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Running "Dinosaurs":

A Political Economy Model of Soft Budget Constraints

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1. Introduction

> "In Turkey, Turkiye Taskorumu Kurmu, a state-owned coal mining company, lost the equivalent of about $6.4 billion between 1986 and 1990. Losses in 1992 worked out to about $12,000 per worker, six times the average national income. Yet health and safety conditions in the mine were so poor that a miner's life expectancy was forty –six years, eleven years below the national average. In short, the miners and the government would have been better off if the government had imported coal and paid the miners to stay home." (World Bank 1995)

Across transition and developing economies and sometimes in developed market economies as well, loss-making firms are often kept alive for an extended period of time through various measures by governments or government-sponsored institutions, a phenomenon known as the soft budget constraint syndrome. Many agree that factors other than economy efficiency, and politics in particular, are often reasons behind such a phenomenon (Kornai 1980 and World Bank 1995). For example, Shleifer and Vishny (1994) argue that self-interested politicians subsidize loss-making firms in order to secure political support from their constituents.

However, as the Turkish story illustrates, it is often much more costly both to the government and the society to subsidize a chronically loss-making firm than to simply shut down the firm and compensate workers and managers who stand to lose from the shut-down. Subsidizing loss-making firms subsidizes not only workers and managers but other physical inputs as well. It encourages these firms to continue to make losses (Schaffer 1989, Dewatripont and Maskin 1995). It also destroys the attrition mechanism of market competition and crowds out efficient competitors (Dewatripont and Roland 2000). It allows these firms to acquire inputs and make investments without bearing associated financial responsibilities, leading to runaway demand and excessive expansions (Kornai 1980, Qian 1994, Huang and Xu 1998). And because firms are allowed to acquire inputs without concerns of financial constraints, the syndrome also distorts the function of price signals.

The political economy argument thus leaves open one important question. If politicians subsidize loss-making firms in order to secure their political support, why don't they choose to shut down these firms and compensate the losers directly? To put the question in the spirit of the Coase theorem, why are politicians' political concerns not addressed with a more efficient social outcome through political bargaining?

The question is not merely an intellectual inquiry, but is of important policy implications as well. Many countries, most noticeably transition economies, are indeed moving away from the old practice of subsidizing loss-making firms and are gradually adopting a new policy of closing down these firms and establishing unemployment benefits for those adversely affected. To understand the process of such policy evolution, it is imperative to understand under why politician would subsidize loss-making firms instead of subsidizing potential losers directly.

This paper sets out to address this question. In this paper, we study the question in a simple setting where a government agency is in charge of dealing with a loss-making firm and the workers and managers, who we refer to as stakeholders collectively, employed by the firm. A politician controls the government agency and makes the decision of whether to subsidize the firm, so that the firm will continue to employ the stakeholders, or to allow the firm to shut down compensate the stakeholders for their losses.

Our study entertains a conventional wisdom, which suggests that politicians subsidize a chronically loss-making firm because subsidizing unemployed workers and managers cannot be credibly committed.[1] While intuitively appealing, this conventional wisdom is half-baked. How could the Turkish government commit to subsidizing the loss-making coal mine at the expense that amounts to $12,000 per worker, six times the average national income, but were unable to compensate the miners after shutting down the coal mine and save the government expense? If subsidizing loss-making firms is to appease the potential losers, there is simply no intrinsic reason why compensating the losers directly is less credible than subsidizing the loss-making firms, which is often much more costly to the economy as well as to the government.

Accordingly, our analysis focuses on a dynamic environment where the government agency cannot commit to either a policy of subsidizing the firm or one that directly compensates the stakeholders. To do so, we assume that each politician has only one-period tenure in the government agency and that in the end of each period, a new politician replaces the incumbent politician. A new politician is able to adjust the policy set by his predecessor. The risk of policy repudiation arises because politicians, while all have concerns over the political support of the stakeholders as well as the cost of the government policy under his tenure, have different preferences.

Assuming that it is more costly to subsidize the firm than to compensate the stakeholders in the static sense, we demonstrate an asymmetry in the choice between the dynamic setting and the static setting. That is, while a politician, seeking support from the stakeholders, will always allow the firm to shut down in a

[1] For example, when discussing SOE reform, a 1995 World Bank research report highlights the credibility of promises to compensate people, particularly SOE workers, who stand to lose from SOE reform. "SOE workers and managers, and others who stand to lose their jobs or suffer wage cuts due to SOE reform, often seeking immediate compensation for their losses. But governments commonly lack the resources to make immediate payments, particularly when, as is frequently the case, they have initiated SOE reform in response to fiscal crisis. If governments can credibly promise future compensation, they can overcome this shortage of current resources. However, governments whose promises are not regarded as credible face much higher immediate costs and may be forced to reduce the scope and the speed of reform or even to abandon reform altogether." (World Bank 1995)

static equilibrium, he may choose to subsidize the firm instead in a dynamic equilibrium. The reason for such a bias in the dynamic environment is as follows. As we will show, when politicians repudiate on a policy that subsidizes the firm, they are likely to switch to a policy that compensates at least some stakeholders; however, when politicians repudiate on a policy that compensates the stakeholders, they stop all the compensation. Accordingly, from the stakeholders' point of view, there is an option value of a policy that subsidizes the firm. As a result, the stakeholders will at the margin favor politicians adopting such a policy.

There is a growing theoretical literature on the soft budget constraint syndrome, devoted to the understanding of reasons behind the syndrome. Within this literature, a considerable amount of studies, mostly following the work of Dewatripont and Maskin (1995), emphasize economic, or more precisely, profit considerations as the cause of soft budget constraint (see Kornai, Maskin, and Roland (2002) for a survey of these studies). In these studies, a potentially profit making firm turns out to incur some losses after the initial investment is sunk. Given the fact that the initial investment is sunk, it is profitable not to shut down the firm but to continue with additional investments. The focus of these analyses is how the expectation of not being shut down after it incurs losses induces the firm not to avoid making losses in the first place.[2] In contrast, our paper emphasizes political considerations as the cause of soft budget constraint. As a result, we are able to explain why the government agency pours in additional funds to the firm knowing that it is not profitable to do so, a question that Dewatripont and Maskin (1995) and other related studies do not address.

A few studies offered explanations as to why a government puts money into a firm that will continue to make losses. Bai and Wang (1997) ponder the reason from the perspective of bureaucratic control. They argue that, in order to induce its bureaucrat to put forward a good effort in sorting out bad projects before the initial investment, a government may have to commit to forcing the bureaucrat to make an additional investment to projects that will continue to make losses after the initial investment. Che (2001) argues for the reason of pecuniary externality.[3] That study suggests that China has dual tracks in corporate finance with firms in the state sector facing potentially soft budget constraint while firms in the non-state sector facing hard budget constraint. It shows that, by allowing some loss-making firms in the state sector

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[2] The same incentive effect emerges when a loss-making firm anticipates a bail out from a paternalistic government. Linbeck and Weibull (1988) analyze such an effect, albeit in a slightly different context. The crucial contribution of Dewatripont and Maskin (1995) is that it demonstrates analytically that the soft budget constraint is not unique to a paternalistic government and that the phenomenon has to with the institutional structure of an economy.

[3] In the context of intergovernmental fiscal relation, Wildasin (1997) suggests that the central government may bail out a local government for concerns of externalities caused by the under-provision of public goods by a local government.

to be financed, the financial dual track helps stabilize the economy and as a result enhances the disciplinary effect of hard budget constraint in the non-state sector, which in turn helps harden the budget constraint in the state-sector as well.

This paper complements these works. While Bai and Wang (1997) is better positioned at the survival of loss-making state-owned enterprises, our analysis is ownership neutral. In our paper, politicians give in to political pressure from their constituents and keep loss-making firms afloat, regardless they are state-owned or private owned. In addition, in Bai and Wang (1997), loss-making firms are kept alive *ex post* to provide incentives for bureaucrats to screen out these firms *ex ante*. Therefore, one would expect only marginal numbers of loss-making firms are kept alive, and not for an extended period of time. In this paper, it is possible that a large number of loss-making firms are kept alive for an extended period of time. While Che (2001) offers an interesting argument concerning the macro-economic reasons of the soft budget constraint syndrome in the context of China, this paper focuses on the micro-aspect of the soft budget constraint phenomenon. Accordingly, while Che (2001) explains the center's intention to keep some loss-making firms alive, this paper better explains what local politicians benefit from by doing so.

Perhaps the most closely related is the study by Shleifer and Vishny, which argues that loss-making firms are subsidized because politically motivated politicians seek support from their constituents, i.e., workers and managers of these firms (Shleifer and Vishny 1994). This paper pushes this argument one step further. Since politicians can also secure political support through a more efficient alternative: shutting down the loss-making firms while at the same time keeping the losers compensated through transfer payments, this paper addresses the question of why politicians opt for the less efficient policy solution of subsidizing the firms instead of subsidizing workers and managers directly.

The rest of the paper is organized as follows. We first present a simple example in section 2 to illustrate the core idea of this paper. Section 3 lays out the model that allows us to compare a soft lending policy that subsidizes a loss-making firm and different subsidy policies that compensate workers and managers with unemployment subsidies. The analysis of the model is carried out in section 4. Section 5 concludes.

2. An Example

Before turning to a formal analysis, we present a simple example to illustrate the core idea of this paper. In this example, time is of two periods. There are two politicians, A and B. A is in charge of the agency in the first period, succeeded by B in the second period. A loss-making firm consisting of many workers needs funding from the government agency in order to stay afloat. These workers derive rents, or private benefits, of being employed in the firm. A q percentage of these workers enjoy private benefit $\alpha = \alpha_l$ apiece, whereas each of the remaining workers receives $\alpha = \alpha_h$, with $\alpha_h > \alpha_l$. The workers lose these rents if the firm is shut down and they become unemployed. The discount factor for the workers is $\delta > 0$.

In the end of his tenure, a politician receives support from his constituents, which in this example are the workers of the loss-making firm, either in the form of electoral votes or in the form of civil obedience. The political support helps the politician to gain a seat at a higher-level government and enjoys political capital λ. In particular, $\lambda = \lambda_A$ for politician A and $\lambda = \lambda_B$ for politician B. The probability that a politician gains the seat is equal to the percentage of support he receives from these constituents. And a worker gives the incumbent politician his support if and only if, under his watch, the worker is as well off as before.

An incumbent politician has two policy choices. He can either offer funding to keep the firm alive, in which case, because the firm loses money, the politician incurs a fiscal cost of π per worker; or he can allow the firm to shut down and compensate workers with unemployment subsidies. We adopt a simplifying assumption such that the unemployment subsidies are set uniformly for all the workers. We will justify the assumption and will clarify how the assumption matters for our results later in the paper. For the moment, we simply note that, with this assumption, an incumbent politician, whether A or B, must set the unemployment subsidy at α_h apiece, if he wants the full support from the workers while shutting down the firm. We assume $\pi > \alpha_h$; therefore a politician will never subsidize the firm.

Things are different in a dynamic environment. Like in the static setting, the incumbent politician, B in this case, will always shut down the firm. How much B will offer in terms of unemployment subsidies, however, depends on what has happened in the first period. If the firm was kept alive in the first period, B will offer an unemployment subsidy at α_l apiece with partial support if and only if doing so is better than offering α_h or offering nothing:

$$q\lambda_B - \alpha_l > \max\{0, \lambda_B - \alpha_h\}.$$

Suppose this condition holds. B will offer α_l if the firm was kept alive in the first period. If instead the firm was shut down and each worker received an unemployment subsidy s in the first period, B will stick to the subsidy s if and only if $s \leq \lambda_B$. Otherwise, B repudiates on the subsidy and offers nothing in the second period.

Let's now decide how A chooses his policy in the first period. If A chooses to fund the firm, a worker with rents in employment $\alpha = \alpha_h$ will receive a payoff of α_h in the first period and α_l in the second period (for B will offer an unemployment subsidy at α_l). Thus the present discounted value of his total payoff will be $\alpha_h + \delta\alpha_l$. A worker with $\alpha = \alpha_l$ will receive α_l in both periods and therefore the present discounted value of his total payoff will be $\alpha_l + \delta\alpha_l$.

If instead A chooses to shut down the loss-making firm and offer an unemployment subsidy s in the first period, a worker will receive s only in the first period if $s > \lambda_B$, and will receive s in both periods if $s \leq \lambda_B$ (for in this case politician B will continue to offer s in the second period). Accordingly, the present discounted value of a worker's total payoff will be $s + \delta s$ if $s \leq \lambda_B$, and s otherwise.

Suppose the loss-making firm has been surviving on the government agency's funding prior to the first period. Suppose in addition that:

$$\alpha_h > \lambda_B.$$

Then A cannot gather support from all the workers when shutting down the firm, unless he sets the unemployment subsidy $s = \alpha_h + \delta\alpha_l$. Thus if

$$\pi < \alpha_h + \delta\alpha_l,$$

A will find it cheaper to solicit support from all the workers by keeping the firm alive. Of course, A must also find it more desirable to get support from all the workers than getting partial or no support, that is:

$$\lambda_A - \pi > 0, \text{ and}$$
$$\lambda_A - \pi > q\lambda_A - \alpha_l.$$

Adding all conditions together, we have a pure-strategy equilibrium in this simple two-period model where A will choose to fund the loss-making firm to keep it alive in the first period, which he would not do in a static situation. Indeed, it is easy to verify that there exists π, λ_A, and λ_B satisfying all the conditions above if and only if:

$$\alpha_h > \alpha_l/q.$$

What does this simple example tell us? Roughly speaking, if politician A wants to obtain full political support by subsidizing workers directly, he must incur a significant amount of fiscal cost (no less than α_h per worker). However, with different preferences, politician B is unwilling to bear such a significant amount of fiscal cost. Therefore, B will repudiate on the unemployment subsidies if A wishes to gather full political support. This in turn implies that A has to offer more than α_h per worker, thus making the policy of subsidizing the firm potentially more attractive. Why can A get full support by subsidizing the firm, but not so when subsidizing the workers at $s = \alpha_h$? This is because of the following reasons. When B repudiates on the policy of subsidizing the firm, he will move to a policy of subsidizing the workers directly, and as a result, the workers are at least partially compensated. However, when B repudiates on the policy of subsidizing the workers directly, he will stop compensating the workers completely. He does so because of the implicit assumption we adopt in this paper, which is also essential to the core idea of the paper. That is, a politician has to adjust his policy uniformly for all workers. In particular, if he is to reduce the unemployment subsidies, he has to do so for all the workers. This assumption, plus the behavioral assumption of the workers such that they will support a politician if and only if his policy makes them weakly better off, drives in the asymmetry between subsidizing the loss-making firm and subsidizing the workers directly in a dynamic setting.

3. The Basic Model

Time consists of infinite number of periods. A loss-making firm employs a unit measure of employees, which we will refer to as stakeholders. These stakeholders live infinitely and have a common discount rate $\delta < 1$. When employed by the firm, each stakeholder enjoys rent, or private benefit, denoted by α, in addition to a salary payment. We normalize the salary payment to zero for all stakeholders for the sake of expositional simplicity. The rent, α, may come either from perks of managing of the firm, as in the case of management personnel, or from higher wages expected due to seniority or firm-specific human capital investment, as in the case of senior or skilled employees, or from learning by doing, as in the case of younger employees, or from various fringe benefits provided by the firm. To capture the possible difference in the amount of rents these stakeholders enjoy when maintaining employment in the firm, we assume that there are two types of stakeholders: low type stakeholders and high type stakeholders, with a measure of q and $1 - q$ respectively. A high stakeholder enjoys more rents, denote by α_h, than a low type stakeholder does, denoted by α_l with $\alpha_l < \alpha_h$. The high type stakeholders may be skilled workers, senior employees, or management personnel, whereas the low type stakeholders may be unskilled employees or junior workers.

The stakeholders remain as employees if and only if the firm is kept in operation. An indivisible investment is needed in each period in order to keep the firm in operation. However, the firm is loss making, and the return to investment never covers the cost. Therefore, such an investment can be financed only by politically motivated politicians through subsidized lending, referred to hereafter as soft lending, with a net cost of $\pi > 0$.[4]

A government agency is responsible for providing the firm soft lending, either directly or indirectly through institutions such as banks. If it stops offering the firm subsidized funding, and hence the firm is forced to shut down, the agency is also responsible for offering unemployment subsidies to the stakeholders for compensating their losses.

A politician is in charge of the agency for a one-period tenure. At the beginning of each period, a new politician takes over the office;[5] at the end of the period, the politician either retires from the agency or advances his political career and gains a seat at a higher-level government office (through either election or promotion).[6] Advancing political career derives political benefit, λ, for a politician. This political benefit fluctuates, perhaps because of external shocks to the political climate faced by the politicians. In particular, in each period λ draws from a density function g(.) on the support of $(0, \infty)$. We assume that g(.) is positive on the entire support. Let G(.) be the corresponding cumulative density function. We refer to a politician with a particular realized value of λ as a type λ politician.

Whether an incumbent politician is able to advance his political career at the end of his tenure depends on the political support he receives from his constituents, who, in this model, are the stakeholders of the loss-making firm his office must deal with. A stakeholder decides at the end of a period whether or not to offer the incumbent politician political support, either in the form of votes or civil obedience (e.g., no protest or demonstration). The measure of stakeholders who offer the support, denoted by m, thus determines the likelihood that an incumbent politician advances his political career. Accordingly, the expected political benefit for a politician is $m\lambda$, where m depends on the policy choice of that politician.

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[4] One can also think of π as the cost of budgetary subsidies to the firm or unpaid taxes by the firm, as in the case of tax arrear.

[5] We do not model the process in which a politician is selected into this office. Endogenizing the process unnecessarily complicates the analysis without affecting our results qualitatively.

[6] Thus, the politicians in this model may be best thought of local politicians or politicians in charge of certain government branches, all with ambition to advance their political career.

More specifically, let V_t denote the long-term expected payoff of a stakeholder. A stakeholder offers political support to an incumbent politician if and only if the politician's policy weakly improves his welfare as compared to the previous period, that is, if and only if $V_t \geq V_{t-1}$.[7] We assume that the firm begins in a soft lending state and therefore V_0 is defined as the long-term expected payoff when soft lending is adopted prior to the first period.

At the beginning of each period, the firm is in one of the following two states: the soft lending state where the firm is kept in operation through soft lending, or the shut-down state where the firm has been put out of business. When the firm is in the soft lending state, the incumbent politician may either continue to offer the firm soft lending or allow the firm to shut down and compensate stakeholders with some transfer payments, which we will refer to as unemployment subsidies.[8] The choice of soft lending allows the firm to remain the soft lending state, whereas the decision to offer unemployment subsidy leads the firm to the shut-down state. When the firm is in the shut-down state, the incumbent politician has only the option of readjusting the unemployment subsidy. We assume in this basic model that these stakeholders are unable to find employment once the firm goes out of business.

Since funding the firm is completely unproductive, both a subsidy policy, i.e., a policy that compensates the stakeholders with a certain amount of unemployment subsidies, and the soft lending policy are policies of making transfer payments to the stakeholders. In weighing his choice between subsidy and soft lending, a politician trades off the fiscal costs of the two policies and the resulting political support. As mentioned earlier, soft lending entails a fixed amount of fiscal cost π. The unemployment subsidy is costly as well. Let s, $s \in \Re^+$, denote the total amount of unemployed subsidies dispensed to the stakeholders, and let c(s) denote the actual fiscal cost of these subsidies borne by the government agency. We assume that $dc/ds > 0$ and $c(s) - s \geq 0$. In other words, the unemployment subsidy may involve certain deadweight loss as soft lending does.

We make one important assumption that a government policy must be non-discriminative. This assumption is certainly satisfied when a policy chooses the soft lending policy. When a politician chooses a subsidy policy, the assumption implies (1) when the unemployment subsidy is first set in the soft lending state, it cannot be made contingent on the type of a stakeholder, and (2) if a politician is to readjust the unemployment subsidy in the shut-down state, he must do so with respect to every stakeholder. The first

[7] This specification implies that the stakeholders have little bargaining power in their political bargaining *vis-à-vis* the politicians.

[8] The purpose of this paper is not to understand the nature of unemployment subsidies. Indeed, unemployment subsidies in this model should be thought of as transfer payments designed to compensate the stakeholders. We will however incorporate some stylized features of unemployment subsidies in some of our extensions.

implication helps simplify, but is not essential to, our analysis. What is essential to the ensuing analysis is the second implication of this assumption. That is, if a politician decides to cut down the unemployment subsidy, he reduces the subsidy for all stakeholders. This, together with the stakeholders' behavior in deciding their political support, means that a politician will adjust the unemployment subsidy to zero whenever he decides to reduce the unemployment subsidy in the shut-down state.

Given the assumption that a policy is non-discriminative, s is also the unemployment subsidy received by an individual stakeholder. Since a politician in the shut-down state will either maintain the unemployment subsidy set by his predecessor, $s_t = s_{t-1}$,[9] or repudiate on the subsidy policy completely by setting $s_t = 0$, we will drop the subscript t and refer to s as the unemployment subsidy first set in the soft lending state.

Accordingly, a politician in the soft lending state receives a payoff of $\lambda - \pi$ for continuing the soft lending policy, and a payoff of $m(s)\lambda - c(s)$ for choosing a subsidy policy with unemployment subsidy set at s. In the shut-down state where the stakeholders received s in the previous period, a politician receives a payoff of $\lambda - c(s)$ if he sticks to the unemployment subsidy set by his predecessor and zero payoff off when he repudiates and sets s = 0 instead.

For a benchmark for the ensuing analysis, consider the static case. A politician will either set an unemployment subsidy $s = \alpha_h$ with full political support coming from all stakeholders as a result, or set the unemployment subsidy $s = \alpha_l$ with partial support, i.e., support from only low type stakeholders, or choose soft lending, again with full political support. We make the following assumption, which ensures that no politician will ever choose soft lending in a static setting:

Assumption 1: $\pi > c(\alpha_h)$.

In a dynamic setting, a government policy adopted by an incumbent politician may or may not be followed by its successor. We say that there is institutional commitment to government policies if every politician has to adhere to a policy chosen by his predecessor, and there is no institutional commitment otherwise. Evidently, the case with institutional commitment is identical to the static one. That is, given Assumption 1, soft lending will not be adopted. Finally, we assume that the political benefit of winning a high-level position is purely re-distributive and therefore does not contribute to social surplus.

[9] A politician will not raise the unemployment subsidy given how the stakeholders decide their political support.

Accordingly, the first best outcome in this model is to allow the firm shut down and offer no unemployment subsidy.[10]

4. Soft Lending vs. Subsidy

In the remainder of this paper, we consider a dynamic setting without institutional commitment to government policies. In each period, an incumbent politician can scratch the policy of his predecessor and make up his own. We analyze whether a politician will choose to subsidize the firm through soft lending or subsidizing the stakeholders directly under such circumstance and what will be the welfare implication.

4.1 The Option Value of Soft Lending

At the beginning of each period, the firm is either in the soft lending state or in the shut-down state. There is irreversibility between these two states. Once a firm is shut down, it cannot be re-established by any politician. Therefore a transition may take place from the soft lending state to the shut-down state but not vice versa. For this reason, our analysis, using the standard backward induction technique, begins with the shut-down state.

An incumbent politician in the shut-down state inherits an unemployment subsidy s from the previous period, where s, as defined earlier, is the unemployment subsidy first set in the soft lending state. The incumbent decides whether to stick to s or to repudiate the policy and eliminate the subsidy completely. Since the incumbent will maintain the subsidy if and only if $\lambda - c(s) \geq 0$, the probability of policy repudiation in the shut-down state is G(c(s)).

Now turn to the soft lending state. Given the repudiation risk on a subsidy policy, the long-term expected payoff of a stakeholder when receiving unemployment subsidy s in the soft lending state is:

(1) $$V(s) = s/[1 - \delta(1 - G(c(s)))].$$

[10] No employment subsidy is offered in the first best situation because of the deadweight loss in transfer payment, $c(s) - s > 0$. If $c(s) = s$, the first best outcome can be either offering no subsidy or offering α_l in the case that the same amount of subsidy is offered to all stakeholders. This paper has assumed away concerns such as risk diversification that are often important reasons for the existence of unemployment subsidies.

A soft lending policy suffers from repudiation risk as well. Let $p(\lambda)$ denote the probability for a type λ politician to adopt a subsidy policy that allows the firm to shut down in the soft lending state. Define $G_p \equiv \int_0^\infty p(z)g(z)dz$ as the probability for the firm to be shut down by any politician, which is also the probability of policy repudiation in the soft lending state. Define $s(\lambda)$ as optimal unemployment subsidy set by a type λ politician in the soft lending state. The long-term expected payoff of a stakeholder when the firm receives soft lending in the soft lending state is:

$$V_j = \alpha_j + \delta(1 - G_p)V_j + \delta\int_0^\infty V(s(\lambda'))p(\lambda')dG(\lambda'), \qquad j \in \{h, l\}.$$

Rearranging, we can write V_j as:

$$(2) \qquad V_j = \alpha_j/[1 - \delta(1 - G_p)] + [\delta\int_0^\infty V(s(\lambda'))p(\lambda')dG(\lambda')]/[1 - \delta(1 - G_p)], \qquad j \in \{h, l\}.$$

We have assumed that the firm begins with soft lending. As a result, an incumbent politician receives support from all stakeholders when he chooses the soft lending policy. In contrast, when an incumbent politician chooses a subsidy policy in the soft lending state, he may improve welfare for some stakeholders but at the same time hurt others. Indeed, when choosing subsidy $s(\lambda)$ in the soft lending state, a type λ politician will have the support from a j type stakeholder, $j \in \{h, l\}$, if and only if $V(s(\lambda)) \geq V_j$ or:

$$V(s(\lambda))[1 - \delta(1 - G_p)] \geq \alpha_j + \delta\int_0^\infty V(s(\lambda'))p(\lambda')dG(\lambda').$$

Substituting (1) into the condition above, we have:

$$(3) \qquad s(\lambda)[1 - \delta + \delta G_p]/[1 - \delta + \delta G(c(s(\lambda)))] \geq \alpha_j + \delta\int_0^\infty V(s(\lambda'))p(\lambda')dG(\lambda').$$

Condition (3) highlights how the political support decision of a stakeholder changes in a dynamic setting where there is no institutional commitment to government policies. In either the static case or a dynamic setting where there is institutional commitment to government policies, a type j stakeholder supports a politician adopting subsidy s if and only if $s \geq \alpha_j$. In contrast, in a dynamic setting without institutional commitment, stakeholders have to take into account the long-term implications of both the soft lending and the subsidy policies. Specifically, they have to consider the relative repudiation risks between soft lending and subsidy. Such relative repudiation risks are reflected in the ratio of the effective discount rates $[1 - \delta + \delta G_p)]/[1 - \delta + \delta G(c(s(\lambda)))]$. In addition, the stakeholders must also attach an option value towards soft lending: $\int_0^\infty V(s(\lambda))p(\lambda)dG(\lambda)$.

The reason for soft lending to have an option value is as follows. Without institutional commitment, an incumbent may repudiate on the soft lending policy and choose a subsidy policy instead. This is an option not available in the static case or in a dynamic setting with institutional commitment. Such an option is not directly valuable to the incumbent, but it is valuable to the stakeholders. This is because, when future politicians repudiate on the soft lending policy adopted by the incumbent, the stakeholders may still be paid in a positive amount of unemployment subsidy (i.e., $s > 0$). In contrast, when future politicians repudiate on a subsidy policy adopted by the incumbent, stakeholder will not be paid at all (i.e., $s = 0$), due to the non-discriminatory nature of a subsidy policy. In other words, by adopting the soft lending policy, the incumbent gives his successor more flexibility in readjusting his own policy and as a consequence allows stakeholders' payoff to decline at a slower rate than when choosing a subsidy policy. Attaching this option value towards soft lending, the stakeholders give the incumbent additional support when the latter chooses soft lending in the soft lending state, *ceteris paribus*.

The observation of an incumbent adopting a policy that gives his successors more flexibility in readjusting the policy can be contrasted with the idea of "tying hands" by Persson and Svensson (1989) and Alesina and Tabellini (1990). In these papers, an incumbent adopts a policy that reduces the freedom of choice by his successor and doing so increases the credibility of the current policy, which as a result strengthens the political support. This paper presents a similar idea, yet with a subtle difference. In this paper, an incumbent increases the credibility of the *intention* of his current policy, i.e., to maintain stakeholders' payoffs, by *expanding*, instead of reducing, the freedom of choice by his successors.

Why does the soft lending policy increase the freedom of choice by the successors? This is not because of the irreversibility between the soft lending state and the shut-down state. In fact, even if shut-down is reversible and a politician can re-establish the firm, the option value of soft lending remains. This is simply because, once a politician repudiates on the soft lending policy, his successor can get the full political support simply by maintaining the subsidy s set initially by him. In other words, his successor will never have the incentive to re-establish the firm with a cost of π, which, by revealed preference, must be larger than $c(s)$.

The soft lending policy increases the freedom of choice by the successors because, when the loss-firm is kept alive, the stakeholders remain heterogeneous as they receive varying amounts of rents. As a result, when a successor repudiates and allows the firm shut down, he can keep some stakeholders being compensated and the policy repudiation hurts only the rest of the stakeholders. However, after the firm is shut down, all the stakeholders must be treated homogenously due to the non-discriminatory property of any government policy and, as a result, a successor's repudiation must hurt all the stakeholders. Accordingly, the soft lending policy has an option value exactly because it is not credible on the one hand (for the value arises only when there is repudiation risk) but it helps enhance the credibility of the policy intention on the other hand (for the stakeholders' payoffs decline at a slower rate when there is repudiation).

Let's now study some of the properties of condition (3). Notice that condition (3) holds when s is sufficiently large but does not hold when s is sufficiently small. Therefore there exists s_j such that the condition holds in equality for $j \in \{h, l\}$. To ensure such a solution is unique, we introduce a monotonicity assumption:

Assumption 2: $g(c(s))(\partial c/\partial s)$ is weakly monotonic for all s.

Under this assumption, the left hand side of condition (3) is increasing in s whenever condition (3) holds in equality.

Lemma 1: Suppose Assumption 2 holds. Then there exists a unique s_j such that condition (3) holds in equality for $j \in \{h, l\}$. Furthermore, $s_j > \alpha_j$ if and only if

(4) $$\alpha_j(G_p - G(c(\alpha_j)))/[1 - \delta + \delta G(c(\alpha_j))] < \int_0^\infty V(s(\lambda))p(\lambda)dG(\lambda).$$

According to Lemma 1, when an incumbent chooses a subsidy policy in the soft lending state, he will get full support (i.e., m = 1) if and only if $s(\lambda) \geq s_h$. If $s(\lambda) \in [s_l, s_h)$, he will have partial support from the low type stakeholders and hence m = q. Therefore, the incumbent will make his choice based on the following objective:

$$\max\{0, \lambda q - c(s_l), \lambda - c(s_h), \lambda - \pi\}.$$

Hereafter, we refer to s_h as a high subsidy and s_l as a low subsidy. The high subsidy invites full political support and the low subsidy invites partial support.

Without loss of generality, we can divide the domain of λ into three segments $(0, \lambda_0)$, $[\lambda_0, \lambda_1)$, and $[\lambda_1, \infty)$ (see Figure 1), where:

$$\max\{\lambda_0 q - c(s_l), \lambda_0 - c(s_h), \lambda_0 - \pi\} = 0, \text{ and}$$
$$\max\{\lambda_1 - c(s_h), \lambda_1 - \pi\} = \max\{\lambda_1 q - c(s_l), 0\}.$$

Thus defined, a subgame perfect equilibrium in this model can be characterized by a vector $\{\lambda_0, \lambda_1, s_l, s_h\}$. Politicians of type $\lambda \in (0, \lambda_0)$ allow the firm to shut down and dispense no unemployment subsidy, $s(\lambda) = 0$. These politicians receive no political support as a result. Politicians of type $\lambda \in [\lambda_0, \lambda_1)$ choose a subsidy policy with $s(\lambda) = s_l$, and they receive partial support. Politicians of type $\lambda \in [\lambda_1, \infty)$ adopt either the soft lending policy, or a subsidy policy with $s(\lambda) = s_h$, or a mix of these two kinds of policies.[11] In each case, they enjoy full political support.

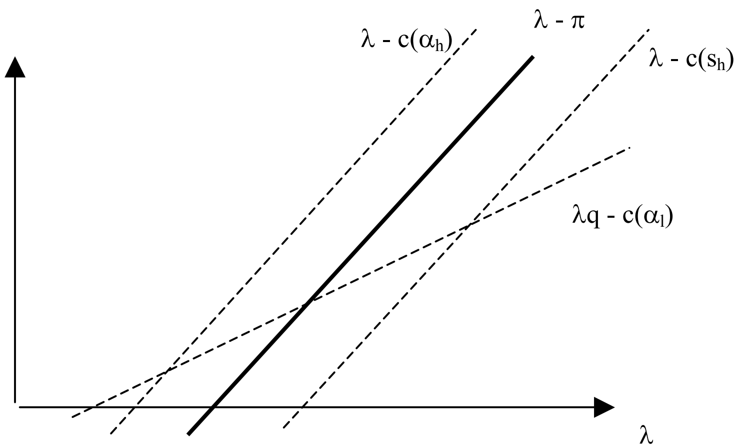

Figure 1

A mixed strategy equilibrium transpires when politicians of type $\lambda \in [\lambda_1, \infty)$ choose a mix of the soft lending policy and a subsidy policy with $s(\lambda) = s_h$. A (pure strategy) subsidy equilibrium is one where politicians of type $\lambda \in [\lambda_1, \infty)$ adopt a subsidy policy with $s(\lambda) = s_h$. And a (pure strategy) soft lending equilibrium emerges when politicians of type $\lambda \in [\lambda_1, \infty)$ adopt the soft lending policy. The values of the high subsidy s_h and the low subsidy s_l, and the values of the cut-off points, λ_0 and λ_1, will depend on the

[11] Without loss of generality, when there is a continuum of types of politicians, we do not consider the possibility of mixing the soft lending policy and a subsidy policy that invites partial support. This is because only one type of politicians will choose such a mix and, in the continuous type case, the type is of measure zero, hence having no effect on an equilibrium.

kind of an equilibrium that transpires. We therefore use superscript, $i \in \{m, s, l\}$, to indicate whether these values are attained under a mixed-strategy equilibrium (i = M), a subsidy equilibrium (i = S), or a soft lending equilibrium (i = L).

We have not specified $p(\lambda)$ for $\lambda \in [\lambda_1^M, \infty)$ in a mixed strategy equilibrium. This is because $p(\lambda)$ is indeterminate in such an equilibrium. To see this, notice that a mixed strategy exists if and only if $c(s_h^M) = \pi$, where, by the definition of s_h^M and s_l^M:

$$s_h^M[1 - \delta + \delta(G(\lambda_1^M) + \int_{\lambda 1}^{\infty} p(\lambda')dG(\lambda'))]/[1 - \delta + \delta G(c(s_h^M))] = \alpha_h + \delta V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)] + \delta V(s_h^M)\int_{\lambda 1M}^{\infty} p(\lambda')dG(\lambda'), \text{ and}$$

$$s_l^M[1 - \delta + \delta(G(\lambda_1^M) + \int_{\lambda 1}^{\infty} p(\lambda')dG(\lambda'))]/[1 - \delta + \delta G(c(s_l^M))] = \alpha_l + \delta V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)] + \delta V(s_h^M)\int_{\lambda 1M}^{\infty} p(\lambda')dG(\lambda').$$

Evidently, $p(\lambda)$ for $\lambda \in [\lambda_1^M, \infty)$ is indeterminate in a mixed strategy equilibrium except that $\int_{\lambda 1M}^{\infty} p(\lambda')dG(\lambda')$ must satisfy the equalities above. In other words:

Lemma 2: There exists either no mixed strategy equilibrium or a continuum of mixed strategy equilibria. Furthermore, among the mixed strategy equilibria, there exists a continuum of equilibria where $p(\lambda)$ is non-increasing in λ for $\lambda \in [\lambda_1^M, \infty)$.

Lemma 2 suggests a possibility in a mixed strategy equilibrium that a politician who attaches more value to his political career chooses to shut down the loss-making firm, whereas a politician who attaches less value to such an objective chooses to keep the firm afloat through soft lending instead.

Having defined the equilibrium concept in this model, let us now consider how the option value of soft lending contributes to the adoption of the soft lending policy in equilibrium. Soft lending is adopted either in a mixed strategy equilibrium or in a (pure strateg) soft lending equilibrium. A soft lending equilibrium exists if and only if $\pi \leq c(s_h^L)$. Similarly, a mixed strategy equilibrium exists if and only if $\pi = c(s_h^M)$. Since we have assumed that $\pi > c(\alpha_h)$ (Assumption 1), there exists π such that soft lending will be adopted in a dynamic setting without institutional commitment, and yet not adopted in a dynamic setting with institutional commitment, only if the high subsidy is larger than the amount of rents received by the high type stakeholders, that is, only if $s_h^L > \alpha_h$ or $s_h^M > \alpha_h$. Following Lemma 1, this implies that a necessary condition for a soft lending equilibrium to exist is:

(5) $$\alpha_h[G(\lambda_1^L) - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))] < V(s_l^L)[G(\lambda_1^L) - G(\lambda_0^L)],$$

and that a necessary condition for a mixed strategy equilibrium to exist is:

(6) $$\alpha_h[G(\lambda_1^M) - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))] < V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)].$$ [12]

Given that $\lambda_1^L - \pi \geq 0$ in a soft lending equilibrium and that $\lambda_1^M - \pi \geq 0$ in a mixed strategy equilibrium, the assumption that $\pi > c(\alpha_h)$ implies that $\lambda_1^L > c(\alpha_h)$ in a soft lending equilibrium and $\lambda_1^M > c(\alpha_h)$ in a mixed strategy equilibrium. Since g(.) is everywhere positive, this observation further implies that $G(\lambda_1^L) > G(c(\alpha_h))$ and $G(\lambda_1^L) > G(c(\alpha_h))$. In other words, the left sides of (5) and (6) are both positive. We conclude:

Proposition 1: Suppose Assumption 1 and 2 hold. Then sot lending takes place in equilibrium only if the option value of soft lending is positive in equilibrium, that is, in a soft lending equilibrium, $V(s_l^L)[G(\lambda_1^L) - G(\lambda_0^L)] > 0$; and in a mixed strategy equilibrium, $V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)] > 0$.

Proposition 1 has a number of implications. The first implication is that, if all stakeholders are homogeneous, there will be no soft lending in equilibrium. The reason is as follows. When all stakeholders are homogeneous, no one will give support to a politician that chooses the low subsidy. Accordingly, a soft lending equilibrium, if it exists, would involve some politicians choosing soft lending and the rest of politicians adopting a subsidy policy with $s(\lambda) = 0$. Similarly, a mixed strategy equilibrium, if it exists, would involve some politicians mixing soft lending and a subsidy with the high subsidy and the rest choosing $s(\lambda) = 0$. In either case, the option value in soft lending is zero. Hence:

[12] This condition is derived as follows. In a mixed strategy equilibrium, s_h^M satisfies the condition:

$$s_h^M[1 - \delta + \delta(G(\lambda_1^M) + \int_{\lambda 1}^{\infty} p(\lambda')dG(\lambda'))]/[1 - \delta + \delta G(c(s_h^M))] = \alpha_h + \delta V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)] + \delta V(s_h^M)\int_{\lambda 1M}^{\infty} p(\lambda')dG(\lambda').$$

Since $V(s_h^M) = s_h^M/[1 - \delta + \delta G(c(s_h^M))]$, the condition can be reduced to:

$$s_h^M[1 - \delta + \delta(G(\lambda_1^M)]/[1 - \delta + \delta G(c(s_h^M))] = \alpha_h + \delta V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)].$$

Following Lemma 1, $s_h^M > \alpha_h$ if and only if:

$$\alpha_h[1 - \delta + \delta(G(\lambda_1^M)]/[1 - \delta + \delta G(c(\alpha_h))] < \alpha_h + \delta V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)].$$

Rearranging the inequality above, we have that a mixed strategy equilibrium exists only if:

$$\alpha_h[(G(\lambda_1^M) - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))] < V(s_l^M)[G(\lambda_1^M) - G(\lambda_0^M)].$$

Corollary 1-1: Suppose Assumption 1 and 2 hold. Soft lending never takes place in equilibrium if all stakeholders are homogeneous.

The second implication is that there does not exist a pure-strategy soft lending equilibrium if all politicians are homogeneous. This is because a pure strategy soft lending equilibrium, if it exists, would involve all politicians choosing the soft lending policy, resulting again a zero option value in soft lending. Accordingly:

Corollary 1-2: Suppose Assumption 1 and 2 hold. There does not exist a (pure strategy) soft lending equilibrium if all politicians are homogeneous.[13]

The third implication is that, in order for soft lending to take place in equilibrium, the set $[\lambda_0^i, \lambda_1^i)$, $i \in \{M, L\}$, must be of a positive measure. In other words, the incumbent will choose soft lending only if he anticipates some of his successors may repudiate and choose a subsidy policy instead. In both a soft lending equilibrium and a mixed strategy equilibrium, λ_1^L and λ_1^M are given by $\lambda_1 q - c(s_1) = \lambda_1 - \pi$, or:

$$\lambda_1^i = (\pi - c(s_l^i))/(1 - q),\ i \in \{M, L\},$$

and λ_0^L and λ_0^M are given by $\lambda_0 q - c(s_1) = 0$, or:

$$\lambda_0^i = c(s_l^i)/q,\ i \in \{M, L\}.$$

Thus, $\lambda_1^i > \lambda_0^i$ if and only if $(\pi - c(s_1^i))/(1 - q) > c(s_1^i)/q$, $i \in \{M, L\}$. Or:

$$\pi > c(s_1^i)/q,\ i \in \{M, L\}. \quad (7)$$

Corollary 1-3: Suppose Assumption 1 and 2 hold. Then soft lending takes place in equilibrium only if at least one of the following two conditions holds:

(a) $\pi > c(s_l^L)/q$ in the case of a (pure strategy) soft lending equilibrium; and

[13] It turns out that a mixed-strategy soft lending equilibrium may exist in this case. In such a mixed-strategy equilibrium, a positive measure of politicians mix the low subsidy that invites only partial support and soft lending.

(b) $\pi > c(s_l^M)/q$ in the case of a mixed equilibrium.

4.2 Soft Lending in Equilibrium

Under what conditions will soft lending emerge in equilibrium, let it be a (pure strategy) soft lending equilibrium or a mixed strategy equilibrium? To explore these conditions, we examine the (non) existence of a (pure strategy) subsidy equilibrium.

In a subsidy equilibrium, politicians will always repudiate on a soft lending policy in a subsidy equilibrium, i.e, $G_p = 1$. Consequently, the amounts of unemployment subsidies, s_l^S and s_h^S are given by:

(8) $$s_l^S/[1 - \delta + \delta G(c(s_l^S))] = \alpha_l + \delta\int_0^\infty V(s(\lambda))dG(\lambda), \text{ and}$$

(9) $$s_h^S/[1 - \delta + \delta G(c(s_h^S))] = \alpha_h + \delta\int_0^\infty V(s(\lambda))dG(\lambda).$$

Subtracting (8) from (9), we have:

(10) $$s_h^S/[1 - \delta + \delta G(c(s_h^S))] - s_l^S/[1 - \delta + \delta G(c(s_l^S))] = \alpha_h - \alpha_l.$$

After some manipulations, we are able to show a simple condition under which $s_h^S > \alpha_h$.

Lemma 3: Suppose Assumption 2 holds. Then in any subsidy equilibrium, $s_h^S \geq \alpha_h$, and $s_h^S = \alpha_h$ if and only if $G(\lambda_1^S) = G(\lambda_0^S)$.

Lemma 3 has an important implication. Since a subsidy equilibrium exists if and only if $c(s_h) \leq \pi$, there exists $\pi > c(\alpha_h)$ such that a subsidy equilibrium will not exist unless $s_h = \alpha_h$. Notice that, when $G(\lambda_1^S) = G(\lambda_0^S)$, no politicians will choose the low subsidy s_l^S in the soft lending state. The intuition of Lemma 3 is as follows.

Suppose politicians either choose either the high subsidy $s_h^S = \alpha_h$ or choose no subsidy at all in the soft lending state. Then if an incumbent chooses soft lending in the soft lending state, a high type stakeholder gets α_h in the current period and faces probability $G(c(\alpha_h))$ of getting nothing in the next period (since $s_h^S = \alpha_h$). If the incumbent chooses the high subsidy instead in the soft lending state, a high type stakeholder also gets α_h in the current period and, for the same reason as before, faces the same probability

$G(c(\alpha_h))$ of getting nothing in the next period. This implies that a high type stakeholder will be indifferent whether the incumbent chooses the high subsidy $s_h^S = \alpha_h$ or soft lending. Since $\pi > c(\alpha_h)$, the incumbent is better off to choose a subsidy policy with $s_h^S = \alpha_h$.

Suppose instead that $G(\lambda_1^S) - G(\lambda_0^S) \equiv p > 0$, that is, some politicians will choose the low subsidy s_l^S. Then if an incumbent chooses the high subsidy s_h^S in the soft lending state, a high type stakeholder gets α_h in the current period and faces probability $G(c(\alpha_h))$ of getting nothing in the next period. However, if the incumbent chooses soft lending instead in the soft lending state, a high type stakeholder gets α_h in the current period and faces probability $G(c(\alpha_h)) - p$ of getting nothing and probability p of getting the low subsidy s_l^S in the next period. Therefore, a high type stakeholder would prefer the soft lending policy to a subsidy policy with the unemployment subsidy set only at the level of α_h. This implies that, in order to obtaining full political support, the incumbent must set the high subsidy higher than α_h.

To find conditions under which $G(\lambda_1^S) = G(\lambda_0^S)$, we substitute $s_h^S = \alpha_h$ into (10) and solve s_l^S accordingly. Define $s^* = s_l^S(s_h^S = \alpha_h)$, we get:

(11) $$s^*/[1 - \delta + \delta G(c(s^*))] = \delta\alpha_h[1 - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))] + \alpha_l.$$

We can then state a simple necessary and sufficient condition for soft lending to be adopted in equilibrium:

Proposition 2: Suppose Assumption 1 and 2 hold. Let s* be given by (11). There exists $\pi > c(\alpha_h)$ such that soft lending takes place in equilibrium if and only if:

(12) $$c(\alpha_h) > c(s^*)/q.$$

Proof of Proposition 2: We show first that, when $c(\alpha_h) > c(s^*)/q$ holds, $s_h^S > \alpha_h$. Suppose otherwise. Then $s_l^S = s^*$. Therefore, $c(\alpha_h) > c(s^*)/q$ implies that $G(\lambda_1^S) - G(\lambda_0^S) > 0$, which in turn implies $s_h^S > \alpha_h$. Contradiction. Next, we show that, if $s_h^S = \alpha_h$, $c(\alpha_h) \le c(s^*)/q$. Again, $s_l^S = s^*$ when $s_h^S = \alpha_h$. According to Lemma 3, this is an outcome for a subsidy equilibrium if and only if $G(\lambda_1^S) - G(\lambda_0^S) = 0$, or $c(\alpha_h) \le c(s^*)/q$.

When $s_h^S > \alpha_h$, there exists π such that $c(s_h^S) > \pi > c(\alpha_h)$. Accordingly, a subsidy equilibrium does not exist, implying that there is either a soft lending equilibrium or a continuum of mixed strategy equilibria. In either case, soft lending takes place in equilibrium.

Q.E.D.

Rewriting condition (12) as $s^* < c^{-1}(qc(\alpha_h))$ and (11) as $s^* < \delta\alpha_h[1 - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))] + \alpha_1$, we have a sufficient condition for soft lending take place in equilibrium:

(13) $$c^{-1}(qc(\alpha_h)) - \alpha_1 > \delta\alpha_h[1 - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))].$$

Condition (3), holding in equality, defines an implicit function $f(q, \alpha_1) = 0$ where $\partial f/\partial q > 0$ and $\partial f/\partial\alpha_1 > 0$.

Corollary 2-1: Suppose Assumption 1 and 2 hold. Fixing α_h, there exists an implication function, $f(q, \alpha_1) = 0$ where $\partial f/\partial q > 0$ and $\partial f/\partial\alpha_1 > 0$. If $f(q, \alpha_1) > 0$, then there exists $\pi > c(\alpha_h)$ such soft lending takes place in equilibrium.

Figure 2 illustrates this corollary. In this figure, soft lending takes place if (q, α_1) falls into the upper corner of the $qx\alpha_1$ space. Notice that, for soft lending to take place, q must bounded below by a positive number, as it is made clear in Corollary 1-1.

Corollary 2-1 illustrates the relation between soft lending and the structure of rents received by the stakeholders during their employment. Indeed, if we assume that there is no deadweight loss in making transfer payments to the stakeholders, i.e., $c(s) – s = 0$. Then (13) can be reduced to $q - \alpha_1/\alpha_h > 1/[1 - \delta + \delta G(\alpha_h)] – 1$, which can be further reduced:

(14) $$q - \alpha_1/\alpha_h > \delta/(1 - \delta).$$

Corollary 2-2: Suppose Assumption 1 and 2 hold. Suppose in addition that $c(s) – s = 0$. Then There exists $\pi > c(\alpha_h)$ such that soft lending takes place in equilibrium if condition (14) holds.

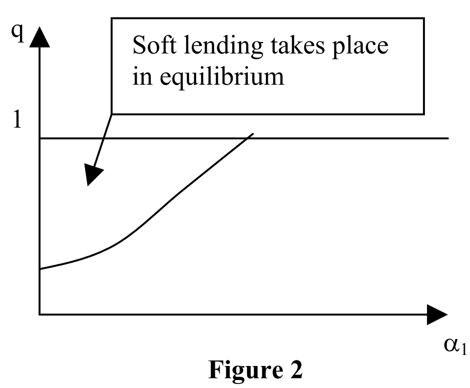

Figure 2

Another interesting observation we draw from (11) is that the right hand side of (11) is increasing in δ. This implies that there exists $\pi > c(\alpha_h)$ such soft lending takes place in equilibrium if δ is sufficiently small, yet remains positive[14] (see also condition (14)). A word of caution, however: this observation does not imply that, fixing π, soft lending is more likely to take place when δ is smaller.

We can also draw another observation from (13). Notice that the right-hand side of (13) is decreasing in $G(c(\alpha_h))$. This implies, if a density function G(.) satisfies condition (13), then soft lending may take place for any density function F(.) that G(.) first order stochastically dominates. That is:

Corollary 2-3: Suppose Assumption 1 and 2 hold. Suppose in addition that a density function G(.) satisfies condition (13). Then There exists $\pi > c(\alpha_h)$ such that soft lending takes place in equilibrium for a density function F(.) that G(.) first order stochastically dominates.

4.3 The Existence of a Soft Lending Equilibrium

The discussion above identifies conditions under which soft lending takes place either in a mixed strategy equilibrium or in a pure strategy equilibrium. In this subsection, we examine when soft lending will be adopted in a pure strategy equilibrium. Recall from (7) that a (pure strategy) soft lending equilibrium exists only if $\pi > c(s_1^L)/q$. An incumbent politician will not deviate from soft lending and choose the high subsidy instead in a soft lending equilibrium if and only if $\pi < c(s_h^L)$. Combining these two conditions together, we can conclude that:

Lemma 4: The necessary and sufficient condition for a soft lending equilibrium to exist is:

(15) $$c(s_h^L) > \pi > c(s_1^L)/q.$$

The question we will address in this section is whether there exists π, which satisfies Assumption 1 ($\pi > c(\alpha_h)$), such that (15) is satisfied. To address the question, we calculate s_l^L and s_h^L in a soft lending equilibrium. Recall that $\lambda_1^L = (\pi - c(s_l^L))/(1 - q)$ and $\lambda_0^L = c(s_l^L)/q$. Therefore, the option value of soft lending is $\int_0^{\lambda 1} V(s(\lambda))dG(\lambda) = (G(\lambda_1^L) - G(\lambda_0^L))s_l^L/[1 - \delta + \delta G(c(s_l^L))]$. Since the repudiation risk of a soft lending policy is $G(\lambda_1^L)$ in the soft lending equilibrium, we have s_l^L such that:

[14] When $\delta = 0$, soft lending has no option value.

(16) $$s_l^L/[1 - \delta + \delta G(c(s_l^L))] = \alpha_l/[1 - \delta + \delta G(c(s_l^L)/q)],$$

and s_h^L such that:

(17) $$s_h^L[1 - \delta + \delta G((\pi - c(s_l^L))/(1 - q))]/[1 - \delta + \delta G(c(s_h^L))] =$$
$$\alpha_h + \delta s_l^L[G((\pi - c(s_l^L))/(1 - q)) - G(c(s_l^L)/q)]/[1 - \delta + \delta G(c(s_l^L))].$$

Equation (17) derives implicitly a function $s_h^L(\pi)$. The next lemma shows that, in a soft lending equilibrium, the higher the cost of soft lending, the smaller the off-equilibrium high subsidy, s_h^L, will be.

Lemma 5: $\partial s_h^L/\partial\pi < 0$ in a soft lending equilibrium.

The intuition is as follows. When the cost of soft lending increases, some politicians will switch to the low subsidy policy. This tends to increase the option value of soft lending, as evidenced by the second term on the right-hand side of (17). However, at the same time the increase in the cost of soft lending also implies a higher risk of repudiation on the soft lending policy, reflected on the left-hand side of (17). Because $s_h^L > s_l^L$ and therefore $s_h^L/[1 - \delta + \delta G(c(s_h^L))] > s_l^L/[1 - \delta + \delta G(c(s_l^L))]$, and s_l^L is independent of s_h^L and π; the increase in the repudiation risk has a larger impact on the soft lending policy than the increase in the option value. In other words, the increase in π increases marginally the popularity of the high subsidy policy. As a result, the off-equilibrium high subsidy s_h^L will decline.

Lemma 5 implies that, given the assumption that $\pi > c(\alpha_h)$, there exists π that satisfies (15) if and only if $\lim s_h^L(\pi) > \alpha_h$ when π approaches $\max\{c(\alpha_h), c(s_l^L)/q\}$, as the next figure illustrates. To put it differently, a soft lending equilibrium exists for $\pi > c(\alpha_h)$, only if a soft lending equilibrium exists when π is infinitely close to $\max\{c(\alpha_h), c(s_l^L)/q\}$. Figure 3 illustrates this observation with the case where $\lim s_h^L(\pi) > \alpha_h$ when π approaches $c(\alpha_h)$. In order for a soft lending equilibrium to exist, the option value of soft lending must be positive. Combining these observations together, we know that, in order for a soft lending equilibrium to exist for $\pi > c(\alpha_h)$, the option value for soft lending must be positive when π is infinitely close to $\max\{c(\alpha_h), c(s_l^L)/q\}$. However, it turns out that, if $c(\alpha_h) \leq c(s_l^L)/q$, the option value converges to zero when π approaches $\max\{c(\alpha_h), c(s_l^L)/q\}$. Therefore:

Lemma 6: Suppose Assumption 1 and 2 hold. There exists $\pi > c(\alpha_h)$ such that a soft lending equilibrium exists only if:

(18) $$c(\alpha_h) > c(s_l^L)/q.$$

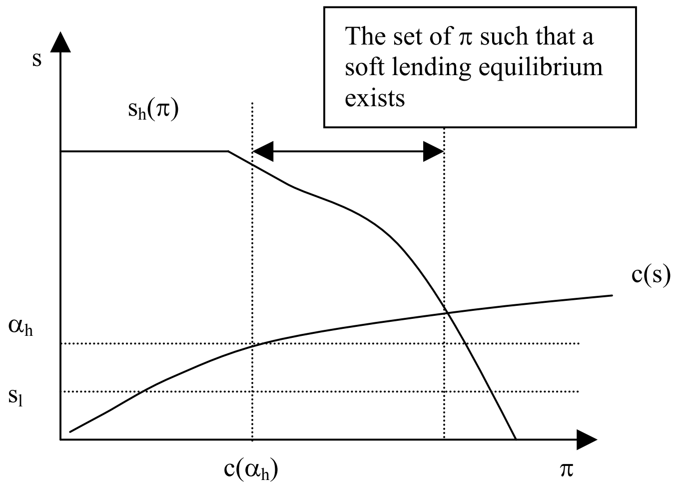

Figure 3

Following (16), we have $s_l^L > \alpha_l(1 - \delta)/[1 - \delta + \delta G(c(s_l^L)/q)] > \alpha_l(1 - \delta)$. Hence we can derive a corollary to Lemma 6, which, complementing our earlier discussion, adds another picture of how the structure of rents received by the stakeholders relates to the soft lending phenomenon in equilibrium:

Corollary 3-1: Suppose Assumption 1 and 2 hold. There exists $\pi > c(\alpha_h)$ such that a soft lending equilibrium exists only if:

(19) $$c^{-1}(qc(\alpha_h)) > \alpha_l(1 - \delta).$$

Assuming that $c(\alpha_h) > c(s_l^L)/q$, where s_l^L is given by (16), we substitute $\pi = c(\alpha_h)$ into (17). According to Lemma 1, $\lim_{\pi \to \alpha h} s_h(\pi) < \alpha_h$, if and only if:

(20) $$\alpha_h[G((c(\alpha_h) - c(s_1^L))/(1 - q)) - G(c(\alpha_h))]/[1 - \delta + \delta G(c(\alpha_h))] <$$
$$\alpha_1[G((c(\alpha_h) - c(s_1^L))/(1 - q)) - G(c(s_1)/q)]/[1 - \delta + \delta G(c(s_1^L)/q)].$$

Proposition 3: Suppose that Assumption 1 and 2 hold. Let s_1^L be given by (16). There exists π such that a soft lending equilibrium exists if and only if $c(\alpha_h) > c(s_1^L)/q$ and condition (20) holds.

A soft lending equilibrium exists because the soft lending policy affects the decision of the stakeholders in political support. As we suggested earlier, such a decision would change when there is no institutional commitment towards a government policy. In particular, the stakeholders have to take into account the option value of soft lending, as well as the relative repudiation risks on the soft lending policy and on a subsidy policy. Which of these two factors then contributes to the existence of a soft lending equilibrium?

In a soft lending equilibrium, the repudiation risk in soft lending equals $G((\pi - c(s_l^L))/(1 - q))$, while the repudiation risk on the off-equilibrium high subsidy policy is $G(c(s_h^L(\pi)))$. As it turns out, it is possible that $G((\pi - c(s_l^L))/(1 - q)) < G(c(s_h^L(\pi)))$.[15] However, such a possibility does not imply that the higher repudiation risk on the off-equilibrium subsidy policy actually contribute to the existence of a soft lending equilibrium. To understand this argument, notice that the repudiation risk on soft lending is lower than that on the off-equilibrium high subsidy policy if and only if $s_h^L \geq s^*$ where $c(s^*) \equiv (\pi - c(s_l^L))/(1 - q)$. However, since $\pi \geq c(\alpha_h)$ and, in order for a soft lending equilibrium to exist, $c(\alpha_h) > c(s_l^L)/q$, therefore $c(s^*) > c(\alpha_h)$. In other words, the higher repudiation risk on the off-equilibrium high subsidy policy does not contribute to the existence of a soft lending equilibrium. Instead, it is the existence of a soft lending equilibrium that may in some instances lead to a higher repudiation risk on the off-equilibrium high subsidy policy. To conclude, a soft lending equilibrium exists only because the option value in soft lending becomes large enough.

4.4 The Extent of Soft Lending in a Soft Lending Equilibrium

In this subsection, we consider two issues. First, in a soft lending equilibrium, the loss-making firm will be kept alive in each period through soft lending with probability $1 - G(\lambda_1^L)$. Thus, after N periods, the likelihood that the firm is still in the soft lending state is $(1 - G(\lambda_1^L))^N$. Eventually, the firm will go bankrupt. In reality, however, many loss-making firms are kept alive for a rather extended period of time. The question we would like to address, therefore, is whether our model can predict such a phenomenon.

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[15] See footnote 17 in the Appendix.

To address this question, notice that condition (20) can be substantially reduced when c(s) = s, i.e., no deadweight loss involved in a subsidy policy, and g(.) is a uniform distribution. To see this, let G(c(s)) = ks where k is constant given by a uniform distribution function with the support of (0, 1/k), where k is appropriately defined so that the aforementioned analysis is valid. Condition (20) can then be rewritten as:

$$\alpha_h k[(\alpha_h - s_1)/(1 - q) - \alpha_h]/(1 - \delta + \delta k\alpha_h) < \alpha_1 k[(\alpha_h - s_1)/(1 - q) - s_1/q]/(1 - \delta + \delta k s_1/q),$$

or,

$$(1 - \delta)(\alpha_h - \alpha_1/q) < \delta k\alpha_h(\alpha_1/q - s_1/q). \tag{21}$$

Corollary 4-1: Suppose Assumption 1hold. Suppose further that c(s) = s for $s \leq \alpha_h$ and λ is uniformly distributed in the interval (0, 1/k) with $1/k > \alpha_h$. Then:

(1) there exists π such that a soft lending equilibrium exists if $\alpha_h \in (s_1^L/q, \alpha_1/q]$, and

(2) in such an equilibrium, the likelihood that soft lending is offered in each period is almost equal to one when $k \to 0$.

The first part of the corollary is derived directly from condition (21). The second part is based on the fact that the likelihood of soft lending in each period is equal to $G(\lambda_1^L) = [1 - k(\pi - s_1^L)/(1 - q)]$. Therefore, $\lim_{k\to 0} G(\lambda_1^L) = 1$. In other words, in such a soft lending equilibrium, the loss-making firm will almost surely be kept alive for an extended period of time.

Second, while Proposition 3 shows the possible existence of π under which a soft lending equilibrium will emerge, it does not explain, however, how costly soft lending could be in such an equilibrium. Is it possible for a soft lending equilibrium to exist even when the net cost of soft lending π is sufficiently large?

To address this question, we look at Figure 3 again. As illustrated in Figure 3, if $c(s) = \infty$ for $s > \alpha_h$, then a soft lending equilibrium may exist for a very large π, provided that $s_h^L(\pi)$ stays above α_h. To formalize such a possibility, consider the following case of two-type politicians, where politicians are one of the two types, $\lambda \in \{\lambda^l, \lambda^h\}$, with $\text{Prob}(\lambda = \lambda^l) = p > 0$ and $\text{Prob}(\lambda = \lambda^h) = 1 - p$. We show in the next result that it is possible for $s_h^L(\pi)$ to be bounded below by α_h.

Corollary 4-2: Suppose that Assumption 1 hold, and suppose in addition that politicians are one of two types, $\lambda \in \{\lambda^l, \lambda^h\}$. Then:

(1) there exists π, δ, p, λ^l, and λ^h for a pure strategy soft lending equilibrium if and only if $c(\alpha_h) > c(\alpha_l)/q$, and

(2) in such an equilibrium, $s_h^L(\pi) > \alpha_h$ for all π such that $\pi > c(\alpha_h)$ and $\lambda^h > (\pi - c(\alpha_l))/(1 - q)$.

4.5 The Welfare of a Soft Lending Equilibrium

We conclude this section with a welfare analysis of a soft lending equilibrium. In particular, we are interested in the following question. Suppose a soft lending equilibrium emerges when there is no institutional commitment. Does the lack of institutional commitment and hence the adopt of soft lending in equilibrium necessarily make things worse off? To answer the question, we compare the social surplus achieved in a soft lending equilibrium with that attained when there is institutional commitment.

Without loss of generality, let us suppose that the government agency institutes an unemployment subsidy at α_h at the cost of $c(\alpha_h)$ under institutional commitment. This policy transfers α_h to every stakeholder. The only social cost is the deadweight loss associated with the transfer payment, which equals $c(\alpha_h) - \alpha_h$.

In comparison, the soft lending policy in a soft lending equilibrium has a social cost equal to $\pi - (1 - q)\alpha_h - q\alpha_l$, because the stakeholders receive only their private benefits as a result of the soft lending policy. Therefore, in a period where the firm is kept alive through soft lending, the soft lending equilibrium inflicts relative efficiency loss in the amount of:

$$\pi - c(\alpha_h) + q(\alpha_h - \alpha_l).$$

However, in a soft lending equilibrium, the soft lending policy will eventually give way, in the probabilistic sense, to a low subsidy policy and in the end no subsidy at all. When the subsidy policy is instituted in a soft lending equilibrium, the social cost is equal to $c(s_l^L) - s_l^L$. Thus in a period where the firm is eventually shut down and the unemployment subsidy is dispensed, the relative efficiency loss of the soft lending equilibrium is:

$$c(s_l^L) - s_l^L - (c(\alpha_h) - \alpha_h).$$

Since s_l^L is less than α_h, $c(s_l^L) - s_l^L – (c(\alpha_h) - \alpha_h)$ will be negative if $c(s) > s$ and $c(s) – s$ is increasing in s. Furthermore, when an incumbent repudiates on the low subsidy policy, the relative efficiency loss of a soft lending equilibrium will be:

$$– (c(\alpha_h) - \alpha_h).$$

Therefore, if $c(s) = s$, having institutional commitment improves social welfare. On the other hand, if transfer payment through a subsidy policy involves a significant amount of deadweight loss, i.e., if $c(s) – s$ is sufficiently large, and furthermore if $c(s) – s$ is increasing in s, it is clearly possible that the efficiency loss incurred in a soft lending equilibrium becomes smaller than that incurred under institutional commitment. Such a possibility comes from our assumption that it is efficient to shut down the loss-making firm and giving no unemployment subsidy to the stakeholders when the transfer payment involves deadweight loss. When there is institutional commitment, the government agency may start by giving out unemployment subsidies and the deadweight loss associated with such transfer payment will linger on forever. In a soft lending equilibrium without institutional commitment, the government policy starts being even more inefficient as it may keep the firm alive through soft lending. However, exactly due to the lack of commitment, the government agency eventually shuts down the firm and trims down the unemployment subsidy to zero.

5. Conclusions

This paper studies the question: why politicians, seeking political support from workers and managers who stand to lose from the closure of their loss-making firms, choose to subsidize these loss-making firms instead of subsidize these workers and managers directly, despite the fact that it is more costly to subsidize the firms. The question has much broader implications than the context in which it is raised. In its essence, it is a question about a puzzling phenomenon, prevalent in daily economy life, where a potentially Pareto improving policy is not adopted despite the possibility of keeping losers compensated. The phenomenon points to the failure of the Coase theorem in the political economy framework, that is, a Pareto improving outcome fails to emerge through political bargaining.

Our study reveals one possible answer to this question. The answer focuses on the dynamic inconsistency of such a potentially Pareto improving policy. In this paper, shutting down the loss-making firm and subsidizing the stakeholders is potentially Pareto improving. Dynamic inconsistency arises because the preferences of incumbent politicians differ.

Nonetheless, this is not the entire story. In fact, the starting point of our study is to recognize the dynamic inconsistency may be inherent to both a potentially Pareto improving policy and the status quo, that is, subsidizing the loss-making firm in this paper. However, as long as politicians can keep losers partially compensated when they abandon the inefficient status quo and embrace the potentially Pareto improving policy, but they must keep losers fully compensated when they repudiate on the potentially Pareto improving policy, there will be an option value of maintaining the inefficient status quo. Such an option value, when it is large enough, induces politicians to delay the adoption of the more efficient policy.

In the context of this paper, politicians may keep losers partially compensated when they shut down the firm for a fairly natural reason: the heterogeneity in the amount of rents that these stakeholders enjoy during employment and the inability for politicians to fully observe such heterogeneity. In other words, two fairly common elements derive the option value of maintaining an inefficient status quo: heterogeneous constituents and information asymmetry between the politicians and the constituents concerning such heterogeneity.[16]

Accordingly, the analysis put forward by this paper, although aimed at explaining the soft budget constraint syndrome, is indeed more general than its context. For instance, one may use a similar analysis to explain why apparently inefficient investments funded by the government keep pouring into economically deprived regions or into sunset industries. More than often, such investments play the role of economic assistance for the potential losers in such regions or industries, just as the soft lending policy in this model functioning as making transfer payments to the stakeholders. Clearly, the two conditions, heterogeneity in the potential losers' payoffs and the information asymmetry for politicians with regard to such heterogeneity, stand and therefore there is an option value for continuing investing in such regions or industries, despite the apparent inefficiency.

[16] Alesina and Drazen (1991) also show the possibility that the adoption an efficient policy may be delayed in equilibrium. The delay arises also because of information asymmetry in political bargaining, albeit in a context of direct democracy, and via a completely different mechanism. In their paper, delay helps reveal private information and hence helps redistribute informational rents *à la* "war of attrition".

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Appendix

Proof of Lemma 1: Notice first that (3) does not hold when s is sufficiently small but does hold when s is sufficiently large. Therefore, there exists some s_j such that (3) holds in equality for $j \in \{l, h\}$. Next, we prove that such a solution is unique.

To do so, we differentiate the left-hand side of (3) with respect to s. We find the sign of the first order derivative to be equal to:

$$\mathrm{Sgn}\{1 - \delta + \delta G(c(s)) - s\delta g(c(s))(\partial c/\partial s)\}.$$

Obviously,

$$1 - \delta + \delta G(c(s)) > s\delta g(c(s))(\partial c/\partial s), \text{ when s is sufficiently small.}$$

Furthermore, $1 - \delta + \delta G(c(s))$ is increasing in s with the derivative being $\delta g(c(s))\partial c/\partial s$; whereas the derivative for $s\delta g(c(s))(\partial c/\partial s)$ is $\delta g(c(s))\partial c/\partial s + s\delta\partial[g(c(s))(\partial c/\partial s)]/\partial s$.

If $g(c(s))(\partial c/\partial s)$ is monotonically weakly decreasing in s, we have

$$\delta g(c(s))\partial c/\partial s > \delta g(c(s))\partial c/\partial s + s\delta\partial[g(c(s))(\partial c/\partial s)]/\partial s;$$

therefore, $1 - \delta + \delta G(c(s)) > s\delta g(c(s))(\partial c/\partial s)$ for all s. In other words, the left-hand side of (3) is strictly increasing. Since (3) does not hold when s is sufficiently small but does hold when s is sufficiently large, there exists a unique s_j such that (3) holds in equality for $j \in \{l, h\}$.

If $g(c(s))(\partial c/\partial s)$ is monotonically increasing in s, we have $1 - \delta + \delta G(c(s))$ increasing at a slower rate than $s\delta g(c(s))(\partial c/\partial s)$ for all s. Since $1 - \delta + \delta G(c(s)) > s\delta g(c(s))(\partial c/\partial s)$ when s is sufficiently small, we can conclude that, if there exists a solution to the equation $1 - \delta + \delta G(c(s)) - s\delta g(c(s))(\partial c/\partial s) = 0$, the solution must be unique. In other words, if $g(c(s))(\partial c/\partial s)$ is monotonically increasing in s, the left-hand side of (3) is either increasing in s, or has a single peak in s. Since condition (3) does not hold when s is sufficiently small but does hold when s is sufficiently large, this implies that there exists a unique s_j such that (3) holds in equality for $j \in \{l, h\}$ in this case as well.

Therefore, provided that $g(c(s))(\partial c/\partial s)$ is weakly monotonic in s, there exists a unique s_j such that (3) holds in equality for $j \in \{l, h\}$. Finally, the fact that (3) does not hold when s is sufficiently small implies that the left-hand side of (3) must be increasing for $s < s_j$. Therefore, if (3) does not hold when $s = \alpha_j$, $s_j > \alpha_j$, for $j \in \{l, h\}$.

Q.E.D.

Proof of Lemma 3: In a subsidy equilibrium, $\lambda_0^S = c(s_l^S)/q$ and λ_1^S is given by $\lambda_1^S q - c(s_l^S) = \lambda_1^S - c(s_h^S)$, or $\lambda_1^S = (c(s_h^S) - c(s_l^S))/(1 - q)$. Accordingly, the option value of soft lending in a subsidy equilibrium is equal to:

(A.1) $\int_0^{\infty} V(s(\lambda))dG(\lambda) = [G(\lambda_1^S) - G(\lambda_0^S)]s_1^S/[1 - \delta + \delta G(c(s_l^S))] + [1 - G(\lambda_1^S)]s_h^S/[1 - \delta + \delta G(c(s_h^S))].$

Substituting (A.1) and (8) into (10), we have:

(A.2) $$s_h^S[1 - \delta + \delta G(\lambda_1^S)]/[1 - \delta + \delta G(c(s_h^S))] = \alpha_h + \delta[G(\lambda_1^S) - G(\lambda_0^S)]s_1^S/[1 - \delta + \delta G(c(s_1^S))]$$

Combining (10) and (A.2) together, we get:

(A.3) $$s_h^S[1 - \delta + \delta G(\lambda_0^S)]/[1 - \delta + \delta G(c(s_h^S))] = \alpha_h + \delta[G(\lambda_1^S) - G(\lambda_0^S)](\alpha_l - \alpha_h).$$

Now, suppose that $G(\lambda_1^S) - G(\lambda_0^S) = 0$ and consequently politicians either choose s_h or zero in this subsidy equilibrium. Accordingly, $c(s_l^S)/q = (c(s_h^S) - c(s_l^S))/(1 - q)$, or $c(s_h^S) = c(s_l^S)/q$. Hence $\lambda_0^S = c(s_h^S)$. Furthermore, (A.3) can be reduced to $s_h[1 - \delta + \delta G(c(s_h))]/[1 - \delta + \delta G(c(s_h))] = \alpha_h$, or $s_h = \alpha_h$.

Suppose instead that $G(\lambda_1^S) - G(\lambda_0^S) > 0$. Since $G(c(s_h^S)) > G(\lambda_1^S) = G((c(s_h^S) - c(s_l^S))/(1 - q))$, (A.3) holds only if:

$$s_h^S[1 - \delta + \delta G(\lambda_0^S)]/[1 - \delta + \delta G(c(s_h^S))] > \alpha_2 + \delta(G(c(s_h^S)) - G(\lambda_0^S))(\alpha_l - \alpha_h).$$

While both the left-hand side and the right-hand side of the inequality above are increasing in $G(\lambda_0^S)$, the left-hand side is increasing at a faster rate in $G(\lambda_0^S)$ than the right-hand side because $s_h^S/[1 - \delta + \delta G(c(s_h^S))] > \alpha_h - \alpha_l$ (see equation (10)). Since $G(\lambda_0^S) < G(\lambda_1^S) < G(c(s_h^S))$, the inequality above holds only if

$$s_h^S[1 - \delta + \delta G(c(s_h^S))]/[1 - \delta + \delta G(c(s_h^S))] > \alpha_h + \delta(G(c(\alpha_h)) - G(c(s_h)))(\alpha_l - \alpha_h),$$

or

$$s_h^S > \alpha_h + \delta(G(c(\alpha_h)) - G(c(s_h)))(\alpha_l - \alpha_h).$$

This inequality implies that $s_h^S > \alpha_h$. This is because otherwise $\alpha_h + \delta(G(c(\alpha_h)) - G(c(s_h^S)))(\alpha_l - \alpha_h) > \alpha_h$, contradiction.

Q.E.D.

Proof of Lemma 4: When $c(s_h^L) > \pi$, an incumbent politician will prefer soft lending to the high subsidy policy. Evidently, a λ type incumbent prefers soft lending to the low subsidy policy, in which case he gets only partial support, or a policy that offers the stakeholders zero subsidy when shutting down the firm, in which case he gets no support. Since $\pi > c(s_1^L)/q$, the option value of soft lending is positive. Thus the necessary condition for a soft lending equilibrium is also satisfied.

Q.E.D.

Proof of Lemma 5: Notice that the left-hand side of (17) is less than the right-hand side if s_h^L is sufficiently small. Furthermore, according to Lemma 1, the solution to (17) is unique. Together, these two observations imply the left-hand side of (17) must be increasing in s_h^L when the equation holds. The same argument holds regarding (16) and s_l^L.

Differentiating (17) with respect to π, we have:

$$\partial\{s_h^L[1 - \delta + \delta G((\pi - c(s_l^L))/(1 - q))]/[1 - \delta + \delta G(c(s_h^L))]\}/\partial s_h^L \ (\partial s_h^L/\partial\pi)$$

$$= \delta/(1 - q)g((\pi - c(s_l^L))/(1 - q))\{s_1^L/[1 - \delta + \delta G(c(s_l^L))] - s_h^L/[1 - \delta + \delta G(c(s_h^L))]\}.$$

As we argued above, $s/[1 - \delta + \delta G(c(s))]$ is increasing in s when $s = s_l^L$ or when $s = s_h^L$. Therefore, $\partial s_h^L/\partial\pi < 0$ if and only if $s_l^L < s_h^L$. Since $\alpha_h > \alpha_l$ and since $s/[1 - \delta + \delta G(c(s))]$ is increasing in s when $s = s_l^L$ or when $s = s_h^L$, it is evident that $s_h^L > s_l^L$ in any soft lending equilibrium. Therefore we conclude that $\partial s_h^L/\partial\pi < 0$ in a soft lending equilibrium.

Q.E.D.

Proof of Lemma 6: Suppose $c(\alpha_h) \leq c(s_1^L)/q$. Then π approaches $\max\{c(\alpha_h), c(s_l^L)/q\} = c(s_l^L)/q$, $\lambda_1 = (\pi - c(s_l^L))/(1 - q) = c(s_lL)/q = \lambda_0^L$. As a result, $G(\lambda_1^L) = G(\lambda_0^L)$ when π approaches $c(s_1^L)/q$, implying that $\lim s_h^L(\pi) < \alpha_h$ following Proposition 1.

Q.E.D.

Proof of Corollary 4-2: First, the necessary condition. To understand why $c(\alpha_h) > c(\alpha_l)/q$ is also necessary for a pure strategy soft lending equilibrium to exist, recall the earlier discussion that $c(\alpha_h) > c(s_1)/q$ is a necessary condition for a soft lending equilibrium. When politicians are of two types, a positive option value of soft lending implies $G(\lambda_1^L) = 0$ and $G(c(s_1^L)) \leq G(c(s_1^L)/q) = 0$ in a pure strategy soft lending equilibrium. Accordingly, $s_1^L = \alpha_1$ following (16). Hence, $c(\alpha_h) > c(s_l^L)/q$ if and only if $c(\alpha_h) > c(\alpha_l)/q$.

We now turn to the sufficient condition. We choose λ^l such that $c(\alpha_1)/q < \lambda^l < \min\{c(\alpha_h), (1 - \delta)\alpha_h + \delta p\alpha_1\}$. Since $\lambda^l > c(\alpha_1)/q > c(\alpha_1)$, $G(c(\alpha_1)) = G(c(\alpha_1)/q) = 0$. It is then evident that $s_1^L = \alpha_1$ constitute a solution to equation (16). Since $s_1^L = \alpha_1$, $c(\alpha_h) > c(\alpha_1)/q$ implies that $c(\alpha_h) > c(s_1^L)/q$. In addition, we choose λ^h and π such that $\pi > c(\alpha_h)$ and $\lambda^h > (\pi - c(\alpha_l))/(1 - q)$. Accordingly, (17) can be rewritten as:

$$s_h^L(1 - \delta + \delta p)/[1 - \delta + \delta G(c(s_h))] = \alpha_h + \delta\alpha_1 p/(1 - \delta).$$

We show first that $c(s_h^L) > \lambda^l$. Suppose otherwise, then $G(c(s_h^L)) = 0$. Accordingly,

$$s_h^L = [(1 - \delta)\alpha_h + \delta p\alpha_1]/(1 - \delta + \delta p).$$

Since $c(s_h^L) \leq \lambda^l$, $s_h^L \leq \lambda^l$, or $(1 - \delta)\alpha_h + \delta p\alpha_l \leq \lambda^l$, contradicting to our assumption. Given that $c(s_h^L) > \lambda^l$, $G(c(s_h^L)) \geq p$ and therefore,

$$s_h^L \geq \alpha_h + \delta\alpha_l p/(1 - \delta) > \alpha_h.$$ [17]

Q.E.D.

[17] It is easy to show that the repudiation risk on a soft lending is lower than that on the off-equilibrium subsidy policy if $\alpha_h + \delta\alpha_l p/(1 - \delta) > \lambda^h$, in which case $G(c(s_h^L)) = 1$.