $\mu'_t > \bar{\mu}$.

This completes the proof that both types of State 1 have no incentive to deviate from the separating strategy in any period t with $\mu'_t > \bar{\mu}$.

The following Lemma shows that both types of State 1 have no incentive to deviate from the prescribed separating strategy in any period t with $\mu'_t < \bar{\mu}$.

Lemma A.13. *In any period t with $\mu'_t < \bar{\mu}$, the rising type State 1 has no incentive to deviate to not to delay, and the static type State 1 has no incentive to deviate to delay.*

Proof: I first show that both types of State 1 have no incentive to deviate in period t with $\mu'_t \leq \bar{\mu} < \mu'_{t+1}$. From previous analysis, State 2 would wait upon delay in period t and fight upon delay in period $t+1$. The rising type State 1 receives $V^t_{R1,D} = (1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)w_1]$ when choosing to delay, and would receive $V^t_{R1,ND} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta(\gamma w'_1 + (1-\gamma)w_1)]$

if deviates to not to delay. The rising type State 1 has no incentive to deviate if and only if

$$\begin{aligned}
(1-\delta)q+\delta[\gamma w_1'+(1-\gamma)w_1] &\geq (1-\alpha)w_1+\alpha[(1-\delta)q+\delta(\gamma w_1'+(1-\gamma)w_1)] \\
(1-\delta)q+\delta[\gamma w_1'+(1-\gamma)w_1] &\geq w_1 \\
w_1' &\geq w_1+\frac{(1-\delta)(w_1-q)}{\delta\gamma}
\end{aligned}$$

which obviously holds under Assumption 2 that $w_1' > \overline{w_1} = 1-w_2+\frac{(1-\delta)(1-w_2-q)}{\delta\gamma}$. Thus, the rising type State 1 has no incentive to deviate.

The static type State 1 receives $V^t_{S1,ND} = (1-\alpha)w_1+\alpha[(1-\delta)q+\delta((1-\alpha)w_1+\alpha w_1)]$ when choosing not to delay, and would receive $V^t_{S1,D} = (1-\delta)q+\delta w_1$ if deviates to delay. The static type State 1 has no incentive to deviate if and only if

$$\begin{aligned}
(1-\alpha)w_1+\alpha[(1-\delta)q+\delta((1-\alpha)w_1+\alpha w_1)] &\geq (1-\delta)q+\delta w_1 \\
w_1 &\geq (1-\delta)q+\delta w_1 \\
w_1 &\geq q
\end{aligned}$$

which obviously holds under the Assumption 1. Thus, the static type State 1 has no incentive to deviate.

I second show that both types of State 1 have no incentive to deviate in period $t-1$ with $\mu'_{t-1} < \mu'_t \leq \bar{\mu} < \mu'_{t+1}$. From previous analysis, State 2 should wait upon delay in period $t-1$ and t, and fight upon delay in period $t+1$. The rising type State 1 receives $V^{t-1}_{R1,D} = (1-\delta)q+\delta[\gamma w_1'+(1-\gamma)((1-\delta)q+\delta(\gamma w_1'+(1-\gamma)w_1))]$ when choosing to delay, equivalently

$$V^{t-1}_{R1,D} = (1-\delta)q+\delta[\gamma w_1'+(1-\gamma)V^t_{R1,D}]$$

and would receive $V^{t-1}_{R1,ND} = (1-\alpha)w_1+\alpha[(1-\delta)q+\delta(\gamma w_1'+(1-\gamma)((1-\alpha)w_1+\alpha((1-\delta)q+\delta(\gamma w_1'+(1-\gamma)w_1))))]$ if deviates to not to delay, equivalently

$$V^{t-1}_{R1,ND} = (1-\alpha)w_1+\alpha[(1-\delta)q+\delta(\gamma w_1'+(1-\gamma)V^t_{R1,ND})]$$

The rising type State 1 has no incentive to deviate if and only if

$$(1-\delta)q+\delta[\gamma w_1'+(1-\gamma)V^t_{R1,D}] \geq (1-\alpha)w_1+\alpha[(1-\delta)q+\delta(\gamma w_1'+(1-\gamma)V^t_{R1,ND})]$$

$V^t_{R1,ND} \leq V^t_{R1,D}$ from previous analysis. It is sufficient to show that

$$(1-\delta)q+\delta[\gamma w_1'+(1-\gamma)V^t_{R1,D}] \geq w_1$$

$V^t_{R1,D} = (1-\delta)q + \delta(\gamma w'_1 + (1-\gamma)w_1) > w_1$ under Assumption 2 that $w'_1 > \overline{w_1}$. The function $F(V_{R1,D}) = (1-\delta)q + \delta(\gamma w'_1 + (1-\gamma)V_{R1,D})$ is increasing in $V_{R1,D}$ for $V_{R1,D} \geq w_1$. It is obvious that $F(V_{R1,D} = V^t_{R1,D}) > F(V_{R1,D} = w_1) > w_1$. Thus, the rising type State 1 has no incentive to deviate.

The static type State 1 receives $V^{t-1}_{S1,ND} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta((1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1))]$ when choosing not to delay, equivalently

$$V^{t-1}_{S1,ND} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta V^t_{S1,ND}]$$

and would receive $V^{t-1}_{S1,D} = (1-\delta)q + \delta[(1-\delta)q + \delta w_1]$ if deviates to delay, equivalently

$$V^{t-1}_{S1,D} = (1-\delta)q + \delta V^t_{S1,D}$$

The static type State 1 has no incentive to deviate if

$$(1-\alpha)w_1 + \alpha[(1-\delta)q + \delta V^t_{S1,ND}] \geq (1-\delta)q + \delta V^t_{S1,D}$$

$V^t_{S1,ND} \geq V^t_{S1,D}$ from previous analysis, it is sufficient to show that

$$(1-\delta)q + \delta V^t_{S1,D} \leq w_1$$

which obviously holds given $V^t_{S1,D} \leq w_1$ from previous analysis. Thus, the static type State 1 has no incentive to deviate.

Lastly, I use the method of induction to prove that both types of State 1 have no incentive to deviate in any k period prior to period t with $\mu'_t \leq \bar{\mu}$.

Suppose that both types of State 1 don't deviate in $t-k$, $t-k+1$, ..., t, I prove that both types of State 1 don't deviate in period $t-k-1$. The rising type State 1 receives $V^{t-k-1}_{R1,D} = (1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)V^{t-k}_{R1,D}]$ when choosing to delay in period $t-k-1$, and would receive $V^{t-k-1}_{R1,ND} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta(\gamma w'_1 + (1-\gamma)V^{t-k}_{R1,ND})]$ if deviates to not to delay. The rising type State 1 has no incentive to deviate if and only if

$$(1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)V^{t-k}_{R1,D}] \geq (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta(\gamma w'_1 + (1-\gamma)V^{t-k}_{R1,ND})]$$

since assuming the rising type State 1 would choose to delay in all k periods prior to t, it implies that $V^{t-k}_{R1,D} \geq V^{t-k}_{R1,ND}$. It is sufficient to show that

$$(1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)V^{t-k}_{R1,D}] \geq w_1$$

since $V_{R1,D}^{t-1} \geq w_1$ from previous analysis, recursively we have $V_{R1,D}^{t-k} \geq w_1$. It is sufficient to show that the function $F(V_{R1,D}) = (1-\delta)q + \delta[\gamma w_1' + (1-\gamma)V_{R1,D}]$ is increasing in $V_{R1,D}$, which obviously holds. Then $F(V_{R1,D} = V_{R1,D}^{t-k}) > F(V_{R1,D} = w_1) \geq w_1$, which holds under the Assumption 2. Thus, the rising type State 1 has no incentive to deviate.

The static type State 1 receives $V_{S1,ND}^{t-k-1} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta V_{S1,ND}^{t-k}]$ when choosing not to delay, and would receive $V_{S1,D}^{t-k-1} = (1-\delta)q + \delta V_{S1,D}^{t-k}$ if deviates to delay. The static type State 1 has no incentive to deviate if

$$(1-\alpha)w_1 + \alpha[(1-\delta)q + \delta V_{S1,ND}^{t-k}] \geq (1-\delta)q + \delta V_{S1,D}^{t-k}$$

since assuming the static type State 1 would choose not to delay in all k periods prior to t, it implies that $V_{S1,ND}^{t-k} \geq V_{S1,D}^{t-k}$. It is sufficient to show that

$$w_1 \geq (1-\delta)q + \delta V_{S1,D}^{t-k}$$

since $V_{S1,D}^{t-1} \leq w_1$ from previous analysis, recursively we have $V_{S1,D}^{t-k} \leq w_1$, the inequality obviously holds. Thus, the static type State 1 has no incentive to deviate.

Since k is arbitrary, this completes the proof that both types of State 1 have no incentive to deviate in any period t with $\mu_t' \leq \bar{\mu}$.

Altogether, given State 2's strategy, both types of State 1 have no incentive to deviate from the separating strategy in any period t.

Now I can prove Proposition 6, which is formally stated in Proposition A.1.

Proposition A.1. *If $w_1' > \overline{w_1} = 1 - w_2 + \frac{(1-\delta)(1-w_2-q)}{\delta\gamma}$ and $\alpha + \gamma < 1$, then the following strategy profile constitutes a Markov Stationary Perfect equilibrium.*

- *The static type State 1 chooses not to delay in period t. If no delay occurs, the static type State 1 accepts any $x_t \geq w_1$ and rejects otherwise.*
- *If $\omega_t = \{0, \mu_t'\}$, the rising type State 1 chooses to delay in each period t. If $\omega_t = \{1, 1\}$, the rising type State 1 accepts any $x_t \geq w_1'$ and rejects otherwise.*
- *If $\omega_t = \{1, 1\}$, State 2 offers $x_t = w_1'$ to State 1. If $\omega_t = \{0, \mu_t'\}$, there exists a valid cut–off belief of State 2, $\bar{\mu} = \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-w_2)}{\delta(1-\alpha)(1-w_1-w_2)-\delta\gamma(1-w_1'-w_2)} < 1$, such that State 2 fights upon delay if $\mu_t' > \bar{\mu}$, and State 2 waits upon delay if $\mu_t' < \bar{\mu}$. If no delay occurs, State 2 offers $x_t = w_1$ to State 1.*

Proof: the uniqueness of strategies is implied by previous Lemmas, I proceed to show that no State has a profitable one–shot deviation from the prescribed strategy profile.

To begin, consider the case $R_t = 1$, that is, the rising type State 1 has achieved a power rise at the beginning of period t. I first show that the rising type State 1 couldn't profitably deviate to reject $x_t = w'_1$, and second show that State 2 couldn't profitably deviate from offering $x_t = w'_1$ in every period t with $R_t = 1$.

Fixing State 2's strategy of offering $x_t = w'_1$, the rising type State 1 would receive the continuation payoff $V_{R1} = w'_1$. Then, consider a one–shot deviation of the rising type State 1 to reject $x_t = w'_1$, he would receive the continuation payoff $V'_{R1} = w'_1$. Comparing this to the continuation payoff of accepting $x_t = w'_1$, the rising type State 1 doesn't have a profitable one–shot deviation if and only if $V_{R1} \geq V'_{R1} \to w'_1 \geq w'_1$, which obviously holds. Thus, the rising type State 1 will accept $x_t = w'_1$ in every period t where $R_t = 1$.

Fixing the rising type State 1's strategy of accepting $x_t = w'_1$, State 2 would receive the continuation payoff $V_2 = 1 - w'_1$. First, consider a one–shot deviation of State 2 to offer $x_t < w'_1$. In response to such a deviation, the rising type State 1 would reject, and State 2 would receive the continuation payoff $V'_2 = w'_2$. Comparing this to the continuation payoff of offering $x_t = w'_1$ which would be accepted by the rising type State 1, State 2 doesn't have a profitable one–shot deviation if and only if $V_2 \geq V'_2 \to 1 - w'_1 \geq w'_2$, which obviously holds. Thus, State 2 will not deviate to offer $x_t < w'_1$. Second, consider a one–shot deviation of State 2 to offer $x_t > w'_1$. In response to such a deviation, the rising type State 1 will accept. Such a one–shot deviation is obviously not profitable since State 2 could receive a higher per–period payoff by offering $x_t = w'_1$ that will also be accepted by the rising type State 1.

Then, consider the case $R_t = 0$ and no delay occurs. Given the separating strategy, State 2 is certain about State 1 being a static type. I first show that the static type State 1 couldn't profitably deviate to reject $x_t = w_1$, and second show that State 2 couldn't profitably deviate from offering $x_t = w_1$ in every period t where $R_t = 0$ and no delay occurs.

Fixing State 2's strategy of offering $x_t = w_1$, the static type State 1 would receive the continuation payoff $V_{S1} = w_1$. Then, consider a one–shot deviation of the static type State 1 to reject $x_t = w_1$, he would receive the continuation payoff $V'_{S1} = w_1$. Comparing this to the continuation payoff of accepting $x_t = w_1$, the static type State 1 doesn't have a profitable one–shot deviation if and only if $V_{S1} \geq V'_{S1} - \to w_1 \geq w_1$, which obviously holds. Thus, the static type State 1 will accept $x_t = w_1$ in period t where no delay occurs.

Fixing the static type State 1's strategy of accepting $x_t = w_1$, State 2 would receive the continuation payoff $V_2 = 1 - w_1$. First, consider a one–shot deviation of State 2 to offer $x_t < w_1$. In response to such a deviation, the rising type State 1 would reject, and State 2 would receive the continuation payoff $V'_2 = w_2$. Comparing this to the continuation payoff of offering $x_t = w_1$ which would be accepted by the static type State 1, State 2 doesn't have a profitable one–shot deviation if and only if $V_2 \geq V'_2 \to 1 - w_1 \geq w_2$, which obviously holds. Thus, State 2 will not deviate to offer $x_t < w_1$. Second, consider a one–shot deviation of State 2 to offer $x_t > w_1$. In response to such a deviation, the static type State 1 will accept.

Such a one–shot deviation is obviously not profitable since State 2 could receive a higher per–period payoff by offering $x_t = w_1$ that will also be accepted by the static type State 1.

Finally, consider the case where $R_t = 0$ and delay occurs in period t. Denote State 2's belief about State 1 being a rising type upon observing delay in period t as μ'_t , and State 2's belief about State 1 being a rising type upon observing no power shift at the beginning of period t as μ_t. I first show that State 2 couldn't profitably deviate from fighting upon delay if $\mu'_t > \bar{\mu}$, and State 2 couldn't profitably deviate from waiting upon delay if $\mu'_t < \bar{\mu}$. I second show that both types of State 1 couldn't profitably deviate from the prescribed separating strategy.

First, consider a one–shot deviation of State 2 to wait upon delay in period t with $\mu'_t > \bar{\mu}$. State 2 would receive the continuation payoff

$$V'_2 = (1-\delta)(1-q)+\delta\mu'_t\gamma+\delta(1-\mu'_t\gamma)[\frac{(1-\mu'_t)(1-\alpha)}{\mu'_t(1-\gamma)+1-\mu'_t}(1-w_1)+\frac{(1-\mu'_t)\alpha+\mu'_t(1-\gamma)}{\mu'_t(1-\gamma)+1-\mu'_t}w_2]$$

Comparing this to the continuation payoff of fighting upon delay in period t, $V_2 = w_2$, State 2 doesn't have a profitable one–shot deviation if and only if

$$V'_2 \leq V_2 \rightarrow \mu'_t > \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-w_2)}{\delta(1-\alpha)(1-w_1-w_2)-\delta\gamma(1-w'_1-w_2)} = \bar{\mu}$$

which is consistent with the assumption. Thus, State 2 doesn't have a profitable one–shot deviation from fighting upon delay in any period t with $\mu'_t > \bar{\mu}$.

Next, consider a one–shot deviation of State 2 to fight upon delay in period t with $\mu'_t < \bar{\mu}$. State 2 would receive the continuation payoff $V'_2 = w_2$. Comparing this to the continuation payoff of waiting upon delay in period t

$$V_2 = (1-\delta)(1-q)+\delta\mu'_t\gamma+\delta(1-\mu'_t\gamma)[\frac{(1-\mu'_t)(1-\alpha)}{\mu'_t(1-\gamma)+1-\mu'_t}(1-w_1)+\frac{(1-\mu'_t)\alpha+\mu'_t(1-\gamma)}{\mu'_t(1-\gamma)+1-\mu'_t}V_2^{t+1}]$$

State 2 doesn't have a profitable one–shot deviation if and only if

$$V_2 \geq V'_2 \rightarrow \mu'_t \leq \frac{1-w_2-q-\delta(w_1-q)-\delta\alpha(1-w_1-V_2^{t+1})}{\delta(1-\alpha)(1-w_1-V_2^{t+1})-\delta\gamma(1-w'_1-V_2^{t+1})} \equiv G(V_2 = V_2^{t+1})$$

$V_2^{t+1} \geq w_2$ by assumption. From previous analysis, $G(V_2)$ is increasing in V_2, and $G(V_2 = w_2) = \bar{\mu}$, implying that $\mu'_t < \bar{\mu} = G(w_2) \leq G(V_2^{t+1})$ obviously holds. Thus, State 2 doesn't have a profitable one–shot deviation from waiting upon delay in any period t with $\mu'_t < \bar{\mu}$.

Then, I proceed by showing that both types of State 1 have no profitable one–shot deviation from the prescribed separating strategy.

First, consider a one–shot deviation of the rising type State 1 to choose not to delay in period t with $\mu'_t > \bar{\mu}$. From previous analysis, State 2 would fight upon delay in period t. The rising type State 1 would receive the continuation payoff

$$V'_{R1} = (1-\alpha)w_1 + \alpha w_1$$

Comparing this to the continuation payoff of choosing to delay in period t, $V_{R1} = w_1$, the rising type State 1 doesn't have a profitable one–shot deviation if and only if

$$V_{R1} \geq V'_{R1} \rightarrow w_1 \geq w_1$$

which obviously holds. Thus, the rising type State 1 doesn't have a profitable one–shot deviation from delaying in any period t with $\mu'_t > \bar{\mu}$.

Next, consider a one–shot deviation of the rising type State 1 to choose not to delay in period t with $\mu'_t < \bar{\mu}$. From previous analysis, State 2 would wait upon delay in period t. The rising type State 1 would receive the continuation payoff

$$V'_{R1} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta\gamma w'_1 + \delta(1-\gamma)V^{t+1}_{R1}]$$

Comparing this to the continuation payoff of choosing to delay in period t, $V_{R1} = (1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)V^{t+1}_{R1}]$, the rising type State 1 doesn't have a profitable one–shot if and only if

$$V_{R1} \geq V'_{R1} \rightarrow w_1 \leq (1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)V^{t+1}_{R1}]$$

$V^{t+1}_{R1} \geq w_1$ from recursive analysis since period t^* with $\mu'_{t^*} = \bar{\mu}$, thus $w_1 \leq (1-\delta)q + \delta[\gamma w'_1 + (1-\gamma)V^{t+1}_{R1}]$ obviously holds under the assumption $w'_1 > \overline{w_1}$. Thus, the rising type State 1 doesn't have a profitable one–shot deviation from delaying in any period t with $\mu'_t < \bar{\mu}$.

Second, consider a one–shot deviation of the static type State 1 to choose to delay in period t with $\mu'_t > \bar{\mu}$. From previous analysis, State 2 would fight upon delay in period t. The static type State 1 would receive the continuation payoff $V'_{S1} = w_1$. Comparing this to the continuation payoff of choosing not to delay, $V_{S1} = (1-\alpha)w_1 + \alpha w_1$, the static type State 1 doesn't have a profitable one–shot deviation if and only if

$$V_{S1} \geq V'_{S1} \rightarrow w_1 \geq w_1$$

which obviously holds. Thus, the static type State 1 doesn't have a profitable one–shot deviation from not to delay in any period t with $\mu'_t > \bar{\mu}$.

Next, consider a one–shot deviation of the static type State 1 to choose to delay in period

t with $\mu'_t < \bar{\mu}$. From previous analysis, State 2 would wait upon delay in period t. The static type State 1 would receive the continuation payoff

$$V'_{S1} = (1-\delta)q + \delta V_{S1}^{t+1}$$

Comparing this to the continuation payoff of choosing not to delay in period t,

$$V_{S1} = (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta V_{S1}^{t+1}]$$

the static type State 1 doesn't have a profitable one–shot deviation if and only if

$$V_{S1} \geq V'_{S1} \rightarrow w_1 \geq (1-\delta)q + \delta V_{S1}^{t+1}$$

$V_{S1}^{t+1} \leq w_1$ from recursive analysis since period t^* with $\mu'_{t^*} = \bar{\mu}$, thus $w_1 \geq (1-\delta)q + \delta V_{S1}^{t+1}$ obviously holds under the assumption $w_1 > q$. Thus, the static type State 1 doesn't have a profitable one–shot deviation from not to delay in any period t with $\mu'_t < \bar{\mu}$.

This completes the proof that no State has a profitable one–shot deviation from the separating strategy profile.

A.4 Extension: Introducing Possible Power Shifts after No-Delay

All lemmas in this section are geared towards generalizing the propositions in the paper to the case where there is a possibility of power shifts $\beta > 0$ after no-delay. I prove equivalent results to the $\beta = 0$ case. I demonstrate that after introducing $\beta > 0$, the equilibrium distribution remains the same as $\beta = 0$ when the sources of delay are distinguishable; then I demonstrate that as long as β is upper bounded, then the equilibrium distribution remains the same as $\beta = 0$ when the sources of delay are indistinguishable. Thus, all findings in the paper still holds even with a positive probability of power shifts after no-delay.

A.4.1 Distinguishable Delays

After introducing a positive probability of power shifts after no-delay, State 2 faces a strategic tension in making a large offer that satisfies both types of State 1, or a small offer that only satisfies the rising type State 1 but irritates the static type State 1. The following lemma demonstrates that State 2's strategic calculation is dependent upon its prior belief r and the likelihood of power shifts after no-delay β.

Lemma A.14. *After no-delay in Period One:*

• *The static type State 1 accepts any* $x^1 \geq w_1$, *and rejects otherwise; the rising type State 1 accepts any* $x^1 \geq w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$, *and rejects otherwise.*

• *State 2 offers* $x_H = w_1$ *if* $r < r^*(\beta)$, *State 2 offers* $x_L = w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$ *if* $r > r^*(\beta)$.

Proof. I start by solving the equilibrium settlement in Period Two. In Period Two, the static type State 1 accepts any x^2 such that $x^2 \geq w_1$ and rejects otherwise; the rising type State 1 accepts any x^2 such that $x^2 \geq w_1'$ and rejects otherwise if has achieved its power rise; and accepts any x^2 such that $x^2 \geq w_1$ and rejects otherwise if has not achieved its power rise. In Period One, the static type State 1 accepts any x^1 such that $(1-\delta)x^1 + \delta w_1 \geq w_1$, implying $x^1 \geq w_1$; the rising type State 1 accepts any x^1 such that $(1-\delta)x^1 + \delta[\beta w_1' + (1-\beta)w_1] \geq w_1$, implying $x^1 \geq w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$.

Then I solve for the offer that State 2 is willing to make. State 2 if offers $x^1 = w_1$, both types of State 1 will accept, and State 2 receives the expected payoff

$$EU_2^{x_H^1} = (1-\delta)(1-w_1) + \delta[r\beta(1-w_1') + (1-r\beta)(1-w_1)] = 1 - w_1 - \delta r\beta(w_1' - w_1)$$

State 2 if offers $x^1 = w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$, the static type State 1 rejects but the rising type State 1 accepts, State 2 receives the expected payoff

$$EU_2^{x_L^1} = (1-r)w_2 + r[(1-\delta)(1-w_1+\frac{\delta\beta}{1-\delta}(w_1'-w_1)) + \delta(\beta(1-w_1') + (1-\beta)(1-w_1))] = (1-r)w_2 + r(1-w_1)$$

State 2 offers $x^1 = w_1$ if and only if

$$\begin{aligned} EU_2^{x_H^1} \geq EU_2^{x_L^1} &\rightarrow (1 - w_1 - w_2) \geq \delta r\beta(w_1' - w_1) \\ &\rightarrow r \leq \frac{1 - w_1 - w_2}{1 - w_1 - w_2 + \delta\beta(w_1' - w_1)} \equiv r^*(\beta) \end{aligned}$$

State 2 offers $x^1 = w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$ if and only if $r > r^*(\beta)$. It is easy to verify $r^*(\beta)$ decreases in β.

The threshold of State 2's posterior belief to trigger fighting after delay remains $\mu_{R|D} = \frac{1-w_2-q-\delta(w_1-q)}{\delta(w_1'-w_1)} \equiv r^*$. It is easy to verify that $r^* > r^*(\beta)$ if and only if $\beta^* < \beta < 1$; and $r^* < r^*(\beta)$ if and only if $0 < \beta < \beta^*$, where β^* equates r^* and $r^*(\beta)$

$$\beta^* = \frac{(1 - w_1 - w_2)[\delta(w_1' - w_1) - (1 - w_2 - q - \delta(w_1 - q))]}{\delta(w_1' - w_1)[1 - w_2 - q - \delta(w_1 - q)]}$$

It is easy to verify that $\beta^* < 1$ always. □

Then, I show that same as $\beta = 0$, the static type State 1 can secure w_1 after no-delay by rejecting x_L or accepting x_H. However, the rising type State 1 receives a higher payoff $w_1 + \delta\beta(w_1' - w_1)$ after no-delay if State 2 offers x_H in Period One.

Lemma A.15. *After introducing the positive probability of power shifts after no-delay:*

- *The static type State 1's payoff after no-delay is $U_{SS1}^{nd} = w_1$, and $U_{SS1}^{ND} \in [(1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1), w_1]$.*
- *The rising type State 1's payoff after no-delay is $U_{RS1}^{nd} \in \{w_1, w_1 + \delta\beta(w_1' - w_1)\}$. When $r < r^*(\beta)$, $U_{RS1}^{nd} = w_1 + \delta\beta(w_1' - w_1)$ and $U_{RS1}^{ND} \in [w_1 + (1-\alpha)\delta\beta(w_1' - w_1), (1-\alpha)(w_1 + \delta\beta(w_1' - w_1)) + \alpha((1-\delta)q + \delta w_1')]$; when $r > r^*(\beta)$, $U_{RS1}^{nd} = w_1$ and $U_{RS1}^{ND} \in [w_1, (1-\alpha)w_1 + \alpha((1-\delta)q + \delta w_1')]$.*
- *The rising type State 1's payoff from the action Delay is $U_{RS1}^{D} \in [w_1, (1-\delta)q + \delta w_1']$*

Proof. If State 2 offers $x^1 = w_1$ after no-delay, the static type State 1 accepts, and its payoff is w_1; if State 2 offers $x^1 = w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$ after no-delay, the static type State 1 rejects, and its payoff is w_1 by fighting. The static type State 1's payoff from the action Not Delay is derived as in Lemma A.2.

When $r < r^*(\beta)$, State 2 offers $x^1 = w_1$ after no-delay, and the rising type State 1 accepts in Period One, then in Period Two, there is probability β that it achieves its power rise. Thus, its payoff after no-delay is $w_1 + \delta\beta(w_1' - w_1)$. When $r > r^*(\beta)$, State 2 offers $x^1 = w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$ after no-delay, and the rising type State 1 still accepts in Period One, since this is the offer that makes it indifferent between fighting and accepting in Period One. Thus, its payoff after no-delay is w_1. The rising type State 1's payoff from the action Not Delay is derived as in Lemma A.2. □

Now, I investigate the equilibrium of the game when there is probability $\beta > 0$ that the rising type State 1 achieves its power rise. I demonstrate that adding this feature does not fundamentally change the equilibrium distribution of the game. It has two effects: first it eliminates some equilibria that used to hold when $\beta = 0$, second it increases the overall probability of war on the path of play since now there can be fighting after no-delay between State 2 and the static type State 1. Still, I show that there is preventive war equilibrium when $r > r^*$ and there is partial power shift equilibrium when $r < r^*$.

Lemma A.16. *When the sources of delay are distinguishable and regardless of the value of β:*

- *If $r > r^*$, there only exists preventive war equilibrium*
- *If $r < r^*$, there exists partial power shift equilibrium*

Proof. I extend the results of Lemma A.3, and show that the equilibrium distribution remains the same as the case $\beta = 0$. Following the same logic, I consider three general types of equilibrium: (1) the pure-strategy equilibrium, (2) the semi-pooling (separating) equilibrium where one type of State 1 uses a mixing-strategy, (3) the full-mixing equilibrium where both types of State 1 use a mixing-strategy.

First, consider the pure-strategy equilibrium where both types of State 1 pool on the same action. If $\mu_{R|D} = r > r^*$, State 2 fights after the delay caused by both types of State 1, so $U^d_{SS1} = U^d_{RS1} = w_1$. Following no-delay, State 2 offers either $x_H = w_1$ or $x_L = w_1 - \frac{\delta\beta}{1-\delta}(w_1' - w_1)$, depending on the value of $r^*(\beta)$. The rising type State 1 accepts both, but the static type State 1 rejects x_L. Thus, the static type State 1's payoff from its action space remains $U^a_{SS1} = w_1$; the rising type State 1's payoff from its action space is $U^a_{RS1} \in \{w_1, w_1 + (1-\alpha)\delta\beta(w_1' - w_1)\}$, where $a \in \{Not\ Delay,\ Delay\}$. Regardless of the pooling action, the static type State 1 has no incentive to deviate if the off-path beliefs are high enough to yield w_1; the rising type State 1 has no incentive to deviate if there exists off-path beliefs that yield a weakly lower payoff than its on-path payoff. By Lemma A.15, this holds independent of β if State 1 pool on the action Not Delay, also holds when $r^{'} > \max\{r^*, r^*(\beta)\}$ if State 1 pool on the action Delay. Thus, this implies that when $r > r^*$, independent of β, there still exists preventive war equilibrium where State 2 fights after both types of delay, with the caution that there maybe fighting after no-delay between State 2 and the static type State 1.

If $\mu_{R|D} = r < r^*$, State 2 waits after the delay caused by both types of State 1, so $U^d_{SS1} = (1-\delta)q + \delta w_1$ and $U^d_{RS1} = (1-\delta)q + \delta w_1'$. Following no-delay, State 2 offers either x_H or x_L, depending on the value of $r^*(\beta)$, so $U^{nd}_{SS1} = w_1$ and $U^{nd}_{RS1} \in \{w_1, w_1 + \delta\beta(w_1' - w_1)\}$. The static type State 1's payoff from its action space is $U^a_{SS1} \in \{(1-\delta)q + \delta w_1, (1-\alpha)w_1 + \alpha[(1-\delta)q + \delta w_1]\}$. Same as $\beta = 0$, the static type State 1 strictly prefers the action Not Delay. Then assuming the rising type State 1 also chooses the action Not Delay, its payoff is $U^{ND}_{RS1} \in \{(1-\alpha)w_1 + \alpha[(1-\delta)q + \delta w_1'], (1-\alpha)[w_1 + \delta\beta(w_1' - w_1)] + \alpha[(1-\delta)q + \delta w_1']\}$. The rising type State 1 will not deviate if there exists off-path beliefs that yield a weakly lower payoff than U^{ND}_{RS1}. In the case $\beta = 0$, State 2 can use a mixing-strategy off-path that makes the rising type State 1 just indifferent. Now $\beta > 0$, the rising type State 1 is better-off on the path of Not Delay, so it has no incentive to deviate assuming State 2 uses the same strategy as $\beta = 0$. This implies that when $r < r^*$, independent of β, there still exists partial power shift equilibrium where State 2 waits after exogenous delay, with the caution that there maybe fighting after no-delay and the rising type State 1 has a higher probability of achieving its power rise—$r[\alpha + (1-\alpha)\beta]$.

If $\mu_{R|D} = r = r^*$, State 2 mixes fight and wait after the delay caused by both types of State 1. When $\beta = 0$, Lemma A.3 shows that there exists PBE where State 2 uses a mixing-strategy both on the path and off the path that makes both types of State 1 indifferent between Delay and Not Delay. When $\beta > 0$, that equilibrium still holds if both types of State 1 receive the same payoff as $\beta = 0$. This happens if r (r') $> r^*(\beta)$ and State 2 offers x_L after no-delay. Both types of State 1 still receive w_1 after no-delay, but there maybe fighting between State 2 and the static type State 1. If r $(r') < r^*(\beta)$, State 2 offers x_H, then the rising type State 1 is strictly better-off on the path of Not Delay, so it has no incentive to choose the action Delay. This implies that when r $(r') < r^*(\beta)$, β eliminates the equilibrium where both types of State 1 pool on the action Delay.

By the same logic, there does not exist any pure-strategy equilibrium where State 1 uses a separating strategy profile when $\beta > 0$.

Second, consider the semi-pooling equilibrium where one type of State 1 uses a mixing-strategy. Suppose the rising type State 1 uses a mixing-strategy, the static type State 1 uses a pure strategy. Then the rising type State 1 will reveal itself through its action, and it will receive w_1 after one type of delay. The rising type State 1 will use a mixing-strategy when it receives the same payoff from both actions, which requires State 2 to fight after both types of delay. Same as $\beta = 0$ in Lemma A.3, this implies that when $r > r^*$, there exists PBE where State 2 fights after both types of delay, independent of β, with the caution that there maybe fighting after no-delay if $r > r^*(\beta)$.

Suppose the rising type State 1 uses a pure-strategy, the static type State 1 uses a mixing-strategy. The static type State 1 will reveal itself through its action, and it would receive $U^d_{SS1} = (1-\delta)q + \delta w_1$ after one type of delay. The static type State 1 will use a mixing-strategy when it receives the same payoff from both actions. Same as $\beta = 0$ in Lemma A.3, this can hold if and only if the rising type State 1 chooses the action Delay, and State 2 uses a mixing-strategy after intentional delay. However, now State 2 offers w_1 after no-delay, since $\beta > 0$, the rising type State 1 will no longer be indifferent and has incentive to deviate to the action Not Delay. Thus there does not exist such presumed PBE.

Third, consider the full-mixing equilibrium where both types of State 1 use a mixing-strategy. Both types of State 1 must receive the same payoff from both actions. Same as $\beta = 0$, there are two scenarios where this potentially holds. In the first scenario, State 2 fights after both types of delay and offers x_L after no-delay, which requires that $\mu_{R|ND} > r^*(\beta)$ and $r > r^*$. In the second scenario, State 2 waits after intentional delay at probability $1 - \kappa_{ID}$ and waits after exogenous delay at probability $1 - \kappa_{ED}$ such that $\frac{1-\kappa_{ID}}{1-\kappa_{ED}} = \alpha$ and offers x_L after no-delay, which requires that $\mu_{R|ND} > r^*(\beta)$ and $r \leq r^*$. There does not exist the full-mixing equilibrium if $\mu_{R|ND} < r^*(\beta)$.

In all, the existence of β improves the rising type State 1's chance of achieving power rise, but it also introduces potential fighting after no-delay. So the overall probability of war and the power shifts on the path of play increases. In addition, β eliminates some equilibria that used to hold in the case $\beta = 0$. However, the distribution of pure-strategy equilibrium ensures that regardless of the value of β, there is preventive war equilibrium when $r > r^*$ and partial power shift equilibrium when $r \leq r^*$. This completes the proof. $\square$

A.4.2 Indistinguishable Delays

When the sources of delay are indistinguishable, I prove that there still exists a separating equilibrium where the rising type State 1 chooses the action Delay, while the static type State 1 chooses the action Not Delay, and there is a peaceful and complete power shift. However, the peaceful power shift equilibrium is contingent on β not being too large.

Lemma A.17. *When $\beta < \bar{\beta}$, there exists a separating equilibrium in which:*

- *The rising type State 1 chooses the action Delay; the static type State 1 chooses the action Not Delay*
- *State 2's posterior belief $\mu_{R|D}$ is derived via Bayes rule, State 2 waits after delay if $r < r_*$ and mixes fighting and waiting after delay if $r = r_*$*

where $\bar{\beta} \equiv \frac{(1-\delta)q+\delta w_1' - w_1}{\delta(w_1' - w_1)}$, $\bar{\beta} < 1$ and $\beta^* < \bar{\beta}$ obviously.

Proof. Given the strategy profile, State 2's posterior belief is derived via Bayes rule $\mu_{R|D} = \frac{r}{r+(1-r)\alpha} < 1$. After no-delay, State 2 is certain that State 1 is the static type, thus offers $x_H = w_1$ after no-delay. By previous Lemma, State 2 fights after delay if $\mu_{R|D} > r^*$ and waits after delay if $\mu_{R|D} < r^*$. Solving for prior, we find the same threshold r_*.

If $r > r_*$, State 2 fights after delay. By previous analysis, the static type State 1 has no incentive to deviate. The rising type State 1 receives $\underline{U^D_{RS1}}$, but would receive $\underline{U^{ND}_{RS1}|x_H}$ if deviates to the action Not Delay. By Lemma A.15, $\underline{U^{ND}_{RS1}|x_H} > \underline{U^D_{RS1}}$. Thus, the rising type State 1 will deviate and there does not exist a presumed separating equilibrium where State 2 fight after delay.

If $r \leq r_*$, State 2 waits after delay with a positive probability. By previous analysis, the static type State 1 strictly prefers the action Not Delay, thus its has no incentive to deviate. The rising type State 1 receives $(1-\kappa_D)\overline{U^D_{RS1}} + \kappa_D \underline{U^D_{RS1}}$, and would receive $(1-\kappa_D)\overline{U^{ND}_{RS1}|x_H} + \kappa \underline{U^{ND}_{RS1}|x_H}$ if deviates to the action Not Delay. The rising type State 1 will not deviate iff $(1-\kappa_D)\overline{U^D_{RS1}} + \kappa_D \underline{U^D_{RS1}} \geq (1-\kappa_D)\overline{U^{ND}_{RS1}|x_H} + \kappa_D \underline{U^{ND}_{RS1}|x_H}$

$$\beta \leq \frac{(1-\kappa_D)[(1-\delta)q + \delta w_1' - w_1]}{\delta(w_1' - w_1)} \rightarrow \bar{\beta}_{\kappa_D = 0}$$

it is easy to verify that $\bar{\beta} < 1$ obviously. Thus, there exists a presumed separating equilibrium where State 2 waits after delay at a positive probability if $r \leq r_*$. Specifically when $r < r_*$, State 2 waits after delay, so there is a peaceful power shift equilibrium. $\square$

Then I check the rest equilibria of the game. I demonstrate that conditional on $\beta < \bar{\beta}$, there is either preventive war equilibrium or partial power shift equilibrium when $r > r_*$.

Lemma A.18. *When $\beta < \bar{\beta}$, in all Perfect Bayesian equilibria of the game:*

- *When $r \leq r_*$, State 2 waits after delay with a strictly positive probability*
- *When $r > r_*$, State 2 fights after delay with a weakly positive probability*

Proof. Lemma A.17 implies the first point of Lemma A.18. I prove that the second point of Lemma A.18 holds in all other equilibria of the game. When $\beta = 0$, the counterpart result in Lemma A.5 holds. When $\beta > 0$, from Lemma A.15, $\underline{U_{RS1}^{ND}|x_H} > \underline{U_{RS1}^{ND}|x_L}$ which implies, over the whole distribution of β, the action Not Delay becomes more attractive to the rising type State 1, but it does not change the static type State 1's payoff distribution. Thus, it is sufficient to check the rising type State 1's incentive compatibility.

First, consider the potential pooling equilibrium. If $\mu_{R|D} = r > r^*$ and State 2 fights after delay. Depending on the pooling action, the rising type State 1 either receives $\underline{U_{RS1}^{D}}$ or receives $\underline{U_{RS1}^{ND}} \in \{\underline{U_{RS1}^{ND}|x_L}, \underline{U_{RS1}^{ND}|x_H}\}$. Noting $\underline{U_{RS1}^{ND}|x_H} > \underline{U_{RS1}^{ND}|x_L} = \underline{U_{RS1}^{D}} = w_1$. If State 1 pool on the action Delay, the rising type State 1 has no incentive to deviate if off-path belief after no-delay $\mu_{R|ND}$ is sufficiently high such that State 2 offers x_L; if State 1 pool on the action Not Delay, the rising type State 1 has no incentive to deviate since it is weakly better-off on the path. This implies that when $r > r^*$, independent of β, there exists preventive war equilibrium where State 2 fights after delay.

If $\mu_{R|D} \leq r^*$ and State 2 waits after delay at the probability $0 < 1 - \kappa_D \leq 1$. By the previous analysis, the static type State 1 strictly prefers the action Not Delay when $1 - \kappa_D > 0$. Then assuming the rising type State 1 also chooses the action Not Delay, by previous analysis in Lemma A.5, it will deviates to the action Delay if State 2 offers x_L after no-delay. If State 2 offers x_H after no-delay, the rising type State 1 receives $\kappa_D \underline{U_{RS1}^{ND}|x_H} + (1 - \kappa_D)\overline{U_{RS1}^{ND}|x_H}$, and would receive $\kappa_D \underline{U_{RS1}^{D}} + (1 - \kappa_D)\overline{U_{RS1}^{D}}$ after deviation. By analysis in Lemma A.17, the rising type State 1 will not deviate if and only if $\beta \geq \frac{(1-\kappa_D)[(1-\delta)q+\delta w_1' - w_1]}{\delta(w_1' - w_1)}$. But since assuming $\beta < \bar{\beta}$, it must be the case $1 - \kappa_D < 1$. This implies that there only exists pooling equilibrium on the action Delay where State 2 mixes fighting and waiting after delay when $r = r^*$.

Consider the potential separating equilibrium where the rising type State 1 chooses the action Not Delay, the static type State 1 chooses the action Delay. Then State 2 offers x_L after no-delay. By previous analysis in Lemma A.5, both types of State 1 have no incentive to deviate only if State 2 fights after delay. Thus, there exists a presumed separating equilibrium only when $r > r' > r^*$ and State 2 fights after delay.

Second, consider the semi-pooling equilibrium where one type of State 1 uses a mixing-strategy. Suppose the rising type State 1 uses a mixing-strategy while the static type State

1 uses a pure-strategy. Denote State 2's posterior belief after delay and no-delay as $\mu_{R|D}$ and $\mu_{R|ND}$ respectively. If $\mu_{R|D} > r^*$ and State 2 fights after delay, by the analysis in Lemma A.5, both types of State 1 have no incentive to deviate if and only if State 2 offers x_L after no-delay, which requires $\mu_{R|ND} > r^*(\beta)$. This implies that when $r > \hat{r} > r_*$, there exists preventive war equilibrium if β is sufficiently high.

If $\mu_{R|D} \leq r^*$ and State 2 waits after delay at a positive probability $0 < 1 - \kappa_D \leq 1$. By previous analysis in Lemma A.5, the static type State 1 strictly prefers the action Not Delay. If State 2 offers x_L, the rising type State 1 will deviate to pure-strategy Delay. The rising type State 1 will not deviate from the mixing-strategy only if State 2 offers x_H, which requires $\beta = \frac{(1-\kappa_D)[(1-\delta)q+\delta w_1' - w_1]}{\delta(w_1' - w_1)}$ and $\mu_{R|ND} < r^*(\beta)$. This implies that when $r_* < r < \hat{r} < r^*$, there exists partial power shifts equilibrium if β is sufficiently low.

Suppose the rising type State 1 uses a pure-strategy while the static type State 1 uses a mixing-strategy. By the analysis in Lemma A.5, the static type State 1 will not deviate from a mixing-strategy if and only if it receives the same payoff from both actions, which occurs if and only if State 2 fights after delay. This reduces to the case $\mu_{R|D} > r^*$. If State 2 offers x_H after no-delay, the rising type State 1 strictly prefers the action Not Delay; if State 2 offers x_L after no-delay, the rising type State 1 is indifferent between the two actions. For the semi-pooling strategy profile to be an equilibrium, the rising type State 1 must choose the action Not Delay. It is easy to verify that $\mu_{R|D} > r^*$ implies $r > \tilde{r} > r^*$. This implies that when $r > r^*$, independent of β, there exists preventive war equilibrium where State 2 fights after delay.

Third, consider the full-mixing equilibrium where both types of State 1 use a mixing-strategy. Both types of State 1 will not deviate from the presumed mixing-strategy if and only if they receive the same payoff from both actions, which occurs only when State 2 fights after delay and offers x_L after no-delay. This requires $\mu_{R|D} > r^*$ and $\mu_{R|ND} > r^*(\beta)$. By previous analysis in Lemma A.5, this implies that when $r > r_{s,d} > r_*$, there exists preventive war equilibrium if β is sufficiently high; there does not exist preventive equilibrium otherwise.

As long as $\beta < \bar{\beta}$, over the probability space of r, State 2 waits after delay with a strictly positive probability when $r \leq r_*$, and fights after delay with a weakly positive probability when $r > r_*$. □

Now, I prove that as long as $0 < \beta < \bar{\beta}$, the pacifying effect of adding uncertainty about reasons for delay conditional on $r < r_*$ still holds

Proof. Using the results from Lemma A.16 and Lemma A.18, I show that the probability of war weakly decreases after adding uncertainty about the reasons for delay, and the probability of peaceful power shifts strictly increases after adding the uncertainty about reasons for delay.

When the sources of delay are distinguishable, from Lemma A.16, there are partial power shift equilibria when $r < r_*$, which features either State 2 waits after exogenous delay or mixes fighting and waiting after both types of delay. The probability of war in those equilibria is 0 when State 2 offers x_H after no-delay and is positive when State 2 offers x_L, and the highest probability of peaceful power shifts is $r[\alpha + (1-\alpha)\beta]$.

When the sources of delay are indistinguishable, from Lemma A.18, when $r < r_*$, there exists a unique PBE where State 2 waits after delay, and the rising type State 1 uses the pure-strategy of Delay and achieves its power rise with probability one. The probability of war in this unique equilibrium is 0, and the probability of peaceful power shifts is 1.

Compare the results from two scenarios, the probability of war weakly decreases after adding uncertainty about the reasons for delay, while the probability of peaceful power shifts strictly increases after adding uncertainty about the reasons for delay.

When $r_* < r < r^*$, there can be preventive war equilibrium after adding uncertainty about reasons for delay, while there only exists partial power shift equilibrium before adding uncertainty about reasons for delay. This implies that the probability of war increases while the probability of peaceful power shifts decreases after adding uncertainty about power shifts. This completes the proof. □