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The Effects of Internal and External Conflict on Democratization Incentives

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The Effects of Internal and External Conflict on

decisions by an autocratic elite to democratize. While there is a strong consensus that internal threats generate pressures to democratize, the effects of external threats on pressures to democratize may be less clear: recent work by Ticchi

in which the two contests in my model, external war and revolution, take a very simple form. Both revolutions and wars are winner-take-all events with explicit costs. Finally, the conflict functions' outcomes take a simple criteria: revolutions are won by the poor if and only if they have more resources in aggregate than the rich, wars are only won if and only if there is participation by both the rich and the poor.³

1.2.2 The Political Economy of Democratization

There is a long tradition of economic theories of democratization. For example, Lipset (1959) argued that democratization part of a development process which included increased economic growth and industrialization.

Recent theories have focused on inter-class conflict. Acemoglu and Robinson (2000), argue that elites use redistribution to prevent revolutions. Since de facto power, i.e. the ability to successfully revolt against the rich mount a revolution is a probabilistic event, the rich may not be able to credibly commit to future redistribution. This commitment problem can make the poor willing to revolt even as the rich redistributes. Revolutionary threats, in turn, force the rich to extend the franchise, in order to solve the commitment problem.

In contrast, some authors argue that franchise extension is the result of intralite interactions. Lizzeri and Persico (2004) develop a model in which gradual

1.2.3 The Political Economy of Military Conflict

A related strand of literature focuses on how political institutions inform decisions to go to war. Fearon (1995) proposes that in a conflict between two countries, private information with respect to the other's resolve can lead to escalating conflict. If backing down affects leaders domestically, there are stronger incentives to fight, once escalation has taken place. Since democracies have

are competing factions domestically, then the faction in power may invade a foreign country to gather resources to defeat its domestic opponent: if there is no credible way to ensure deterrence from the domestic challenge, war may be ensured. My model is similar, except that in the model, I place stronger restrictions on the leader's ability to fight a war. In particular, I explicitly assume that the war is costly and that support from the challenger, in my case the poor, is needed to succeed militarily. Furthermore, the poor rationally supports the war effort and bear some of its costs.

The paper is structured in the following way: Section 2 structures the model and presents the results. Section 3 discusses the implications of the model and links them to the related literature. Section 4 concludes.

2 Model

2.1 Agents

A proportion α

2.2.2 Revolutions (Internal Conflict)

bear a proportion $(1 - \alpha)$ of the costs of war, c , and join the war effort.
The war is won, and the game advances to node

$$1 - c > 1 - (1 - c)c$$

which may be reexpressed as:

$$\frac{1}{c} > 1 \quad (\text{RDC})$$

Let c define the minimum level of c under which revolt remains undesirable, then

$$= \begin{cases} 0 & \text{when } c \leq 1 \quad (\text{RD1}) \\ \frac{1}{c} & \text{when } 1 < c \leq 2 \quad (\text{RD2}) \\ \frac{1}{c} & \text{when } c > 2 \quad (\text{RD3}) \end{cases}$$

In order to see if revolt is feasible, we compare the afterwar resources of the rich to those of the poor.

Revolt is feasible in an afterwar period only if:

$$1 - (1 - c)c > c$$

which may be reexpressed as:

$$1 - (1 - c)c > c$$

Which can be reexpressed as:

$$\frac{s + c - 1}{c} \quad (\text{WJC})$$

Let τ denote the minimum value of τ under which the poor would join the war effort, then

$$= \begin{cases} 0 & \text{when } s \leq 1 - c \quad (\text{WJ1}) \\ \frac{s - c}{c} & \text{when } s > 1 - c \quad (\text{WJ2}) \end{cases} \quad 15$$

From combining these three conditions, the minimum level of τ required for the poor to join the war effort and not revolt after the war can be found.

2.4.4 Finding τ_{poor}

The rich require three conditions to be willing to preserve the autocracy when war has begun: they require to come up with a the lowest value of τ which ensures that a) the poor are willing to join the war effort and b) the poor will not revolt afterwards, in addition, they require the rents from autocracy to remain higher than the rents from democratizing.

Let $\tau_{\text{poor}}(s; c; \tau)$ denote the minimum value of τ which ensures war participation and no revolt.

Claim 1 When either $\tau \geq \frac{s - c}{c}$ or $\tau \geq \frac{1 - c}{c}$ then $\tau_{\text{poor}} = 0$ if $s \leq 1 - c$ and $\tau_{\text{poor}} = \frac{s - c}{c}$ otherwise.

Under these conditions, the poor do not pose a revolutionary threat to the rich. For that reason, it is only necessary to offer a value of τ sufficient to ensure war participation.

Claim 2 If $\tau \in [\frac{1 - c}{c}; \frac{s - c}{c}]$ and $s > 1 - c$ then $\tau_{\text{poor}} = 0$.

Under these conditions, the poor are willing to participate in war even if they bear all the costs. This allows the rich to select a value of $\tau_{\text{poor}} = 0$, under

Under these conditions, revolt is always feasible. The only way to prevent revolt is to make it undesirable by choosing a large value of τ . If $s < 1 - c$ then the rich must offer τ to prevent revolt. If $s \geq 1 - c$, τ is sufficiently high to make revolt undesirable.

Claim 5 When $\tau > \tau + c$, $\tau \in [-c; -c]$ and $s > 1 - c$, $\tau_{\text{poor}} = \frac{s-c}{c}$ if and only if $s < \frac{c}{c}$, otherwise, there is no value which prevents reform from taking place.

Under these conditions, revolt is always desirable. This means that revolt may only be prevented if the value of τ required to ensure war participation is sufficiently low, so as to ensure that revolt is unfeasible.

Claim 6 When $\tau + c < \tau < -c$ then there is no value of τ which may prevent revolt.

Here revolt is always feasible and desirable, as the value of τ is so high with respect to revolutionary costs that there is no way to make it undesirable. In addition, the aggregate resources of the rich are so little with respect to total resources that there is no way to prevent revolt from taking place.

From all these claims, we can construct the value of τ required to ensure both war participation and deterrence from revolt.

Proposition 1 (Acceptable Offers to the Poor) The value of $\tau_{\text{poor}}(s; c; \tau; \tau)$ takes the following values:

- I. $\tau_{\text{poor}}(s; c; \tau; \tau) = 0$: When $s \geq 1 - c$ and either
 - A) $\tau > -c$.
 - or B) $\tau > -c$.
- II. $\tau_{\text{poor}}(s; c; \tau; \tau) = \frac{s-c}{c}$: When either A) $s > 1 - c$ and either
 - A) $\tau > -c$
 - or B) $\tau > -c$
 - or C) $s < \frac{c}{c}$ and $\tau > -c$
 - or D) $s > 1 - c$ and $\tau < \tau + c$ and $\tau > -c$.
- III. $\tau_{\text{poor}}(s; c; \tau; \tau) = \frac{s-c}{c}$ When $\tau < \tau + c$ and $s < 1 - c$ and either
 - A) $\tau < -c$ and $\tau < s$.
 - or B) $\tau < -c$.
- IV. $\tau_{\text{poor}}(s; c; \tau; \tau) \geq f; g$: When $\tau > \tau + c$ and either
 - A) $\tau < -c$
 - or B) $\tau \in [-c; -c]$ and $s > -c$.

Now we must study whether at the minimum value of τ required to ensure both participation and deterrence from revolt by the poor, the rich prefers to preserve the autocracy than to democratize.

2.4.5 The Decision by the Rich to Preserve Autocracy

In times of war, the rich prefers to preserve the autocracy only if

$$\frac{b_{\text{poor}}c}{1-c} > 1 \quad (\text{AW})$$

and democratizes otherwise.

In times of peace, the rich knows that the poor revolt if and only if $\frac{b_{\text{poor}}c}{1-c} < 1$ and preserve the autocracy otherwise. Since the rich is better off under autocracy, the rich would democratize only if $\frac{b_{\text{poor}}c}{1-c} < 1$.

2.4.6 The Decision to Start a War

If revolt is imminent in times of peace, then the rich can preemptively start a war if that will lead to consolidation of power in a postwar period. The rich start a war if and only if in times of peace revolt is imminent and the payoffs from afterwar autocracy are greater than the payoffs of democracy in times of peace, that is:

The rich start a war if and only if $\frac{b_{\text{poor}}c}{1-c} > 1$ and

$$\frac{b_{\text{poor}}c}{1-c} > 1 \quad (\text{WAR})$$

Notice that inequality (WAR) makes inequality (AW) redundant.

Let us study how the different values of s , b_{poor} , and c determine the decisions of the rich to start wars, democratize and/or offer to share the costs of war:

First we focus on the cases where $b_{\text{poor}} = 0$.

Clearly, since $b_{\text{poor}} = 0$, $\frac{b_{\text{poor}}c}{1-c} > 1 > 1 - c$, so AW and WAR always hold.

Claim 7 When $s > 1 - c$:

If A) $\frac{b_{\text{poor}}c}{1-c} < 1$ or if B) $\frac{b_{\text{poor}}c}{1-c} > 1$ and $\frac{b_{\text{poor}}c}{1-c} < 1 - c$, then the rich preserves autocracy in both peace and war, proposes $\frac{b_{\text{poor}}c}{1-c} = 0$ and never starts a war. If C) $\frac{b_{\text{poor}}c}{1-c} < 1$ and $\frac{b_{\text{poor}}c}{1-c} > 1 - c$, then the rich starts a war, preserves autocracy and proposes $\frac{b_{\text{poor}}c}{1-c} = 0$.

It follows from $s > 1 - c$ that the poor would join the war effort even if $b_{\text{poor}} = 0$. In A) revolt is either too costly and in B) revolt is unfeasible. In C) the poor would revolt in times of peace. Since the rich can transfer all the war costs to the poor it can strengthen its domestic position by starting a war.

Now let us consider the cases where $b_{\text{poor}} = \frac{s-c}{c}$. In this case, AW holds if and only if

$$\frac{(\frac{s-c}{c})c}{1-c} > 1 \quad (\text{AW})$$

which may be reexpressed as

If B) $\frac{c}{s} < 1 - c$ and $(1 - c)(1 - c) < s$, autocracy is preserved in times of peace and the rich democratizes in times of war.

If C) $\frac{c}{s} < 1 - c$ and $1 - c < s$, the rich start a war and preserve autocracy by offering $\frac{s - c}{c}$ to the poor.

If D) $\frac{c}{s} < 1 - c$ and $1 - c < s < (1 - c)(1 - c)$, the rich democratize in times of peace and preserve the autocracy in times of war by offering $\frac{s - c}{c}$ to the poor but do not start war.

If E) $\frac{c}{s} < 1 - c$ and $s > (1 - c)(1 - c)$ the rich democratize both in times of war and peace.

In A) and B) autocracy is secure in times of peace but can only be preserved in times of war if s is sufficiently low. In C), D) and E) autocracy is not secured in times of peace. If s is sufficiently low then the rich can use war to preserve autocracy (C), if s is of an intermediate range, then the rich is actually worse off by war but it allows the rich to preserve autocracy by making the poor bear the majority of the costs (E). Finally, if s is sufficiently high then the rich has to democratize in either case.

A similar analysis can be made for those cases in which $\frac{c}{s} > 1 - c$.

Now the rich preserve the autocracy in times of war if and only if

$$\frac{(1 - c)c}{s} > 1 - c$$

which can be reexpressed as

$$(1 - c) > s \tag{AW*}$$

and when revolt cannot be prevented in times of peace, the rich start a war if and only if

$$\frac{(1 - c)c}{s} > 1$$

which can be reexpressed as

$$(WAR*)$$

The following analysis can be constructed:

Claim 11 When $\frac{c}{s} < s < 1 - c$ and $\frac{c}{s} < 1 - c + c$

If A) $\frac{c}{s} < s$ and $\frac{c}{s} < 1 - c$ then autocracy is preserved both in war and peace, and the rich offer $\frac{c}{s}$ to the poor.

If B) $\frac{c}{s} < s$ and $\frac{c}{s} < 1 - c$ then autocracy is preserved in times of peace and the rich democratizes in times of war.

If C) $\frac{c}{s} < s$ and $\frac{c}{s} > 1 - c$, then the rich start a war and preserve autocracy by offering $\frac{c}{s}$ to the poor.

If D) $\frac{c}{s} < s$ and $\frac{c}{s} > 1 - c$, then the rich democratize in times of peace and preserves the autocracy in times of war by offering $\frac{c}{s}$ to the poor.

If $E) \frac{c}{s} < 1 - c$ and $\frac{c}{s} < (1 - c)$ the rich democratize both in times of peace and war.

The analysis is similar to the previous claim, the main difference is that now the rich is trying to make revolt undesirable by offering $\frac{c}{s}$.

Claim 12 When $s > 1 - c$ and $\frac{c}{s} < 1 - c$ and $\frac{c}{s} < \frac{c}{s}$:

If A) $\frac{c}{s} < 1 - c$ the rich start a war to preserve autocracy and offer $\frac{c}{s}$ to the poor.

If B) $(1 - c) < \frac{c}{s}$ the rich democratize in times of peace and preserve the autocracy by offering $\frac{c}{s}$ to

to preserving the autocracy. Case C) is the corner of Case B) when revolt is always desirable (i.e. there is no level of τ to prevent revolt). Case D) is the

the decision to preserve the autocracy becomes independent from war. For that reason, the rich are able to preserve the democracy. In case A) s is sufficiently low that $\frac{1}{s} < \frac{1}{\alpha}$, so that as the poor bear most of the costs from war, they are no longer capable of revolting. In case C) s is at an intermediate level, which causes $\frac{1}{s} < \frac{1}{\alpha} < \frac{1}{\beta}$, so the rich are forced to over =

3 Conclusions

This paper presents a model which studies the link between internal conflict, external conflict and democratization. In contrast to the standard view which suggests that conflict in general contributes to democratization, this paper studies the conditions under which external threats may contribute to democratization. In particular, if the elite is either very entrenched or very vulnerable, the decision to go to war does not directly affect political outcomes. On the other hand, at intermediate levels of stability, an external war may either debilitate or strengthen the domestic regime leading to either democratization or consolidation. There are three possibilities: as suggested by Ticchi and Vindigni (2008), war may destroy an otherwise stable democracy by making it unfeasible (Proposition 4.D-E) or undesirable (Proposition 4.A-C) for the rich to sustain the autocracy. In contrast, if war is bestowed upon autocrats, then the costs of fighting it become sunk and to the extent that the rich can share the war burden with the poor in such a way as to make revolt either undesirable, by reducing inequality to a point where revolutionary costs are greater than the benefits from expropriation (Proposition 5.B-D) or unfeasible, by making debilitating the poor through war (Proposition 5.A). Finally, if the benefits from preserving the autocracy, the rich may be tempted to start costly wars to prevent democratization.

This result is interesting, because it sheds insight as to why autocratic regimes may be more prone to war. While Powell (2006) has already proposed a similar idea, this model endogenizes the payoffs from joining the war effort for the losing domestic party and shows how the decision to join the war effort is affected. This idea that autocrats may start wars to prevent democratization links interestingly with the work by Hess and Orphanides (1995) Hess and Orphanides (2001) on democracies, and Glaeser (2006) on both democracies and non-democracies, in which leaders may enter in unprofitable wars. Its value is larger in studying why non-democracies may be more likely to enter into conflicts that they can lose, an empirical regularity suggested by Bueno De Mesquita and Siverson (1995). Furthermore, it provides a more feasible explanation for the phenomenon: Bueno De Mesquita and Siverson (1995) argue that autocracies may be more willing to start wars and less committed to winning them since their political survival is less linked to military success than democracies where bad military outcomes may prompt the people to vote leadership out. This idea misses the point that in contrast to democracy, political survival is closely linked to physical survival in non-democracies. This of course raises the stakes of war for the individual in power, so that explanation seems unlikely. In contrast, if political survival is endogenous to the distribution of power in non-democracies, then it is likely that the internal effects of wars on the distribution of power may have been a more important consideration on the decisions to start a war. This point raises an empirical discussion: are stable or unstable autocracies more likely to start wars? If stable autocrats are more likely to start wars, this would provide evidence in favor of Bueno De Mesquita and Siverson (1995), whereas the opposite would suggest that the view espoused by this paper and by Powell

(2006) is more likely.

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4 Appendix 1: Proofs

Proof of Lemma 1. If the poor do not revolt, their payoff is $\frac{1}{2}$. If $\frac{1}{2} - c < 0$, revolt fails. The payoff to the poor are: $0 < \frac{1}{2} - c$. If $\frac{1}{2} - c > 0$, the payoff would be $\frac{1}{2} - c > 0$. ■

Proof of Lemma 2. $\frac{1}{2} \in [0; 1]$. Assuming that revolt is feasible, it is desirable if and only if $\frac{1}{2} - c > \frac{1}{2} - c$. If $\frac{1}{2} - c > 0$, then no value of c can make $\frac{1}{2} - c > 0$ hold. If $\frac{1}{2} - c < 0$, then $\frac{1}{2} - c > 0$ if and only if $\frac{1}{2} - c > 0$. Finally, if $\frac{1}{2} - c > 0$, then $\frac{1}{2} - c > 0$. Clearly if revolt is not feasible, the poor do not revolt as the payoff of a failed revolt is 0 versus a value $\frac{1}{2} - c > 0$ of preserving the autocracy. Revolt is feasible if and only if $1 - (1 - c)c > \frac{1}{2} - c$. If $\frac{1}{2} - c > 0$, then $\frac{1}{2} - c > 0$ even if $\frac{1}{2} - c < 0$, then the value holds even if $\frac{1}{2} - c < 0$, finally, when $\frac{1}{2} - c < 0$, $\frac{1}{2} - c < 0$ if and only if $\frac{1}{2} - c > 0$, or in other words, revolt is unfeasible as long as $\frac{1}{2} - c < 0$. ■

Proof of Corollary 1. If $\frac{1}{2} - c < 0$ and it follows from lemma 2 that revolt is not feasible. If $\frac{1}{2} - c > 0$, revolt is not desirable. ■

Proof of Claim 1. It follows from lemma 2 that the poor would not revolt if either $\frac{1}{2} - c < 0$ or $\frac{1}{2} - c > 0$. The rich must offer the minimum value that ensures war participation. It follows from inequality WJ1 that this value is $s_{poor} = 0$ if $s < 1 - c$ and from WJ2 that it is $s_{poor} = \frac{s - c}{c}$ otherwise. ■

Proof of Claim 2. It follows from WJ1 that if $s < 1 - c$, $s_{poor} = 0$ and it follows from applying RF2 to lemma 2 that $\frac{1}{2} - c > 0$ and therefore, as long as the rich offer $s_{poor} = 0$ the poor join war and do not revolt. ■

Proof of Claim 3. It follows from $\frac{1}{2} - c > 0$ and $\frac{1}{2} - c < 0$ and $s > 1 - c$, that $\frac{1}{2} - c > 0$, $\frac{1}{2} - c < 0$ and $\frac{s - c}{c} > 0$ are interior values as RD2, RF2 and WJ2 hold. Revolt is feasible and desirable at $s_{poor} = \frac{s - c}{c}$ if and only if $\frac{1}{2} - c < \frac{s - c}{c} < \frac{1}{2} - c$ which holds if and only if $\frac{1}{2} - c < \frac{s - c}{c} < \frac{1}{2} - c$ which holds if and only if $\frac{1}{2} - c < s < 1 - c$. When these conditions are met, the rich cannot make revolt non-feasible. For that reason, they must offer $s_{poor} = \frac{s - c}{c} = \frac{1}{2} - c$ to make revolt non-desirable. If $\frac{1}{2} - c < s < 1 - c$ then

Proof of Claim 4. It follows from $\frac{c}{s} > 1$ that RF3 holds so there is no value of τ which can make revolt unfeasible. The only way to prevent revolt is to make it undesirable. The rich therefore require to make sure that a) revolt is undesirable and b) the poor are willing to join. That is, they need to choose $\tau_{\text{poor}} = \max\{f(\tau); g(\tau)\}$. Since $\tau \in (0; 1 + c]$ it follows from RD2 that $\tau = \frac{c}{s}$. Notice that if WJ1 holds, then clearly $\tau = 0$ as WJ1 and $\tau > 0$ imply that $s < 1 + c$. So the interesting case arises if WJ2 holds, in which case, $\tau_{\text{poor}} = \frac{s-c}{c}$ if and only if $s > 1 + c$ and

■

Proof of Claim 5. It follows from $\frac{c}{s} > 1 + c$ that RD3 holds so there is no value of τ which makes revolt undesirable. The only way to prevent revolt is by making it unfeasible. Since $\tau \in [-\frac{c}{s}; -\frac{c}{s}]$, it follows from RF2 that $\tau = -\frac{c}{s}$. It follows from WJ2 that since $s > 1 + c$, the rich must offer at least $\tau = \frac{s-c}{c}$ to ensure war participation from the poor. At this level, the poor preserve the autocracy if and only if revolt is unfeasible, that is if and only if

$s < (1 - c)(1 - c)$. ■

Proof of Claim 9. It follows from Proposition 1.II.C) that if $\frac{c}{1 - c} > s > \frac{c}{1 - c}$, $\frac{c}{1 - c} < -$ and $\frac{c}{1 - c} > \frac{c}{1 - c}$, $\text{poor} = \frac{s - c}{c}$. In times of war, the rich democratize if and only if $s > (1 - c)(1 - c)$ but since $\frac{c}{1 - c} < -$ then $(1 - c)(1 - c) > \frac{c}{1 - c} > s$, so the rich never democratize. A) if $\frac{c}{1 - c} < -$, then it follows from lemma 1 that the poor do not revolt in times of peace and therefore the rich do not start war, nor do they democratize. B and C) If $\frac{c}{1 - c} > -$, then it follows from lemma 1 that the poor revolt in times of peace. Since in times of war, the poor do not revolt, the rich must decide whether to democratize in times of peace or start a war. If the rich democratize they earn 1, if they start a war, they earn $\frac{s - c}{c}$, so the rich democratize if and only if $\frac{s - c}{c} < 1$ () $s > 1 - c$ and start a war otherwise. ■

Proof of Claim 10. It follows from Proposition 1.II.D) that when $s > 1 - c$ and $\frac{c}{1 - c} < - + c$ and $\frac{c}{1 - c} > \frac{c}{1 - c}$, $\text{poor} = \frac{s - c}{c}$. A-B) If $\frac{c}{1 - c} < -$, it follows from lemma 1 that the poor do not revolt in times of peace, for that reason, the rich never start a war. If a war has taken place, then the rich prefer $\text{poor} = \frac{s - c}{c}$ to democratization if and only if AW^{***} holds which holds if and only if $s > (1 - c)(1 - c)$. C-E) In times of war, autocracy is preserved if and only if $s > (1 - c)(1 - c)$. In times of peace, it follows from lemma 1 that when $\frac{c}{1 - c} < -$, since $\frac{c}{1 - c} < -$, it follows that the rich cannot preserve the revolt in times of peace. The rich therefore decide between democratizing and starting a war. The rich start a war if WAR^{***} holds, that is, if $s > 1 - c$. Now clearly, since $1 - c < (1 - c)(1 - c)$, it follows that there can be three possibilities: if $s > \text{Ⓣ}$

times of peace (i.e. if $\alpha < 1$), but a war starts sporadically, the rich may prefer to preserve the autocracy and offer $\alpha_{\text{poor}} = \frac{1}{c}$ if and only if $\alpha > 1 - c$ and democratize otherwise. ■

Proof of Claim 13. A) Since $\alpha < 1 + c < \alpha < \frac{1}{c} < 1 - \alpha$ it follows from lemma 1 that the poor always revolt in times of peace and from Proposition 1.IV.A) that the poor always revolt in times of war, so the rich must democratize in order to prevent revolt. B) Since $\alpha < 1 + c < \alpha$ and $\alpha < 1 - \alpha$ it follows from lemma 1 that the poor always revolt in times of peace. Since $1 + c < \alpha$ and $\frac{1}{c} < 1 - \alpha$ and $\alpha > \frac{1}{c}$, It follows from Proposition 1.IVB) that if there is no value to ensure war participation and prevent revolt in times of peace, so the rich is forced to democratize. C) Since $1 - \alpha < \frac{1}{c}$ the poor do not revolt in times of peace. Finally, since $\frac{1}{c} < 1 - \alpha < \frac{1}{c}$ and $1 + c < \alpha$ and $\alpha > \frac{1}{c}$, It follows from Proposition 1.IVB) that if there is no value to ensure war participation and prevent revolt in times of peace, so the rich is forced to democratize. ■

Proof of Proposition 2. A) follows from Claim 10.E), B) follows from Claim 11.E), C) follows from Claim 13.B). D) follows from Claim 12.C) and E) follows from Claim 13.A). ■

Proof of Proposition 3. A) and B) follows directly from Claim 7.A) and B) respectively. C) and D) follow from Claim 8.A) and B) respectively. E) follows from claim 9.A). F) follows from Claim 10.A) and G) follows from Claim 11.A). ■

Proof of Proposition 4. A) follows from Claim 10.A) and B) follows from Claim 10.B). ■

5 Appendix 2 Figures

