Appendix to "Financial Crises and Political Crises"

Roberto Chang

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The purpose of this Appendix is to prove some claims in section 3 of the paper, as well as providing further discussion.

1 Proof of Proposition 3.1

PBE Type i: Neither default nor political crisis

If $V \leq \chi_L$, the costs of default are always larger than the costs of servicing the debt even for the benevolent government. Then in equilibrium, the government proposes to service the debt, which is accepted by the representative agent. Hence the debt is repaid and political crisis is avoided. Neither the benevolent government nor the self interested government has any incentive to propose default, regardless of whether such an announcement results in dismissal. In turn, the representative agent cannot possibly gain from dismissing the policymaker.

PBE Type ii: Default but no political crisis

These PBEs are such that the policymaker proposes default if and only if she is benevolent and the social cost χ is low. In turn, the representative agent never dismisses the policymaker.

To check that the representative agent has no incentive to fire the policymaker, suppose first that the government announces default. Given the policymaker's strategy, the representative agent must then infer that χ is low with probability one. Hence default is socially optimal, and there is no reason to fire the government. After a proposal not to default, the representative agent knows that the cost of retaining the policymaker is equal to $X + \Psi(X)$.The cost of firing her depends on the representative agent's beliefs about χ

conditional on the policymaker's proposal. Given the policymaker's strategy, Bayes rule gives

$$\Pr\{\chi = \chi_H | \text{ policymaker proposes to repay}\} = \frac{q}{q + (1-q)(1-p)} \equiv z$$

Hence dismissing the policymaker costs φ for sure plus an expected cost of $z(X+\Psi(X))+(1-z)(\chi_L - R)$, as the representative agent expects that he will himself repay the debt with probability z and default with probability $(1-z)$. The expected cost of dismissal is then greater than that of accepting the policymaker's proposal if $X+\Psi(X) \leq \varphi + z(X+\Psi(X))+(1-z)(\chi_L - R)$, or

$$V \leq \chi_L + \varphi/(1-z) \tag{A1}$$

The presence of φ in this condition is intuitive: if a political crisis is very costly, the representative agent is more prone to accept a proposal to repay the debt even if the policymaker may be acting selfishly. More interesting is the role of z. A1 must hold if z is close enough to one. For given q, z close to one requires p to be close to one, that is, that the (prior) probability that the policymaker is self interested is small. This is because the representative agent can only gain from firing the government if doing so leads to correcting a "wrong" outcome, which happens when the policymaker turns out to be self interested (and the cost of default low). If p is close to one, the expected gain from dismissing the government is accordingly too small to justify the cost of dismissal.

Finally, checking that the policymaker's strategy is optimal is easy: she always obtains her most preferred outcome conditional on her type and her information.

PBE Type iii: Socially optimal default, but political crises.

In these PBE, the policymaker follows the same strategy as in PBE Type ii. However, she is dismissed unless she proposes default. Hence a political crisis occurs unless the policymaker is benevolent and the social cost of default is low.

The reasoning preceding (A1) implies that (A1) must fail for the representative agent to choose to dismiss the policymaker if she proposes to repay the debt. Assuming that is the case, let us turn to the optimality of the policymaker's strategy. If the policymaker is benevolent, it is clearly optimal for her to propose default when the cost of default is low. If the cost of default is high, the benevolent policymaker's cost from proposing repayment is $X + \Psi(X) + \varphi$, as she knows that she will be fired following such an announcement, after

which the representative agent will repay the debt after all. By proposing default, on the other hand, the benevolent policymaker secures a cost of $\chi_H - R$, as the political crisis will be avoided at the price of defaulting. Hence it is optimal for the benevolent policymaker to propose debt repayment when $\chi = \chi_H$ if

$$V = R + X + \Psi(X) \leq \chi_H - \varphi \tag{A2}$$

It is easy to check that the same condition implies that the self interested government will propose to repay the debt, and be dismissed, if $\chi = \chi_H$. Finally, consider the decision of the self interested government if $\chi = \chi_L$. Proposing default avoid a political crisis, but at a cost to the government of $(1+\gamma)\chi_L - R$, since it includes the self interested policymaker's personal loss. On the other hand, proposing repayment results in dismissal, after which the representative agent will default since the cost is low; the associated cost for society and the policymaker is $\chi_L + \varphi - R$. Hence proposing repayment is optimal for the policymaker if $\gamma\chi_L > \varphi$; this is one of the assumptions of the Proposition.

2 The Case $V > \chi_H - \varphi$

If $V > \chi_H - \varphi$, we have two other PBE kinds:

PBE Type iv: Excessive default plus political crisis

In this kind of PBE, the benevolent government proposes default regardless of χ, which the representative agent accepts. The self interested government proposes to repay the debt and is fired. In the latter case, the representative agent defaults if the social cost is low. Hence there is default with probability $p+(1-p)(1-q)$, and a political crisis with probability $(1-p)$. From a social point of view both default and political crisis occur too often .

In this case, the cost of a political crisis is large enough for the benevolent government to be forced to propose default even if the social cost of default is large. To see why, consider the benevolent government's dilemma if $\chi = \chi_H$. Proposing default has a social cost of $\chi_H - R$. But, given the strategy of the representative agent, proposing repayment has a expected cost of $\varphi + X + \Psi(X)$. Hence proposing default dominates if $\chi_H - R < \varphi + X + \Psi(X)$, that is, if $V > \chi_H - \varphi$ (so that (A2) fails). If the cost of default is low, the benevolent government cannot do better than proposing for default, which is accepted by the representative agent.

Consider now the self interested government. If the cost of default is low, proposing repayment and proposing default both end up in default; however, the first alternative is preferred since $\gamma\chi_L > \varphi$ means that the self interested government would rather be fired than to be personally associated with the default. If the cost of default is high, proposing repayment leads to dismissal followed by repayment, while proposing default is accepted. Since $\gamma\chi_H > \gamma\chi_L > \varphi$, the cost of the former $(\varphi + X + \Psi(X))$ is less than the cost of the latter $((1+\gamma)\chi_H - R)$.

To see that the representative agent strategy is optimal for him, suppose that the government has proposed to repay the debt. If the government is not dismissed, the representative agent expects a cost of $X + \Psi(X)$. To calculate the cost of firing the government, note that in this PBE the policymaker's proposal does not provide any information about the cost of default χ. Hence, the representative agent expects to default with probability $(1-q)$ if he dismisses the government. The expected cost of dismissal is, then, $\varphi + q(X + \Psi(X)) + (1-q)(\chi_L - R)$. This is less than $X + \Psi(X)$ if (A1) fails.

Finally, if the policymaker has proposed default, and she is fired, the expected cost to the representative agent is $q(X + \Psi(X)) + (1-q)(\chi_L - R) + \varphi$. Not firing her implies an expected cost of $q(\chi_H - R) + (1-q)(\chi_L - R)$. Hence the representative agent must retain the policymaker if $q(\chi_H - R) < q(X + \Psi(X)) + \varphi$, or if $V > \chi_H - \varphi/q$, which holds if (A2) fails.

Finally suppose that the debt is so large and reserves so low that $V > \chi_H$. Then the outcome is

PBE Type v: *Sure default, and political crisis.*

In this PBE, if the government is dismissed, the representative agent will choose to default for sure. The benevolent policymaker defaults and is not dismissed; the self interested policymaker proposes to repay the debt, she is fired, and the representative agent defaults. Default then obtains with probability one, while a political crisis occurs with probability $(1-p)$.

It is easy to see that the benevolent policymaker's strategy is optimal, and that the self interested policymaker's strategy is optimal. After a proposal to default, it is obviously optimal for the representative agent not to dismiss the government. After a proposal to

repay the debt, the situation is not as obvious: retaining the government has a known cost of $X + \Psi(X)$. On the other hand, dismissing the government and defaulting has an expected cost of $\varphi + (q\chi_H + (1-q)\chi_L) - R$, as the repayment proposal does not convey any information about χ in equilibrium. Hence dismissal is the better option only if

$$\varphi + (q\chi_H + (1-q)\chi_L) \leq V$$

This inequality is guaranteed, in the region $V > \chi_H$, if $(1-q)(\chi_H - \chi_L) \geq \varphi$, which assume for concreteness. The intuition is, clearly, that the cost of firing the government cannot be too large if the representative agent is to exercise that option.

The following table summarizes the analysis:

PBE Type	Value of default (V)	Prob. of default	Political crisis prob.
i	$V \leq \chi_L$	0	0
ii	$\chi_L < V \leq \chi_L + \frac{\varphi}{1-z}$	$p(1-q)$	0
iii	$\chi_L + \frac{\varphi}{1-z} < V \leq \chi_H - \varphi$	$1-q$	$1-p(1-q)$
iv	$\chi_H - \varphi < V \leq \chi_H$	$p + (1-p)(1-q)$	$1-p$
v	$\chi_H < V$	1	$1-p$

3 Uniqueness

Other PBE candidates are quickly ruled out, or are supported by questionable beliefs out of the equilibrium path. The discussion so far leaves open two main possibilities:

1. PBEs in which the government is fired only after a default announcement. Then, as the reader can check, both policymaker types must propose repayment if $\chi = \chi_H$. If $\chi = \chi_L$ there are two alternatives:

(i) If $V \geq \varphi + \chi_L$ both policymakers must announce default. But then both are being truthful, and hence it cannot be optimal for the representative agent to dismiss either.

(ii) If $V < \varphi + \chi_L$ both policymakers must announce repayment. This possibility is readily ruled out by the Intuitive Criterion (discussed, for instance, in Gibbons 1992).[1]

[1] A default proposal is out of the equilibrium path. But, if $\chi = \chi_L$, announcing default is equilibrium dominated by the self servient policymaker and not for the benevolent one. This implies that after a default

2. PBEs in which the policymaker is fired no matter what she says. As easily shown, this can be optimal for the representative agent only if $\chi_L \leq V \leq \chi_H$. Otherwise the representative agent is better off dismissing only a policymaker that is observed lying.

I restrict attention to the case in which the good government acts truthfully. In this case, there are two alternatives not already settled:

(i) The bad government always proposed default. Then, after a repayment proposal, the representative agent learns that $\chi = \chi_H$ for sure and has no incentive to fire the government.

(ii) The bad government always lies. One can show that this can be a PBE only if

$$\varphi \left[2 + \frac{q}{1-q} \left(\frac{p}{1-p} + \frac{1-p}{p} \right) \right] < \chi_H - \chi_L$$

To rule out this PBE, I assume that the inequality fails: a sufficient condition is that either p or q is close enough to one.

proposal, the representative agent should place zero probability to the event that the policymaker is self servient and $\chi = \chi_L$.