16

Institutions, Public Policy, and the Political Economy of Finance

16.1 Introduction

Our analysis of financial design has taken the legal, regulatory, social, and political environment as given. We now investigate the determinants of public policies regarding corporate finance. To set the scene, we begin with a few reminders concerning public policy and its normative and positive rationales.

(a) *A large array of policies affecting corporate financing.* The interaction between public policy and corporate financing starts with the various laws and regulations that affect the borrowers' ability to pledge income to the investors. Those rules impact the latter's formal and real control over the firms through voting procedures (one-share–one-vote, proxy by mail, ability to call extraordinary shareholder meetings), board composition, and transparency requirements (disclosure rules, regulation of auditors' or analysts' conflicts of interest); they protect minority shareholders (by limiting controlling shareholders' tunneling ability or ordering mandatory dividends) or creditor rights; and they may shield contracting commitments from borrower opportunism (depending on the efficiency and probity of the court system) or from government intervention into private contracting (debt moratoria, mingling in mergers and acquisitions).[1]

It would, however, be a mistake to restrict attention to rules that explicitly govern the contracting relationship between investors and borrowers, as most public policies influence corporate profitability and pledgeable income: tax, labor, and environmental laws; competition policy; prudential and other regulations with regards to financial intermediaries (capital adequacy and risk management regulations, banking bailouts, promotion of bank competition[2]); policies affecting savings (interest rate regulation) and the macroeconomy; and open-economy policies (trade and capital account liberalization, exchange rate management).

(b) *Rationales and determinants of public policy.* An influential view, developed, for example, in North (1981), distinguishes between the (positive) role of the government as an enabler of private contracting through the provisions of a legal, regulatory, and enforcement environment, and the (negative) role of the government when expropriating private wealth on behalf of powerful interest groups.[3]

Needless to say, this view is overly simplistic for two reasons. First, redistribution, when it operates from the rich to the poor, is a most legitimate objective, even though one can argue about whether the redistribution is best performed through specific policies (such as employment protection, minimum wage, or codetermination) rather than through a progressive income taxation.[4] Second, efficiency-

1. An interesting question is whether the regulatory infrastructure could not be provided by the private sector itself. A number of rules could, of course, be set by the contracting parties themselves, offering more flexibility for financial design; in this view, the government can content itself with (a) the design of some "default rules" that economize on transaction costs for parties whose preferred contractual design is rather ordinary, (b) the enforcement of private contracting arrangements. We will later come back to rationales for government intervention.

2. See Kroszner and Strahan (1999) for an analysis of the politics of the relaxation of bank branching restrictions in the United States.

3. North calls the latter the "predatory theory of the state."

4. In the celebrated model of Atkinson and Stiglitz (1976), the least distortive means of achieving (an arbitrary amount of) redistribution is income taxation. The Atkinson–Stiglitz result implies that redistribution should not be a concern in any other policy dimension. It rests on a number of strong assumptions, such as the perfect observability

enhancing government intervention is not limited to the provision of a contract-enhancing infrastructure. The restrictive view exposited above assumes that if the parties' contracts are enforceable, then they will contract efficiently; that is, the Coase Theorem (1960) will apply. As is well-known, though, private contracts may be inefficient for several reasons. First, the absence of some stakeholders at the bargaining table leads to a failure to internalize their welfare and therefore to contract-generated externalities;[5] we already encountered this rationale when discussing limits on antitakeover devices in Chapter 11. Second, efficient contracting generally requires symmetric information; as discussed in Chapter 6, private information held by the contracting parties may lead to suboptimal or inefficient contracting.[6] Proponents of the view that private contracting inefficiencies may call for government intervention have also put forth the possibility of socially undesirable bargaining positions[7] and, more in accord with supporters of a more laissez-faire approach, the transaction-cost savings of regulation.[8]

(c) *Contracting and property rights institutions.* The chapter's organization reflects a basic distinction between contracting and property rights institutions.[9]

Contracting institutions (analyzed in Section 16.2) will refer to the policy environment that prevails when borrowers, investors, and other stakeholders—most notably the employees—contract. As discussed above, this policy environment includes not only the laws and regulations that govern contracts between borrowers and investors, but other policy variables as well, such as taxes, labor laws, or macroeconomic policies, which also affect pledgeable income and value.

Property rights institutions (studied in Sections 16.3 and 16.4), in contrast, will refer to the permanence of the contracting institutions. Because their relationship is often long lasting, stakeholders cannot take it for granted that the contracting environment in force at the date of contracting will remain unaltered. Public policies may be modified in the future either because of the time inconsistency of public policy (the fact that governments in general would like to commit to future policies that they would have no incentives to abide by when the time comes), as studied in Section 16.3, or because of changes in government, the relative power of interest groups, or the composition of dominant political alliances, as studied in Section 16.4.

When contractual institutions are not remanent, stakeholders must project into the future to forecast how they will evolve over time. In particular, the

of income, the identity of tastes (individuals differ in their ability to earn money, but their preferences are separable between their labor input and the basket of goods and services they consume), and the absence of externalities.

5. This is the standard rationale for antitrust enforcement (to protect consumers against undue monopolization or the abuse of market power) and environmental regulation.

6. Aghion and Hermalin (1990) more generally argue that adverse selection provides a rationale for certain types of government intervention into private contracting.

7. As in the cases of duress or unequal expertise. Another argument, of a behavioral nature, stresses individuals' time-inconsistency problems; their desire for instant gratification or avoidance of costly conflict may push them to accept terms of contracting that their "long-term self" would not sign up for. This is the rationale behind cooling-off periods, which allow consumers to cancel certain types of purchases within, say, a week of the purchase.

Our discussion of possible rationales for government intervention is closely related to Shavell's discussion of "legal overriding of contracts" (2004, Chapter 13). Shavell first mentions "harmful externalities" and "losses in welfare to the contracting parties." In the latter category, he includes (a) the possibility for courts to override terms of the contracts that are inconsistent with the court's interpretation of the contract, (b) losses due to asymmetric information at the date of contracting, and (c) misleading representations (as when a person buys food that is mislabeled), including in some cases a lack of disclosure. Shavell then discusses "paternalism" as another oft-cited reason why it may not be optimal to enforce contracts. Paternalism may relate to the prohibition of the sale of things that are deemed inalienable (such as human organs, babies, or voting rights) or to undesirable consumptions (of certain drugs, of pornography for children). Shavell argues (properly in my view) that, once one digs deeper and derives justifications for such paternalism, one is led to consider one of the previous rationales for the legal overriding of contracts (externalities, asymmetric information, individual's time inconsistency, etc.) and so paternalism is not a rationale on its own.

8. A standard illustration is supplied by the fact that very few people read the small print, if any, on the parking ticket when they park their car in a public parking space, or go through the terms of the license of the software they install on their computers. Clearly, it could not be efficient to enforce all contracting provisions in such circumstances, as this would force consumers to devote a wasteful amount of time to protect themselves against exploitative clauses (not to mention the anxiety created by the possibility of mistake).

Transaction costs of contracting can also be reduced by the provision of standard-form agreements (as we already noted), and by the courts' completing incomplete terms "in the spirit of the contract."

9. The definitions given here differ slightly from those found in the literature, most notably in Acemoglu and Johnson (2003). Acemoglu and Johnson define "contracting institutions" as those supporting private contracts, and "property rights institutions" as those constraining the expropriation by government and elite.

credibility of contractual institutions hinges on the cost for governments to renege on their promises or on changing the previous administration's policies. Constitutional provisions, judicial reviews, the outright devolution of decision making to independent bodies,[10] and reputational concerns of entrenched, long-lasting governments all tend to insulate policy from interest group pressure and to make contracting institutions longer lasting.[11] Stakeholders must also anticipate how political majorities may evolve and which interest groups future governments will want to pander to.

16.2 Contracting Institutions

16.2.1 Roadmap

This section focuses on the borrower–investor relationship and analyzes the two parties' preferences over contracting institutions. It first assumes that there are no externalities among borrowers, an assumption which in particular rules out competition for savings (that is, the investors supply funds elastically for a given rate of return).

A key theme of the book has been that borrowers must usually make concessions to investors in order to attract financing. Indeed, most interesting issues in financial design stem from a basic conflict between value and pledgeable income. Borrowers often sacrifice value in order to boost pledgeable income. When pressed to produce return to attract investors, borrowers first offer them a large debt repayment or a higher share of profits. This policy is, however, limited by entrepreneurial moral hazard and must be supplemented by costly concessions.[12] Value is sacrificed until investors get a sufficient rate of return, i.e., until the pledgeable income allows them to recoup their initial outlay.

Importantly, the weaker the firm's balance sheet, the more extensive the concessions made to investors. For example, the weaker the balance sheet (the parentheses refer to the relevant sections, numbered within chapters), the lower the scale of operations (3.4), the higher the amount of costly collateral pledged to investors (4.2), the more restricted the entrepreneur's exit options (4.4), the shorter the debt maturity (5.2), the higher the need for speculative and active monitoring (8.2 and 9.2), the more numerous the control rights conceded to investors (10.2) and, among investors, to creditors (10.4), and the weaker the antitakeover defenses (11.3).

This observation leads to a "topsy-turvy principle" concerning borrowers' preferences over contracting institutions. From an "*ex ante* perspective," firms with weak balance sheets benefit most from strong contracting institutions, which allow them to have access to financing and then to reduce the number of costly concessions that they must make to investors. Once they have raised funds, though, firms with a weak balance sheet often become the most vocal advocates of a weakening in contracting institutions, as they do not want to abide by the concessions that they have made to attract funding in the first place.

Section 16.2.2 provides a few illustrations of this logic. Section 16.2.3 then synthesizes them in a general model. Finally, Section 16.2.4 adds externalities among borrowers to the picture by allowing them to compete either for savings or in the product market.

We will develop these arguments within the fixed-investment model, and will take cash on hand (net worth) as an indicator of the strength of the borrowers' balance sheet (as discussed earlier in the book, there are other indicators, such as those arising from a heterogeneity in opportunities for misbehavior, which lead to similar results).

10. Such as the judiciary or independent agencies (regulatory agencies or central banks).

11. There is a legitimate question as to the desirability of commitment in the realm of public policy. On the one hand, commitment protects stakeholders against expropriation of their specific investments and thereby induces them to invest. On the other hand, a lack of commitment allows more flexibility to react to changes in the environment (when policies cannot be contractually indexed on these changes); it also allows an incoming administration to undo bad public policies chosen by a previous administration that was captured by interest groups (see, for example, the mechanism-design approach in Laffont and Tirole (1993, Chapter 16), which provides conditions under which regulatory flexibility is desirable despite the fact that it allows the regulator to partially expropriate the regulated firm's investment).

Faure-Grimaud and Martimort (2003) analyze the possibility of collusion between interest groups and regulatory agencies in a dynamic setup in which political principals change over time. They show that regulatory independence stabilizes policies by making it harder for a new majority to overrule previous policies and make them more responsive to its own preferences. Independence thus moderates the swings associated with changes in political majorities.

12. Recall that with a dichotomous effort (behavior, misbehavior), pledging a higher share to investors is costless as long as the entrepreneur keeps a sufficient stake to be induced to behave. When effort is continuous, in contrast, the dilution of the entrepreneur's stake always reduces effort away from the efficient level and therefore itself constitutes a costly concession.

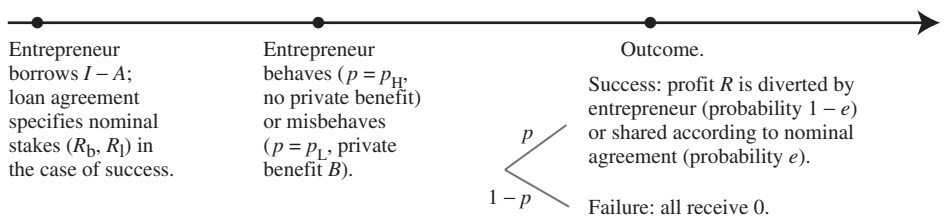


Figure 16.1

16.2.2 Contracting Institutions, Financial Structure, and Attitudes toward Reform

The illustrations build on the fixed-investment model of Section 3.2: risk-neutral entrepreneurs are protected by limited liability and have a project of size I and cash on hand A, and so must borrow $I - A$. The population of entrepreneurs in the economy is described by the cumulative distribution function $G(A)$; that is, entrepreneur heterogeneity stems from differences in net worth.[13] The project, if funded, yields profit R with probability p and 0 with probability $1 - p$, where p is subject to entrepreneurial moral hazard: $p = p_H$ (the entrepreneur receives no private benefit) or $p = p_L = p_H - \Delta p$ (the entrepreneur receives private benefit B). The market rate of return is, for the moment, normalized at 0; that is, investors stand ready to supply funds as long as they recoup their investment in expectation. We will assume throughout that it is optimal to provide the entrepreneur with an incentive to behave. The project has positive NPV if the entrepreneur behaves, $p_H R > I$, but not if she misbehaves, $I > p_L R + B$.

The first illustration, which follows Acemoglu and Johnson (2003)[14] closely and is developed in Section 16.2.2.1, analyzes this basic model in an imperfect-enforcement environment, where only a fraction of the investors' nominal claim on the final profit is actually returned to investors. Weak enforcement is represented as a reduction in the pledgeable income and in a first step is assumed per se not to destroy value (i.e., it reduces the piece going to investors, not the size of the cake). The other three illustrations are summarized in the text and are treated in more detail in the supplementary section; they extend this imperfect-enforcement model by introducing costly concessions to investors (costly collateral pledging, short-term debt and control rights).

16.2.2.1 Weak Contract Enforcement Impairs Funding Ability

As usual, we let R_l and R_b denote the lenders' and borrower's claims on the final profit in the case of success. Suppose that the investors' claim $R_l = R - R_b$ is enforced only with probability e; relatedly, a fraction of profit could be diverted in all impunity by the entrepreneur.[15] The parameter is a measure of the strength of enforcement. In practice, it is affected by laws,[16] regulations such as those on transparency and minority shareholder protection and by the efficacy and expediency of courts. With imperfect enforcement, we must distinguish between the nominal or contractual entrepreneurial stake R_b in success, and the actual stake, which, with probability $1 - e$, is equal to R and exceeds the contractual stake. We assume that the entrepreneur chooses her effort before knowing whether she will be able to divert income in the case of success (see Figure 16.1).

On the one hand, given nominal stakes (R_b, R_l), an imperfect enforcement makes investors less eager

13. As we just noted, we could alternatively measure the strength of balance sheets through a heterogeneity in benefits from misbehavior or other relevant variables.

14. See also Bolton and Rosenthal (2002) for a theoretical analysis of government intervention in debt contracts.

15. The two interpretations give slightly different expressions since the investors in expectation receive eR_l in the former and $\max\{eR, R_l\}$ in the latter. But the results are very similar for both interpretations.

16. A case in point (studied by Kroszner 1999) is the repudiation by the United States of the gold indexation clause in long-term (private and public) contracts during the Great Depression (the law was passed by Congress on June 5, 1933, and then upheld by the Supreme Court). The debt burden of borrowers would have been 69% (the extent of the devaluation) higher if gold clauses had been enforced.

to lend than when $e = 1$; indeed, they recoup their initial outlay if and only if

$$p_H e R_l \geqslant I - A. \tag{16.1}$$

On the other hand, the entrepreneur, again for given nominal stakes, appropriates a higher fraction of the return, and so has stronger incentives to behave; the incentive compatibility condition is now

$$(\Delta p)[eR_b + (1-e)R] \geqslant B. \tag{16.2}$$

Rewriting the investors' breakeven condition (16.1), a necessary condition for financing is that

$$p_H e R - p_H e R_b \geqslant I - A,$$

or, using the incentive constraint (16.2),

$$p_H e R - p_H \left[\frac{B}{\Delta p} - (1-e)R\right] \geqslant I - A$$
$$\Leftrightarrow \quad p_H \left[R - \frac{B}{\Delta p}\right] \geqslant I - A. \tag{16.3}$$

The reader will here recognize condition (3.3), obtained for $e = 1$. Intuitively, imperfect enforcement implies an extra *ex post* transfer from investors to the entrepreneurs, and this transfer can *ex ante* be undone (reappropriated by the investors) by lowering the nominal reward R_b. Because the *ex post* transfer involves no deadweight loss, the necessary condition for financing is unchanged.

This, however, does not imply that the contracting institutions (here described by the enforcement level e) are irrelevant; the necessary condition (16.3) is also sufficient if and only if one can find a nominal reward $R_b \geqslant 0$ satisfying (16.1) and (16.2). Two cases need to be considered. If $(1-e)R < B/\Delta p$ (which holds when e is close to 1), then, from (16.2), incentive compatibility requires $R_b > 0$ anyway. The necessary and sufficient condition for financing is then (16.3). In other words, small changes in contracting institutions (i.e., in the parameter e) are neutral.

We will focus on the other case by making the following assumption.

Assumption 16.1. $(1-e)R > B/\Delta p$.

This condition, which holds for lower levels of enforcement,[17] states that the entrepreneur is incentivized even in the absence of nominal reward ($R_b = 0$). Under this condition, the breakeven condition, combined with $R_l \leqslant R$, imposes that

$$p_H e R \geqslant I - A$$

or

$$A \geqslant \bar{A}(e),$$

where the threshold,[18]

$$\bar{A}(e) \equiv I - p_H e R, \tag{16.4}$$

is a decreasing function of e: *the stronger the enforcement, the more firms that have access to financing*. The fraction of firms that receive funding is equal to $[1 - G(\bar{A}(e))]$.

Conditional on receiving funding, the borrower's utility is independent of the level of enforcement, since the lack of enforcement involves no deadweight loss and therefore does not impact the NPV:

$$U_b \equiv p_H R - I.$$

Remark. Jappelli et al. (2005) provide empirical evidence of the impact of the quality of contract enforcement on the access to funding. They first develop a theoretical model in which lenders' ability to recoup collateral depends on the efficiency of court enforcement.[19] An improvement in judicial efficiency opens up the credit market to borrowers with little collateral; and so, again, borrowers with weak balance sheets benefit *ex ante* from better corporate institutions. Jappelli et al. then test the model using judicial data for twenty-seven Italian districts.[20] Proxies for court (in)efficiency are taken to be the length of trials and the number of civil suits pending per inhabitant. Judicial districts with better legal enforcement also display more lending and fewer credit constraints.

The topsy-turvy principle. We have assumed that there is commitment as to the level of enforcement. That is, e is determined prior to the investors' funding decision. Let us investigate the political forces that may (a) *ex ante* affect the determination of e and (b) *ex post* create a lobby for a revision of contracting institutions. For expositional simplicity, we

17. Recall that $p_H R > I > p_L R + B$, and so $R > B/\Delta p$.

18. Note that $\bar{A}(e)$ exceeds the value $\bar{A}$ given by $p_H(R - B/\Delta p) = I - \bar{A}$ due to Assumption 16.1.

19. The fraction of the cash flow that can be recouped by investors also depends on the efficiency of the court system in Jappelli et al.

20. See also their paper for references of empirical studies performed on other countries.

will confine our attention to a dichotomous choice between weak institutions ($e = e_W$) and strong institutions ($e = e_S$), where

$$e_W < e_S.$$

From an *ex ante* perspective (that is, prior to the funding decisions), a move from weak institutions to strong ones benefits "borrowers with weak balance sheets," namely, those with

$$\bar{A}(e_S) \leqslant A < \bar{A}(e_W),$$

who receive funding only under strong institutions. "Borrowers with very weak balance sheets," i.e., "nonborrowers" ($\bar{A} < \bar{A}(e_S)$), are indifferent because they never have access to financing. "Borrowers with strong balance sheets" ($\bar{A} \geqslant \bar{A}(e_W)$) are also unaffected by the reform. (Actually, borrowers with strong balance sheets would suffer from institutions being strong rather than weak if savings were not perfectly elastic, so that the entry of entrepreneurs with weak balance sheets would compete the interest rate up. Conversely, borrowers with very weak balance sheets, who really are savers, would benefit from strong institutions if the interest rate were not rigid. See Section 16.2.4.)

Ex post (after investments are made), though, entrepreneurs with initial cash on hand A, provided they receive funding, reimburse $R_1(A)$, given by

$$p_H e R_1(A) = I - A.$$

Thus firms with weak balance sheets reimburse more, regardless of the level of enforcement. This implies that firms with weak balance sheets *ex post* have more incentives to lobby for a weak enforcement. They suffer from time inconsistency as they need a strong enforcement *ex ante* and have a deep interest in a weak enforcement *ex post*. By contrast, firms with a strong balance sheet do not benefit *ex ante* (and, as we noted, even lose if savings are elastic) from strong institutions and are less hurt by strong institutions *ex post*.

16.2.2.2 Contracting Institutions and Concessions (Collateral, Liability Maturity, Control Rights)

The previous simple illustration did not offer scope for costly concessions, that is, payments to investors in "inefficient currencies." Consequently, weak contracting institutions either had no impact or prevented funding altogether. The next three illustrations, developed in the supplementary section, show, among other things, that weak institutions destroy value in a "more continuous way," by forcing the firms to make inefficient concessions. For conciseness, the treatment in the text of these illustrations covers only the key ideas.

- The second illustration enriches the first by allowing the borrower to pledge assets and not only income to investors. In the *costly collateral* model, investors value the assets that they foreclose less than the borrower does, and so the borrower pledges as little collateral as is needed to attract financing. Consequently, firms with weak balance sheets pledge more collateral to make up for the dearth of pledgeable income. Furthermore, and as in Section 4.2, it is efficient to pledge in a contingent rather that unconditional fashion: the collateral is turned over to the investors only if the firm fails.

When investor *claims on income* are better enforced, pledgeable income is more abundant, and so less collateral needs to be pledged: firm value is raised for those borrowers who had (and still have) access to financing. Furthermore, some borrowers who were previously unable to commit enough collateral to attract funds gain access to financing.

When investor *claims on assets* are better enforced (that is, when the probability that investors are indeed able to seize the assets in the case of failure increases), less collateral needs to be pledged in order to boost pledgeable income by a given amount, and again more borrowers get access to financing.

Ex ante, firms with weak balance sheets benefit most from a better enforcement of investor claims on income or assets because better contracting institutions either allow them to gain access to financing or allow them to pledge fewer assets. Once the funds have been raised, though, these weak-balance-sheet firms become the strongest advocates of a relaxation of the enforcement of investor claims, as they have pledged more income and/or more assets to investors.

- The third illustration investigates the impact of contracting institutions on the *maturity structure*

of liabilities. Recall from Section 5.2 that firms with weak balance sheets must not only allocate a bigger share of final profit to their investors, but must also issue more short-term debt. Short maturities, while appealing to investors, induce inefficient liquidity shortages and early liquidations. In that sense, they represent a concession to investors.

When investor claims on long-term profit are better enforced, there is more pledgeable income, and so borrowers can contract for more liquidity (less short-term debt) with investors. As a result, firm value increases. The impact on the level of short-term debt, in contrast, is ambiguous. As discussed in Chapter 5, liquidity results from a combination of retained earnings[21] (for cash-rich firms) and the ability to conduct a seasoned offering. With stronger enforcement, a seasoned offering raises more cash, and so, while the contracted-for amount of liquidity increases, the net impact on target retained earnings, and thus on short-term debt, is *a priori* unclear.

The topsy-turvy principle again holds. Firms with weak balance sheets have a particularly short maturity and high risk of illiquidity; hence, they are *ex ante* the primary beneficiaries of a better enforcement. But they become particularly eager to see enforcement relaxed as time goes by.

• The fourth illustration investigates the impact of contracting institutions on *governance*. Recall from Section 10.2 that firms with weak balance sheets must relinquish more control rights to assuage investors. When investor claims on income are better enforced, fewer control rights need be relinquished and borrower utility increases. Furthermore, firms with weak balance sheets *ex ante* benefit most from the better enforcement of investor cash-flow rights, as they value the marginal control rights that they relinquish highly. Similarly, when investor control rights are better enforced, borrowers with weak balance sheets *ex ante* benefit most. As usual, the profile of borrowers' preferences over enforcement as a function of the strength of their balance sheet is reversed once funding has been secured.

21. We abuse terminology slightly by letting "retained earnings" denote the difference between short-term profit and short-term debt (there is no difference between a short-term debt payment and a dividend in the model of Section 5.2).

16.2.3 The Broader Picture

More generally, the borrower makes concessions $c = (c_1, \ldots, c_n)$ in order to get investors on board. Concessions may be the investors' income claim, the amount of collateral, the level of short-term liabilities, or the extent of investor control, as in the illustrations above, or any other concession reviewed in this book. The contracting institutions are summarized by a vector $e = (e_1, \ldots, e_m)$; examples of components of e include, as we have seen, the enforcement of equity and debt claims or that of control rights. But more generally, e stands for all variables that are exogenous to the firm and yet affect pledgeable income and possibly firm value.

The pledgeable income can then be written as[22] $\mathcal{P}(c, e)$, where, in the relevant range,

$$\frac{\partial \mathcal{P}}{\partial c_i} > 0, \quad i = 1, \ldots, n \text{ (concessions help attract funding)},$$

$$\frac{\partial \mathcal{P}}{\partial e_j} > 0, \quad j = 1, \ldots, m.$$

The investors' breakeven condition is then

$$\mathcal{P}(c, e) \geqslant I - A.$$

The firm's *value gross of investment* can be written $\mathcal{V}(c, e)$, where, in the relevant range,

$$\frac{\partial \mathcal{V}}{\partial c_i} < 0, \quad i = 1, \ldots, n.$$

(The NPV is then $\mathcal{V}(c, e) - I$.) When the contracting environment is formalized as the degree of enforcement of cash-flow rights, affecting *ex post* transfers between investors and borrower (Section 16.2.2.1),

$$\frac{\partial \mathcal{V}}{\partial e_j} = 0, \quad j = 1, \ldots, m.$$

More generally, though, an investor-friendly contracting environment increases or decreases the NPV for a given design of concessions. A stricter enforcement of investors' claims on costly collateral pledges, for instance, reduces the NPV, ceteris paribus.[23] Or, to take an example not yet alluded to,

22. Here we keep assuming that investment is fixed, and so we omit I in the expression of $\mathcal{P}$. As we note below, this involves no loss of generality.

23. Of course, and as we will see in Section 16.5.1, the borrower may reduce the amount of collateral pledged accordingly so as to keep the same expected value of the pledge as the contracting environment changes.

an investor-friendly environment may create transaction costs or penalize the firm in its competitive environment,[24] as when it involves disclosure of information to investors ($\partial \mathcal{V}/\partial e_j < 0$). Conversely, when we broaden the range of applications of the theory to tax or labor laws, the borrower may benefit from an investor-friendly environment ($\partial \mathcal{V}/\partial e_j > 0$).[25]

Remark (variable investment). While we have apparently stuck to the fixed-investment-size environment, the modeling above actually allows for variable investment size *as long as investment moderation is modeled as a concession.*

To see this, let $\mathcal{P}(I, c, e)$ and $\mathcal{V}(I, c, e)$ denote more generally pledgeable income and value (and so $\mathcal{P} - (I - A)$ is the investors' net profit); suppose that the borrower, ceteris paribus, prefers a larger investment than the investors would want, as has been the case in the models we have considered in the book:

$$\frac{\partial((\mathcal{V} - I) - (\mathcal{P} - (I - A)))}{\partial I} > 0.$$

This inequality has an *ex post* version:

$$\frac{\partial(\mathcal{V} - \mathcal{P})}{\partial I} > 0.$$

Once funding is secured, the entrepreneur receives in expectation the gross value of investment minus what is returned to investors. Indeed, in the relevant range, we have the fundamental equation of credit rationing: at the margin an extra unit of investment increases social value but cannot be funded,

$$\frac{\partial \mathcal{V}}{\partial I} > 1 > \frac{\partial \mathcal{P}}{\partial I}. \tag{16.5}$$

(Suppose that the marginal value of investment and the marginal pledgeable income both exceed 1. Then increasing investment marginally benefits the borrower and facilitates financing. Similarly, if both values are below 1, the two parties benefit from a reduction in investment.) Thus we can view (a low) investment as a concession, $c_{n+1} \equiv -I$, as long as we redefine the pledgeable income in *ex ante* (or net) terms, $\mathcal{P}^{\mathrm{n}} \equiv \mathcal{P} - (I - A)$, with $\partial \mathcal{V}/\partial c_{n+1} < 0$ and $\partial \mathcal{P}^{\mathrm{n}}/\partial c_{n+1} > 0$ in the relevant range.

We are now in a position to examine the impact of a change in the contracting environment on firm value. Treating its components as well as concessions as continuous variables, the borrower solves

$$\max_{\{c\}} \mathcal{V}(c, e)$$
$$\text{s.t.}$$
$$\mathcal{P}(c, e) \geqslant I - A.$$

And so if μ denotes the shadow price of the financing constraint,

$$\frac{\partial \mathcal{V}}{\partial c_i} + \mu \frac{\partial \mathcal{P}}{\partial c_i} = 0 \quad \text{for all } i.$$

The impact of a change in a component of the contracting environment is

$$\frac{\mathrm{d}\mathcal{V}}{\mathrm{d}e_j} = \frac{\partial \mathcal{V}}{\partial e_j} + \mu \frac{\partial \mathcal{P}}{\partial e_j}.$$

The first term on the right-hand side of this latter equation is the *direct (or cost) effect*; as we observed, this direct effect is equal to 0 if the enforcement relates to cash-flow rights and is a mere transfer between investors and borrower. The second, and more interesting, term is the *enabling effect* (a better enforcement allows the borrower to make fewer costly concessions).

A special case. Let us assume (as in Section 16.2.2.1) that there is no direct effect:

$$\mathcal{V}(c, e) = \mathcal{V}(c).$$

We will furthermore focus on single-dimensional c and e. Figure 16.2 illustrates the funding decision.

In Figure 16.2, the *relevant range* refers to concessions that lie between c^{FB} (the first-best level, which maximizes $\mathcal{V}$) and $c_1^*(e)$ (the concession that maximizes pledgeable income).[26] The figure illustrates the financing decision for three types of firm:

24. For example, the disclosure of information to investors as to the firm's strategy in the market may benefit competitors. It then reduces value even if it raises pledgeable income on balance.

25. One may have in mind, for example, a decrease in wage-related taxes, an increase in R&D investment subsidies, or the provision of communications or telecommunications infrastructures that benefit corporations.

26. For example, in the costly collateral pledging illustration, the first-best level was 0 and the one preferred by investors was the maximum feasible level of collateral. In the maturity liability illustration, the concession referred to (minus) the cutoff liquidity shock that could be withstood by the firm; the first-best cutoff level was (using the usual notation; see also the supplementary section) ρ_1, while the one that maximizes pledgeable income was ρ_0. In the control rights illustration, the first-best level of control rights, derived in the supplementary section, was given by $\gamma'(\tau^{\mathrm{FB}}) = R$; and investors wanted as many control rights as possible.

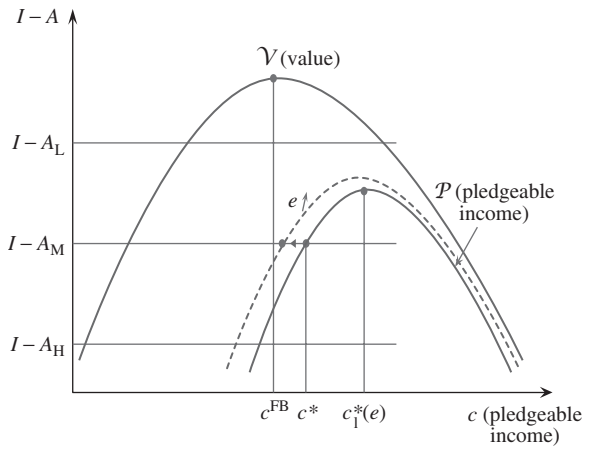


Figure 16.2

A_L ("very weak balance sheet"), A_M ("weak balance sheet"), and A_H ("strong balance sheet"), with $A_L < A_M < A_H$. The firm with cash on hand A_L cannot make concessions that guarantee enough pledgeable income to investors to allow them to recoup their initial outlay. The firm with cash on hand A_H can secure financing without sacrificing value ($c = c^{FB}$). Finally, the firm with cash on hand A_M must make concession c^* and sacrifice some value in order to attract financing.

The dashed curve shows the impact of an increase in enforcement e: pledgeable income increases and the firm's cash on hand A_M is able to make fewer concessions; and so firm value increases. Firms with strong balance sheets are unaffected, and a few marginal firms with very weak balance sheets gain access to funding.

16.2.4 Externalities among Borrowers

We have already alluded to the fact that the analysis above neglected interactions among borrowers. These interactions can occur either in the input markets (for example, competition for savings or labor) or in the output market. (Section 16.3 will study a third form of interactions, namely, through the impact of private contracting choices on future government policies.)

Competition for savings. We have assumed that investors supply funds perfectly elastically to borrowers as long as they receive a nonnegative rate of return. Let us now introduce an upward-sloping savings function, while preserving investor risk neutrality. That is, investors have utility function

$$u(c_0) + c_1,$$

where c_0 and c_1 are their consumptions at the date of funding and at the date at which investors receive their return.[27] The function u is increasing and concave. Assuming that y is the investors' date-0 endowment and letting r denote the market rate of interest, the savings function is given by[28]

$$u'(y - S(r)) = 1 + r.$$

Note that $S'(r) > 0$.

For simplicity, we keep assuming that entrepreneurs have utility function $c_0 + c_1$ from consumption stream $\{c_0, c_1\}$ and we will restrict attention to positive interest rates so that entrepreneurs who do not receive funding save their cash on hand (this assumption is not important). Finally, and also for simplicity, we will focus on the special case of no direct effect of the degree of enforcement on the NPV.

Using the general formulation exposited above, let $\bar{A}(e,r)$ and $\underline{A}(e,r)$ be defined by[29]

$$\mathcal{P}(c^{FB}, e) = (1 + r)(I - \bar{A}(e,r))$$

and

$$\mathcal{P}(c_1^*(e), e) = (1 + r)(I - \underline{A}(e,r)).$$

Note that $\underline{A}(e,r) < \bar{A}(e,r)$ and that both are decreasing in e.[30]

Thus, firms with cash on hand $A < \underline{A}(e,r)$ do not have access to funding, those with $\underline{A}(e,r) \leqslant A < \bar{A}(e,r)$ receive financing but must make inefficient concessions, and those with $A \geqslant \bar{A}(e,r)$ secure "first-best funding."

Consider a distribution $G(A)$ of firms with $G(0) = 0$ and $G(I) = 1$ (for simplicity, this hypothesis does

27. The notation $\{c_0, c_1\}$ for consumptions is used here only. It is not to be confused with that for concessions.

28. The investor solves $\max_{\{c_0,c_1\}}\{u(c_0) + c_1\}$, where

$$c_1 = (1 + r)(y - c_0) = (1 + r)S.$$

29. The cutoff type's utility, as measured at date 1, is then

$$U_b(\underline{A}(e,r)) = \mathcal{V}(c_1^*(e)) - [1 + r(e)]I \geqslant 0,$$

where $c_1^*(e)$ is the concession made by $\underline{A}(e,r)$ and $r(e)$ the equilibrium rate of interest.

30. This is obvious from $\bar{A}(e,r)$. For $\underline{A}(e,r)$, recall that $\mathcal{P}$ is by definition maximized at $c_1^*(e)$ and so $d\mathcal{P}/de = \partial\mathcal{P}/\partial e$.

not alter the analysis). The date-0 equilibrium interest rate is determined in the market for funds:

$$S(r) = \int_{\underline{A}(e,r)}^{I} (I - A)\, \mathrm{d}G(A) - \int_{0}^{\underline{A}(e,r)} A\, \mathrm{d}G(A).$$

And so the interest rate r increases with the level of enforcement e (as more firms get access to financing).[31]

A borrower's net utility, as measured at date 1, is given by[32]

$$U_{\mathrm{b}} = \mathcal{V}(c) - (1 + r)I.$$

And so

$$\frac{\mathrm{d}U_{\mathrm{b}}}{\mathrm{d}e} = \mathcal{V}'(c^*(e))\frac{\mathrm{d}c^*}{\mathrm{d}e} - \left(\frac{\mathrm{d}r}{\mathrm{d}e}\right)I.$$

Firms with strong balance sheets ($A \geqslant \bar{A}(e,r)$) are hurt by an improvement in contracting institutions since $c^* = c^{\mathrm{FB}}$ and so $\mathcal{V}' = 0$. They simply see their cost of capital increase. The utility of entrepreneurs of firms with weak balance sheets ($\underline{A}(e,r) \leqslant A < \bar{A}(e,r)$) is more indeterminate: their cost of capital has increased, but better enforcement allows them to make fewer concessions to investors ($\mathrm{d}c^*/\mathrm{d}e < 0$), which benefits the entrepreneur (as $\mathcal{V}' < 0$). And, of course, the entrepreneurs in firms with very weak balance sheets ($A < \underline{A}(e,r)$) are better off: the marginal firms gain access to funding, while the others remain net lenders and therefore benefit from an increase in the rate of interest.

Competition in the product market. In their paper on the politics of financial development in the twentieth century, Rajan and Zingales (2003) emphasize the potential hostility of incumbents to financial development. The idea is that better contracting institutions result in entry by firms with little cash on hand and thereby breed competition for incumbents.

Suppose indeed that (i) entry reduces the incumbent's expected profit,[33] and (ii) entrants have much less cash than incumbents (they could alternatively have a weaker reputation, a greater investment need, or whatever feature calls for more pledgeable income). Incumbents may then oppose an improvement in contracting institutions so as to hinder entrants' access to capital and thereby to deter entry.

Competition for labor. In Biais and Mariotti (2003), entrepreneurs with strong balance sheets can invest irrespective of the degree of investor protection. They favor a soft bankruptcy law, which may preclude liquidation and thereby reduce the pledgeable income and the funding ability of firms with weaker balance sheets. A soft bankruptcy law thereby reduces labor demand and the workers' wage. Firms that still obtain funding thus benefit in two ways: a reduced wage bill and a lower probability of liquidation brought about by this reduction in the wage bill.[34]

16.3 Property Rights Institutions

16.3.1 Overview

As we discussed in the introduction to this chapter, there is a natural distinction between policies and their persistence. Section 16.2 looked at the consequences of the contractual environment on corporate financing.[35] The contracting institutions define the set of feasible contracts that can govern the relationship among borrowers, investors, and other stakeholders. The firm's policy environment may evolve over time for two reasons: the first, studied in Section 16.4, is associated with (endogenous) shifts in political power; the second is the standard time-inconsistency issue, the object of this section.

As is well-known, a government, even if it has stable preferences over interest groups and therefore outcomes, may in general want to alter its policies as the various parties (borrowers, investors, and other stakeholders) sink their investments. Typically, the government tends to be much less respectful "*ex post*" than "*ex ante*" of the interest of groups that it does not try to pander to; put differently, it would

31. Note that the interest rate is the expected return demanded by investors. If the investors' claim is interpreted as debt (on this, see Chapter 3), then the *nominal* interest rate (equal to the ratio of the debt claim over the loan, minus 1), may vary in an ambiguous way with the efficiency of the court system as it factors in the probability of repayment (see Jappelli et al. 2005).

32. One way of obtaining this expression is as follows: the borrower could lend A and obtain return $(1 + r)A$. Instead, she receives $\mathcal{V} - \mathcal{P}$ from the undertaking, where $\mathcal{P} = (1 + r)(I - A)$. Thus,

$$U_{\mathrm{b}} = [\mathcal{V} - (1 + r)(I - A)] - [(1 + r)A] = \mathcal{V} - (1 + r)I.$$

33. See Chapter 7 for the link between product-market competition and corporate financing.

34. Biais and Mariotti actually show that overall welfare may be higher under a soft bankruptcy law.

35. It also took an initial, very incomplete stab at the persistence issue by showing how borrowers' preferences changed as they received financing, depending on the strength of their balance sheet.

often like to promise not to expropriate in the future the investments made by these less favored groups, but it is unable later on to abide by its promise. The anticipation of reneging in turn discourages less favored groups from sinking investments.[36] For example, a government may *ex ante* be eager to facilitate the access of firms to funding by wealthy domestic or foreign investors. Once lending has occurred, though, the government's policy choices put less weight on attracting funds and more weight on other stakeholders, including borrowers.

More generally, time inconsistency may arise even if investors receive the same weight as, or even a higher weight than, borrowers in the government's objective function; for, the government may *ex ante* want to promise to *ex post* implement inefficient (i.e., value-reducing) policies that boost pledgeable income and thereby *ex ante* enable firms' access to funding. Once investment has been attracted, though, the rationale for costly policies has disappeared and so it becomes optimal for the government to adopt a less investor-friendly policy. Anticipating this incentive, investors are therefore more reluctant to lend in the first place than they would be, were the government able to commit to a policy long term.[37]

Even though governments cannot commit without devolving all their regalian powers, they can adopt policies that alleviate the time-inconsistency problem. In particular, we will argue that the strategy of providing a "shield" for investors in general, and those least favored by the government in particular, facilitates funding and we will offer a couple of practical applications of this idea.

For simplicity, much of our analysis focuses on the borrower–investors relationship, but the general principles will obviously apply to a broader spectrum of stakeholders.

This section's general points can be summarized in the following way.

• The incentives of policy makers are, except in some instances of targeted interventions (such as the public bailout of a private company), determined by economy-wide considerations; for, the corporate laws and regulation, the tax and labor environments, and the many other policy dimensions that were discussed in the introduction to this chapter apply not to a single firm, but to a larger set of firms, sometimes to all firms.

Technically, this situation gives rise to *common-agency externalities*.[38] One can view the state as a common "agent" who takes discretionary actions—public policies. The multiple "principals" are the "borrower–investors" pairs,[39] whose welfare is affected by the public policies. In structuring a financial contract, the borrower and investors do not take into account the general equilibrium effect of contract designs on policy, and therefore tend to exert externalities on other borrowers and investors. This abstract principle will take a more concrete form when we investigate specific examples below.

• The remanence of the contracting environment, i.e., the extent of time inconsistency, depends crucially on how the policy risk is allocated among stakeholders. *Time consistency is enhanced when some match between stakeholders' exposure to policy risk and political constituencies is achieved.* Put differently, property rights institutions are more sturdy if those who bear the political risk are also politically influential. This implies that, from a social viewpoint, fragile claims should be shifted toward those who have influence over politics in order to minimize the risk of expropriation; this incentive to

36. Policy makers' time inconsistency figures prominently in many fields of economics, such as monetary and fiscal policy (e.g., Kydland and Prescott 1977; Barro and Gordon 1983; Rogoff 1985; Persson et al. 1987; Calvo 1996; Athey et al. 2005), international trade (Matsuyama 1990; Tornell 1991; Bagwell and Staiger 2000), sovereign debt management (e.g., Bulow and Rogoff 1989a,b), and utility regulation (e.g., Laffont and Tirole 1993, Chapters 9, 10, 16, and the references therein). It is also an important issue in corporate finance, since investments often bear fruit over long horizons.

37. These considerations will be studied in the context of a three-period framework in which the government chooses its policy after firms get access to funding. But the time-inconsistency problem arises even under the more realistic assumption that funding is an ongoing activity. At any point in time there is an "installed base" of investors' investment in the firms, whose supply is therefore inelastic. And so the government is not concerned about the impact of funding on past funding; rather, its policy choices are guided by the elasticity of *marginal* (new) funding.

38. The theory of common agency was developed in contributions in a moral-hazard context by Pauly (1974) and Bernheim and Whinston (1986a,b), among others, and in an adverse-selection context by Martimort (1991) and Stole (1990).

39. Or, more generally, all parties to a private contract. Workers and other stakeholders can be appended without modifying the argument.

match exposure to policy risk and politically influential groups, however, does not exist at the individual financial arrangement level.[40]

16.3.2 Basics of Time Inconsistency in Corporate Finance

To illustrate the time-inconsistency issue, we employ the variable-investment model of Section 3.4.

Entrepreneurs. There is a continuum of risk-neutral entrepreneurs protected by limited liability. The representative entrepreneur has cash on hand A and borrows $I - A$ in order to reach investment size I. Risk-neutral investors demand a rate of return equal to 0.

The project succeeds (yields profit RI) with probability $p + \tau$ and fails (yields nothing) with probability $1 - (p + \tau)$.[41] The component p is chosen by the entrepreneur. The latter may behave, and receive no private benefit, and then $p = p_{\mathrm{H}}$; or she misbehaves and receives private benefit BI, in which case $p = p_{\mathrm{L}} = p_{\mathrm{H}} - \Delta p$.

Government policy and incidence. The component $\tau \geqslant 0$, in contrast, is chosen by the government. This profit-friendly action involves cost $\hat{\gamma}(\tau)I$, also proportional to investment, with $\hat{\gamma}(0) = \hat{\gamma}'(0) = 0$, $\hat{\gamma}' > 0$, and $\hat{\gamma}'' > 0$.

The incidence of the cost $\hat{\gamma}(\tau)I$, that is, the way this cost is allocated between borrowers and lenders, falls on both parties: a share σ_{b} (respectively, σ_{l}) is borne by the borrowers (respectively, the lenders), where $\sigma_{\mathrm{b}} + \sigma_{\mathrm{l}} = 1$. We can make one of two alternative assumptions on how the incidence operates. Suppose, for instance, that the profit-enhancing action (τ) is a better transportation infrastructure or court system. The question is whether the corresponding cost ($\hat{\gamma}(\tau)I$) is borne by the parties as part of participating in a financing agreement or in another incarnation (say, as a taxpayer); for example, the cost of the transportation infrastructure might be financed through a tax on capital, in which case the investors would pay it only if they invest in firms, or through an income tax, in which case they would pay it regardless of their investment in the firm. As we will show, up to a couple of twists, the choice of assumption is rather inconsequential for the analysis. We will first assume that $\sigma_k \hat{\gamma}(\tau)I$ ($k = \mathrm{b}, \mathrm{l}$) is borne by the parties when and only when they enter a financing agreement of size I, and later we make the opposite assumption, that they bear these costs as citizens.

Government objective function. The government's objective function puts weights w_{b} and w_{l} on the borrower's and the lenders' welfares, respectively.[42]

Timing. Figure 16.3 summarizes the timing. As usual, the separable form for the probability function ensures that it does not matter whether policy τ is chosen before or after the entrepreneur chooses her effort.

We are obviously particularly interested in the case in which the government cannot commit to a policy. In this case, the initial choice (stage (i)) is irrelevant.

40. The analysis in this section builds on Tirole (2003), where the model is framed in a capital-account-liberalization context and it is argued that ignoring political economy considerations can lead to incorrect policy making by international financial institutions such as the International Monetary Fund.

41. As usual, we will assume that probabilities lie in $[0, 1]$ in the relevant range of parameters.

42. This reduced form will suffice for our purposes. One may just assume that the politicians in power put weights w_{b} and w_{l} on the two political constituencies. These weights may result from bargaining and alliance building among interest groups, as in Section 16.4. Alternatively, they could be endogenized through the political economy process. There are two broad approaches in this respect.

The first approach assumes that the politician is driven by reelection concerns. For example, in Maskin and Tirole (2004), the politician uses policy choices to signal his/her congruence with political constituencies that are unaware of his/her true preferences (see also the older literature initiated by Barro (1973) and Ferejohn (1986): this literature abstracts from informational asymmetries and uses the voters' indifference between candidates to reward or punish incumbents as a function of their past behavior). Policy choices may also reflect the voting elasticities, i.e., how sensitive various constituencies' voting behavior is to the candidate's attractiveness, as in the "Ramsey model of political choices" developed by Lindbeck and Weibull (1987) (this model formally applies only to the choice of political platforms, but its main thrust carries over to the policy choices made by incumbents in office).

The second approach (which is not necessarily inconsistent with the first) focuses on the quid pro quo between interest groups and policy makers. Grossman and Helpman (1994) formalize such capture of policy makers as a symmetric-information bidding contest among interest groups, as in Bernheim and Whinston (1986a). Laffont and Tirole (1991, 1993) use a three-tier (principal–supervisor–agent) framework in which the general electorate's imperfect knowledge about the consequences of policy choices (or about policy choices themselves) both motivates the existence of government decision making and affects the extent to which interest groups can effectively capture the policy process.

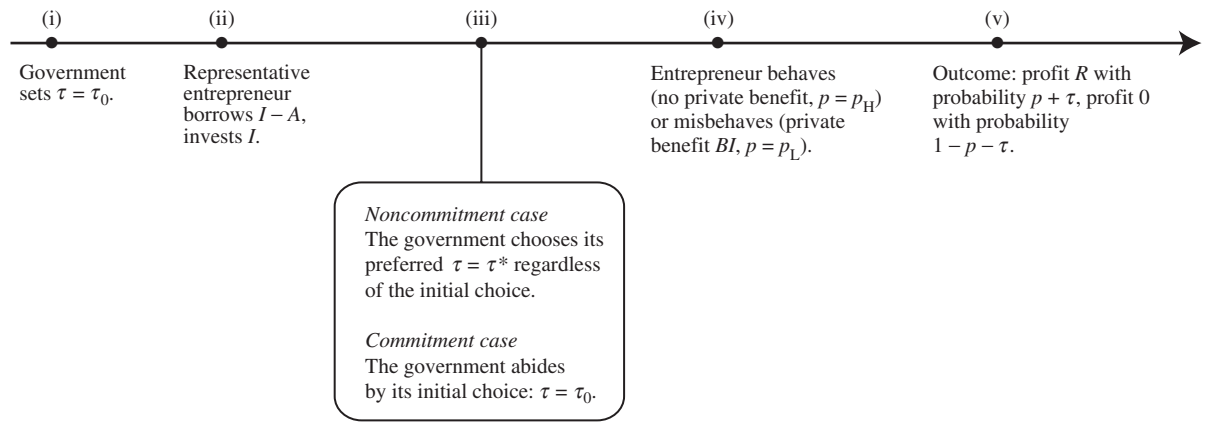


Figure 16.3

Borrowing capacity. When facing policy τ, the representative entrepreneur's borrowing capacity is obtained in the usual fashion. The entrepreneur behaves if and only if her stake in the case of success, R_b, is sufficient to induce her to forgo the private benefit:

$$[(p_H + \tau) - (p_L + \tau)]R_b \geqslant BI;$$

and so an amount $(p_H + \tau)BI/\Delta p$ is not pledgeable to investors. The investors are willing to finance the firm at level I if and only if they recoup their investment in expectation. And so, remembering that the market rate of interest is equal to 0, the investors' breakeven constraint is given by

$$(p_H + \tau)\left(R - \frac{B}{\Delta p}\right)I - \sigma_l \hat{y}(\tau)I = I - A,$$

where use is made of the assumption that the incidence falls on investors in proportion to the firm's investment (under the alternative assumption that they bear the cost as taxpayers rather than as stakeholders in the firm, the term $\sigma_l \hat{y}(\tau)I$ on the left-hand side disappears because the investors' tax burden is then not contingent on whether they invest in the firm). We will assume all along that, in the relevant range, the pledgeable income per unit of investment $((p_H + \tau)[R - B/\Delta p] - \sigma_l \hat{y}(\tau))$ is smaller than 1; otherwise, the entrepreneurs' borrowing capacity would be infinite in this constant-returns-to-scale model. Similarly, we will assume that the NPV is positive and so entrepreneurs want to invest $((p_H + \tau)R - 1 - \hat{y}(\tau) > 0)$.

It will prove convenient to change variables. Let a denote the proportional increase in expected revenue brought about by the public policy[43]

$$a \equiv \frac{\tau}{p_H} \quad \text{and} \quad \gamma(a) \equiv \hat{y}(p_H a).$$

As usual, let

$$\rho_0 \equiv p_H\left(R - \frac{B}{\Delta p}\right) \quad \text{and} \quad \rho_1 \equiv p_H R.$$

The borrowing constraint can be rewritten as

$$(1 + a)\rho_0 I - \sigma_l \gamma(a)I = I - A$$

or

$$I = I(a) = \frac{A}{1 + \sigma_l \gamma(a) - (1 + a)\rho_0}. \tag{16.6}$$

We will think of a as an "investor-friendly action." In this perspective, we will focus on a range of parameters such that $\rho_0 > \sigma_l \gamma'(a)$. Otherwise, a would not be an investor-friendly action and investment would decrease with a.

Borrowers' utility. Because investors break even, the representative borrower's net utility is equal to the project's NPV:[44]

$$U_b = [(p_H + \tau)R - 1 - \hat{y}(\tau)]I;$$

43. The variable a thus defined resembles the enforcement variable e in Section 16.2 in that both variables are profit friendly and are determined exogenously at the level of the firm.

44. A different derivation is

$$\begin{aligned} U_b &= [(p_H + \tau)R_b - \sigma_b \hat{y}(\tau)I] - A \\ &= (p_H + \tau)(RI - R_l) - \sigma_b \hat{y}(\tau)I - A \\ &= (p_H + \tau)RI - \sigma_l \hat{y}(\tau)I - (I - A) - \sigma_b \hat{y}(\tau)I - A \\ &= [(p_H + \tau)R - 1 - \hat{y}(\tau)]I. \end{aligned}$$

note that the borrower *ex ante* bears the full incidence, as she must compensate investors not only for their contribution, $I - A$, to investment, but also for the subsequent cost $\sigma_b \hat{\gamma}(\tau) I$ that will be imposed upon them by the government's policy. Changing variables,

$$U_b = [(1+a)\rho_1 - 1 - \gamma(a)]I(a). \tag{16.7}$$

Ex post, in contrast, the borrower has transferred shares to investors and so her utility is

$$\begin{aligned} U_b^{ex\ post} &= (p_H + \tau)R_b - \sigma_b \hat{\gamma}(\tau) I \\ &= \left[(p_H + \tau)\frac{B}{\Delta p} - \sigma_b \hat{\gamma}(\tau)\right] I \\ &= [(1+a)(\rho_1 - \rho_0) - \sigma_b \gamma(a)]I. \end{aligned}$$

Noncommitment. Suppose, first, that the government chooses its policy after investments are sunk. Investment then depends on the anticipated or equilibrium value a^* of the policy,

$$I = I(a^*),$$

and not on the realized policy a, which has not yet been chosen. (Of course, in a rational expectations equilibrium, $a = a^*$; but we need to allow for the possibility that $a \neq a^*$ in order to study government incentives.)

For policy a and weights w_b and w_l on the borrowers and the lenders,[45] the government's *ex post* objective function is

$$\begin{aligned} &W^{ex\ post}(a, a^*) \\ &\quad = [w_b[(1+a)(\rho_1 - \rho_0) - \sigma_b \gamma(a)] \\ &\qquad + w_l[(1+a)\rho_0 - \sigma_l \gamma(a)]]I(a^*). \end{aligned}$$

And so

$$\frac{dW^{ex\ post}}{da} = 0$$

yields policy $a = a^*$, given by

$$\gamma'(a^*) = \frac{w_b(\rho_1 - \rho_0) + w_l \rho_0}{w_b \sigma_b + w_l \sigma_l}. \tag{16.8}$$

Commitment. Let us now solve the benchmark case of commitment. Investors, having a perfectly elastic supply of funds, enjoy no rent *ex ante* (in contrast, as we have seen, they have quasi-rents *ex post*). And so the government's objective function is

$$\begin{aligned} W^{ex\ ante} &= w_b U_b + w_l \cdot 0 \\ &= w_b[(1+a)\rho_1 - 1 - \gamma(a)]I(a). \end{aligned}$$

The optimal commitment policy solves

$$\frac{dW^{ex\ ante}}{da} = 0$$

or $a = a^C$ ("C" for "commitment"), given by

$$\gamma'(a^C) = \rho_1 + \frac{U_b(a^C) I'(a^C)}{I^2(a^C)}. \tag{16.9}$$

Because $U_b > 0$ (otherwise the entrepreneur would not invest) and $I' > 0$,

$$\gamma'(a^C) > \rho_1.$$

That is, the optimal policy is even more profit friendly than it would be in the absence of credit rationing or for a fixed investment ($\gamma' = \rho_1$). The reason for this is that the prospect of an investor-friendly policy helps entrepreneurs attract funds: it has an *enabling effect*.

Let us now compare the commitment and noncommitment policies. Rewriting (16.9), one has

$$\gamma'(a^C) = \gamma'(a^*) + \underbrace{\frac{(w_b - w_l)(\rho_0 - \rho_1 \sigma_l)}{w_b \sigma_b + w_l \sigma_l}}_{\text{rent-shifting effect}} + \underbrace{\frac{U_b(a^C) I'(a^C)}{I^2(a^C)}}_{\text{enabling effect}}. \tag{16.10}$$

The enabling effect (discussed above) by itself implies that the equilibrium policy is not investor friendly enough ($a^* < a^C$), regardless of the weights on the two groups. This effect is the only source of divergence between the commitment and noncommitment outcomes when the government's welfare function weighs the two groups equally ($w_b = w_l$).

The second source of divergence comes from the fact that investors have no stake *ex ante* but have quasi-rents *ex post*: in order to attract funding, borrowers shift quasi-rents (namely, $(1+a)\rho_0 I$) to investors.

For example, if the government puts more weight on borrowers ($w_b > w_l$), then the rent-shifting effect

45. Again we assume that the government's weights on the two groups are stable. A large literature, starting with Persson and Svensson (1989), Tabellini and Alesina (1990), and Aghion and Bolton (1991), has investigated how a government may try to constrain future ones with different preferences.

indicates the existence of opportunism against investors under noncommitment (a positive rent-shifting effect) if and only if

$$\frac{\rho_0}{\rho_1} > \sigma_l,$$

that is, if and only if the fraction of cash-flow rights held by investors exceeds the fraction of the cost they bear.

Under the same condition, the government is *ex post* too investor friendly (ignoring the enabling effect) if it puts more weight on lenders ($w_b < w_l$).

Alternative assumption on incidence. If we make the alternative assumption that the cost of the policy is socialized and so the borrowers and the lenders bear costs as citizens rather than as parties to the agreement, i.e., $\sigma_b \hat{y}(\tau)\bar{I}$ and $\sigma_l \hat{y}(\tau)\bar{I}$, respectively, where $\bar{I}$ is the representative entrepreneur's investment (rather than the investment of the firm in question) the conclusions are even starker. We only sketch the analysis as it closely follows the previous one.

The financing condition is now

$$I = I(a) = \frac{A}{1-(1+a)\rho_0},$$

and the borrower's *ex ante* utility is

$$U_b = [(1+a)\rho_1 - 1]I(a) - \sigma_b y(a)\bar{I}$$

(where, in equilibrium, $\bar{I} = I(a)$).

The *ex post* social welfare function $W^{ex\ post}(a, a^*)$ is unchanged, and so a^* is still given by condition (16.8).

The *ex ante* social welfare function is now written as

$$W^{ex\ ante} = w_b[(1+a)\rho_1 - 1 - \sigma_b y(a)]I(a) + w_l[-\sigma_l y(a)]I(a).$$

The difference between this and the previous assumption on incidence is that investors bear

$$\sigma_l y(a) I(a)$$

as citizens anyway, and so they have no way of shifting this cost to borrowers through a demand for a higher share of income claims. The comparison between a^C and a^* is now given by

$$y'(a^C) = y'(a^*) + \underbrace{\frac{(w_b - w_l)\rho_0}{w_b\sigma_b + w_l\sigma_l}}_{\text{rent-shifting effect}} + \underbrace{\left(\frac{w_b[(1+a^C)\rho_1 - 1 - \sigma_b y(a^C)]}{w_b\sigma_b + w_l\sigma_l} - \frac{w_l\sigma_l y(a^C)}{w_b\sigma_b + w_l\sigma_l}\right)\frac{I'(a^C)}{I(a^C)}}_{\text{enabling effect}}. \quad (16.11)$$

When $w_b = w_l$, a^C does not depend on the assumption made on incidence: conditions (16.10) and (16.11) give the same expression for a^C.

This is no longer so under unequal weights:

- When $w_b > w_l$ and $\sigma_l > 0$, then the rent-shifting effect is higher in (16.11) than in (16.10) and so is the enabling effect for any a^C; hence, the latter assumption on incidence calls for an even higher a^C, because the investors, as we noted, are unable to pass the cost of the policy through to borrowers.

- The opposite conclusion holds when $w_b < w_l$. Interestingly, suppose that the government cares only about investors ($w_b = 0$). Then

$$a^C = 0 < a^*.$$

The reason for this is that *ex ante* investors have nothing to gain from a profit-enhancing policy: they compete away the resulting gains by accepting a higher investment level from borrowers; and they must bear $\sigma_l y(a) I(a)$ as citizens. Hence, the government would like to protect them by being as profit unfriendly as possible. This policy, however, is time inconsistent: *ex post*, the investors have acquired a stake in the firms and the government is forced to support these claims. (An analogy would be that of a nationwide union opposing the introduction of pension funds, knowing well that once these funds are in place, the workers will have a stake in the corporate sector's profitability, and so the union will have to accept agreements and policies that are more corporate friendly.)

16.3.3 Shield Economics

Earlier we claimed that, from a social viewpoint, policy risk should be shifted to politically influential

actors. Let us provide a few illustrations of this principle. For concreteness, let us assume that the costs attached to the government's policy are borne by the contracting parties (first assumption on incidence) and that the noncommitment outcome does not support enough investment from the government's point of view:

$$a^C > a^*.$$

Assume that there are two types of investors: type-1, or politically connected, investors, with weight w_{l_1}, and type-2, or less connected, investors, with weight w_{l_2}, where

$$w_{l_1} > w_{l_2}.$$

Interpretation 1 (nationality). In this interpretation, type-1 investors are domestic investors and type-2 investors foreign investors.

Interpretation 2 (social class). Another interpretation involves rich and poor investors. The government puts more weight on poor (type-1) investors than on rich (type-2) investors, either because it is concerned about social justice or (more prosaically or sometimes more realistically) because the poor are more likely than the rich to be politically pivotal.

Let θ_1 and θ_2 denote the shares of investor cash-flow rights held by type-1 and type-2 investors, respectively ($\theta_1 + \theta_2 = 1$). Condition (16.8) generalizes to

$$\gamma'(a^*) = \frac{w_b(\rho_1 - \rho_0) + (w_{l_1}\theta_1 + w_{l_2}\theta_2)\rho_0}{w_b\sigma_b + (w_{l_1}\theta_1 + w_{l_2}\theta_2)\sigma_l}.$$

Let us analyze what happens to policy when more of the claims on corporate income are held by type-1 investors and fewer are held by type-2 investors (θ_1 increases). Then a^* increases if and only if

$$\rho_0 > \sigma_l\gamma'(a^*),$$

which is nothing but the statement that a is an investor-friendly action. A stronger ownership by type-1 investors, keeping investors' cash-flow rights constant, then increases a^* towards the commitment outcome. Put differently, *the time-consistency problem is alleviated by aligning stake ownership and the politically influential investor group.*

Application 1: Home Bias or Portfolio Diversification?

In interpretation 1, type-1 investors are domestic investors and type-2 investors foreign investors. Under (frictionless!) capital mobility and assuming risk neutrality, investors are *individually* indifferent as to where to invest. Consequently, small transaction costs associated with investing abroad or small tax incentives for home investment create a strong home bias. Conversely, a small amount of risk aversion calls for international portfolio diversification, i.e., investing very little domestically.[46] This suggests that θ_1 may vary. For a government suffering from not being able to commit to investor-friendly policies, a home bias (θ_1 high) is a boon, as it makes the commitment not to expropriate investors a bit more credible (see Tirole 2003; Wagner 2001).

Application 2: Pension Funds

Let us sketch a highly stylized model of pension funds politics.[47] At the initial date (stages (i) and (ii) in the timing), there are two classes, the poor (type-1 investors) and the rich (type-2 investors). Only the rich have money to invest. The government would like to guarantee some fixed amount of pension benefits (for stage (v) in the timeline in Figure 16.3) for the poor. There are two ways of doing so.

(1) "*Pay as you go*": the government will tax the rich at the final date to deliver the target retirement benefits to the poor.
(2) "*Pension funds*": the government taxes the rich at the initial date and puts the money on behalf of the poor into pension funds, i.e., shares in the entrepreneurs' firms. The poor receive the income attached to these shares at the end.

Under a pay-as-you-go system, $\theta_1 = 0$ (the poor do not own shares). Under the pension fund system, $\theta_1 > 0$. Because $w_{l_1} > w_{l_2}$, the government at stage (iii) chooses a higher a^* under a pension-fund

46. Domestic investors might even want to short their country to the extent that their human capital is positively correlated with the country's index (i.e., they are more likely to lose their job or see their career halt precisely when the country faces a recession).

47. This model, among other things, abstracts from key issues related to the overlapping-generations aspect of savings and retirement benefits.

system.[48] In other words, *the pension funds system, like the home bias, is an indirect commitment to support an investment-friendly environment.*

Biais and Perotti (2002) put forth a related idea. They argue that privatization policies, especially those providing incentives for a wide range of citizens to hold shares in the privatized firms (as was the case in the United Kingdom and in France), build popular (or at least median voter) support for investor protection. Relatedly, Pagano and Volpin (2005c) develop a political economy model in which there is a two-way interaction between investor protection and the size of the stock market. Better investor protection allows firms to issue more equity; in turn, a large stock market expands the shareholder base and creates political support for shareholder protection (there may therefore exist multiple equilibria). Pagano and Volpin further present evidence on panel data for forty-seven countries over the period 1993–2002 that is consistent with the theory.

Application 3: Who Should Hold Equity?

Finally, and by the same principle, one can argue that *providing politically influential investors with an incentive to hold equity rather than debt is also an indirect commitment to support an investment-friendly environment.* According to this reasoning, if equity is more exposed to political risk than are debt claims, foreigners or the rich should hold debt. The point can be made in two different, but similar, ways. First, one can follow Section 3.4 and generalize the variable-investment model to allow for a salvage value of assets: the profit is then $R^F I$ for a failing firm and $R^S I = (R^F + R)I$ for a successful firm. The safe claim on income $R^F I$ is debt, and the claim on the risky income RI is equity. As long as investors are either risk neutral or are able to diversify their portfolio, the prices of claims adjust so that individual investors are indifferent between holding debt and holding equity (both yield a zero return in our model). Once the concern for government expropriation of investors (through a low a) arises, it is socially optimal for the politically less influential groups to hold debt, and to leave equity, which is exposed to policy risk, to more favored investors. Put differently, the government should encourage, perhaps through tax incentives or regulations, equity holding by its most favored investors.

An exception to this reasoning arises when a denotes a policy affecting the enforcement of debt claims (consider, for instance, a policy affecting the creditors' ability to seize collateral in bankruptcy). The analysis is then obviously reversed.

Finally, another way of making the same point consists in looking at the allocation of savings between corporate equity and Treasury bonds. If there is little or no risk of default on sovereign bonds and provided that time inconsistency leads to too little investment from the government's viewpoint, it is socially desirable, ceteris paribus, that investors with little political clout hold the bonds rather than equity.

16.4 Political Alliances

Contracting and property rights institutions are fashioned by political alliances. These alliances are not cast in stone, though. Rather, they are endogenous and furthermore are policy contingent.

To illustrate these points, we enlarge the set of relevant stakeholders to include workers besides entrepreneurs and investors, and look at two specific issues: rules regarding dismissals and those regarding takeovers or creditor rights. The first illustration is in the spirit of the contribution by Pagano and Volpin (2005a); the second is in the spirit of work by Perotti and von Thadden (2001) and Pagano and Volpin (2005b).

16.4.1 Rules Regulating Dismissals: When Managers Side with Investors

Consider the following environment.

Entrepreneurs. There is a continuum of entrepreneurs of mass 1. Each entrepreneur has a project of fixed size I, which requires hiring N workers. As usual, the entrepreneur has limited wealth A, is risk neutral, and is protected by limited liability. She may further engage in moral hazard: the project yields R with probability p and 0 with probability $1-p$, where

48. Suppose, for instance, that $\sigma_1 = 0$. Then

$$\gamma'(a^*) = \rho_1 - \rho_0 + \frac{w_{l_1}\theta_1 + w_{l_2}\theta_2}{w_b}\rho_0.$$

And so an increase in θ_1 from 0 to a positive value leads to a higher a^*.

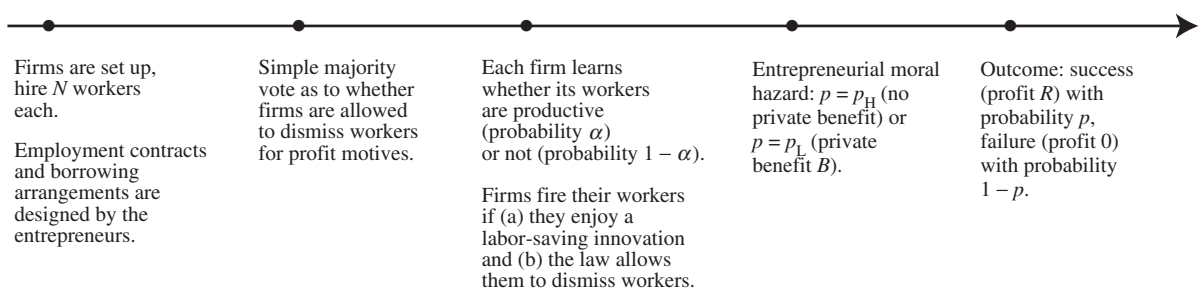


Figure 16.4

$p = p_H$ (no private benefit) or $p = p_L = p_H - \Delta p$ (private benefit B).

The distribution of cash on hand in the population of entrepreneurs is given by $G(A)$. This heterogeneity in wealth will deliver a smooth labor demand function by firms. For simplicity, entrepreneurs do not become workers when their project does not receive funding.

At the intermediate date (see Figure 16.4 for a description of the timing), there may or may not be a (firm-specific) innovation that makes workers useless. If the labor-saving innovation accrues (which has probability $1-\alpha$), the same stochastic profit can be obtained without keeping the N workers employed. With probability α, the firm needs to keep the N workers in order to produce. The shocks are independent and identically distributed (i.i.d.) across firms.

Workers, if they are retained, are given efficiency wage $\bar{w} > 0$, regardless of the technological mutation. This efficiency wage could be endogenized through the introduction of worker moral hazard.[49] Let

$$w \equiv N\bar{w}$$

denote the wage bill.

Workers. There is a continuum of mass N of cashless[50] workers. Workers either find a job in a firm or they become self-employed. In the latter case, their income is normalized at 0 (so $\bar{w}$ also measures the rent associated with being employed in a firm). Like other economic agents, workers are risk neutral.

49. As in, for example, the efficiency-wage models of Calvo and Wellisz (1978) and Shapiro and Stiglitz (1984).

50. Thus, workers cannot post a bond with firms in order to bid for their future quasi-rent.

Investors. There is a continuum of investors with mass NH, where $H < 1$ (there are fewer investors than workers). Investors are risk neutral and willing to lend any amount as long as they receive a rate of return equal to 0.

(a) *Private labor contracts are enforced.* Suppose, first, that firms can offer any employment contract they want to workers and that such contracts, if agreeable at the initial date with workers, are later enforced. Let us further assume that some workers in equilibrium remain self-employed (see below for a sufficient condition). It is in the interest of borrowers to offer workers wage $\bar{w}$ and keep the option to dismiss them (employment-at-will contract). Employed workers then obtain $\bar{w}$ with probability α and 0 with probability $1-\alpha$, which is more than they get, 0, when self-employed. Borrowers take advantage of the existence of a "reserve army" of workers to offer employment-at-will contracts without severance pay in the case of dismissal.

Given this employment contract, a borrower with cash on hand A can raise funds if and only if

$$I - A \leqslant \alpha[p_H[R - B/\Delta p] - N\bar{w}] + (1-\alpha)[p_H(R - B/\Delta p)]$$

or, letting $\rho_0 \equiv p_H(R - B/\Delta p)$ and using the definition of the wage bill ($w \equiv N\bar{w}$),

$$I - A \leqslant \rho_0 - \alpha w. \tag{16.12}$$

(The investors foot the wage bill w at the intermediate stage either through a credit line or a dilution right (see Chapter 5). In either case they are worse off in the state of nature in which workers have to be retained by the firm.)

The number of workers employed in corporations is

$$N[1 - G(I + \alpha w - \rho_0)].$$

This number is lower than N (there is a reserve army of self-employed workers), for example, if

$$I + \alpha w > \rho_0$$

(i.e., if a cashless entrepreneur cannot raise funds) and the density around $A = 0$ is positive. The number of self-employed workers is equal to $NG(I + \alpha w - \rho_0)$.

(b) *Vote on dismissal regulation at the intermediate stage.* Suppose now that after investments have been sunk and workers hired in firms, a vote takes place as to whether firms are allowed to dismiss workers (see Figure 16.4). The simple majority rule governs the outcome of the vote.[51]

For expositional simplicity (this involves no restriction in the analysis), let us assume that N is large, so that we can ignore the entrepreneurs' votes when determining the winning majority.

Let us investigate the preferences of the three other categories of economic agent:

Employed workers obviously prefer to vote against dismissals and receive $\bar{w}$ for certain rather than only with probability α.

Investors vote against a dismissal regulation.

Self-employed workers are here indifferent. For concreteness, we will assume that they vote against a dismissal regulation. This would be the case, for example, if they had even a small amount of savings, so that they would be congruent with investors.[52] Assuming a different voting pattern for self-employed workers would not affect the analysis qualitatively.

Let us assume that

$$1 - G(I + \alpha w - \rho_0) > G(I + \alpha w - \rho_0) + H, \quad (16.13)$$

where H, recall, is the ratio of investors to workers. Then a majority votes in favor of prohibiting dismissals. This implies that our maintained hypothesis that private employment contracts are enforceable is unwarranted.

Thus, suppose to the contrary that, at the investment stage, economic agents expect that layoffs will later be prohibited. The investors' breakeven condition is altered by the fact that the wage bill w is incompressible. Only firms with cash on hand A such that

$$I - A \leqslant \rho_0 - w$$

are able to fund that investment. The number of workers is therefore smaller than earlier and is now equal to

$$N[1 - G(I + w - \rho_0)].$$

If

$$1 - G(I + w - \rho_0) > G(I + w - \rho_0) + H, \quad (16.14)$$

then dismissal regulation is indeed the equilibrium outcome.

If neither (16.13) nor (16.14) hold, the only possible equilibrium expectation is that an anti-dismissal law will be voted for with probability z, $0 < z < 1$; for this to be the case, though, no majority in favor of or against the dismissal regulation can emerge:[53]

$$1 - G(I + [\alpha + (1 - \alpha)z]w - \rho_0) = G(I + [\alpha + (1 - \alpha)z]w - \rho_0) + H. \quad (16.15)$$

Note the stabilizing mechanism: the expectation that layoffs will be regulated reduces the entrepreneurs' access to funding; firms create fewer jobs, and so the political support for the law decreases.

We simplified the analysis by assuming that entrepreneurs are too few to have a political weight.

51. The determination of policy by simple majority voting is a blatant oversimplification of actual public decision making. A large literature (see, in particular, Persson and Tabellini 2000, 2003) has studied how political institutions shape public policies.

52. Alternatively, in a slight extension of the model in which product prices depended on the cost of production, they, as consumers, would be in favor of cost minimization.

53. The reader may wonder how this probability z (which is the only possible equilibrium outcome) can emerge in reality. Introducing a bit of noise answers this question. Suppose, for example, that the distribution $G(A)$ is not perfectly known at the initial date. Rather, it is indexed by an unknown parameter θ drawn from some smooth distribution $K(\theta)$. Suppose, for instance, that θ is a parameter of first-order stochastic dominance: $G_\theta(A \mid \theta) < 0$ (a higher θ means a more favorable distribution of wealth). Then

$$z = 1 - K(\theta^*)$$

(a majority is in favor of a dismissal regulation when $\theta > \theta^*$, i.e., when lots of firms have access to funding and therefore few workers are self-employed) and

$$1 - G(I + [\alpha + (1 - \alpha)z]w - \rho_0 \mid \theta^*) = G(I + [\alpha + (1 - \alpha)z]w - \rho_0 \mid \theta^*) + H.$$

When $\theta \neq \theta^*$ (i.e., with probability 1), a strict majority for or against the regulation emerges. Note that the noise in the distribution can be "arbitrarily small."

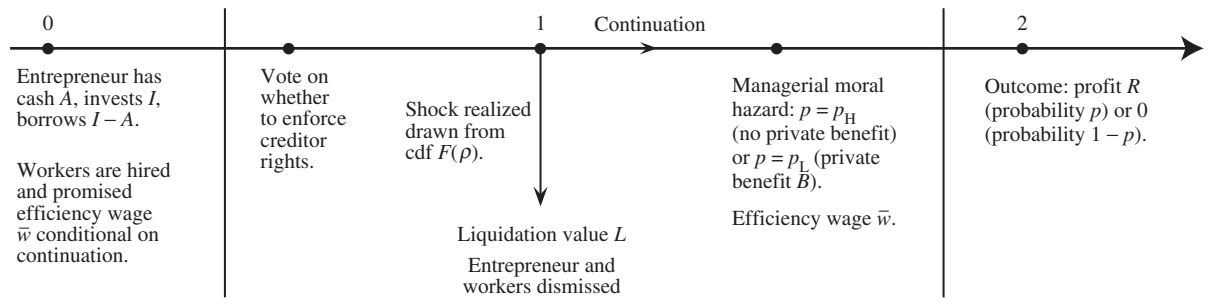


Figure 16.5

Adding them to the determination of the winning majority does not change the overall picture. It is, however, interesting to see whether managers are congruent or dissonant with workers on this policy dimension.

Entrepreneurs *ex ante* are, of course, against regulating dismissals, as this regulation reduces both pledgeable income and value.[54] *Ex post*, though, their preferences depend on how reimbursements are structured. If investors foot the wage bill entirely, then entrepreneurs are *ex post* not affected by the regulation. By contrast, if the wage bill is financed at least in part through a dilution of all claims, entrepreneurs vote against the regulation. This indeterminacy is an artefact of the modeling in that (almost all) firms that receive funding have extra cash. If we add an extra "margin" (choice of liquidity, allocation of control rights, and so forth), this indeterminacy disappears. For example, when the firms must content themselves with limited liquidity in order to attract investors, entrepreneurs *ex post* strictly prefer no regulation.[55]

Lastly, note that entrepreneurs might vote differently if the regulation came together with some fiscal benefits.

16.4.2 Rules Regulating Takeovers or Creditor Rights: When Managers Side with Employees

Let us next consider (*ex post*) attitudes toward the enforcement of laws concerning takeovers or creditor rights. As we saw in Chapters 4, 5, and 11, the ability of investors to liquidate the firm in the case of distress or to sell the firm to a more efficient managerial team facilitates financing. Consider the familiar timing described in Figure 16.5.

The firm faces a random liquidity shock ρ with cumulative distribution function $F(\rho)$ at date 1. It can continue only if it spends ρ. Otherwise, the firm is liquidated and the liquidation value, L, is pledgeable to investors; L could alternatively be interpreted as the price at which the firm is sold to a raider (see Chapter 11). We assume for the moment that the investors' claim L on income is enforceable as specified by the contract.

As in the previous subsection, there are N workers per firm who in the case of continuation must each be paid efficiency wage $\bar{w}$, for total wage bill $w = N\bar{w}$.

54. The NPV is equal to

$$U_b = \rho_1 - [\alpha + (1 - \alpha)z]w - I$$

when funded, where, as usual, $\rho_1 = p_H R$.

55. To see this, suppose, as in Chapter 5, that the firm faces a liquidity shock ρ with distribution $F(\rho)$ at the intermediate stage, and that this shock must be withstood in order to continue. Whether workers are made obsolete by a labor-saving innovation and whether a regulation has been voted for is known to the firm when it must cover liquidity demand ρ. It is then optimal to have two thresholds: ρ^* when workers are dismissed and ρ_w^* when they are not. The NPV is then

$$U_b(\rho^*, \rho_w^*) = [\alpha + (1 - \alpha)z]\left[F(\rho_w^*)(\rho_1 - w) - \int_0^{\rho_w^*} \rho \, dF(\rho)\right] + (1 - \alpha)(1 - z)\left[F(\rho^*)\rho_1 - \int_0^{\rho^*} \rho \, dF(\rho)\right] - I.$$

The investors' breakeven condition can be written as

$$I - A = [\alpha + (1 - \alpha)z]\left[F(\rho_w^*)(\rho_0 - w) - \int_0^{\rho_w^*} \rho \, dF(\rho)\right] + (1 - \alpha)(1 - z)\left[F(\rho^*)\rho_0 - \int_0^{\rho^*} \rho \, dF(\rho)\right].$$

The reader will check that maximizing the NPV subject to the breakeven condition yields $\rho_w^* = \rho^* - w$. Hence, the entrepreneurs are better off even *ex post* when there is no regulation: because the liquidity needs are reduced by w (the shock is really ρ instead of $\rho + w$), the firm is more likely to be liquidated.

Letting $\rho_0 \equiv p_H[R-(B/\Delta p)]$, the investors' breakeven condition, which we will assume is binding, is

$$I - A = F(\rho^*)(\rho_0 - w) - \int_0^{\rho^*} \rho \, dF(\rho) + [1 - F(\rho^*)]L,$$

where ρ^* is the cutoff (the firm continues if and only if $\rho \leqslant \rho^*$). Letting $\rho_1 \equiv p_H R$, the NPV is

$$U_b = F(\rho^*)(\rho_1 - w) - \int_0^{\rho^*} \rho \, dF(\rho) + [1 - F(\rho^*)]L - I.$$

Recall from Chapter 5 that the optimal cutoff satisfies

$$\rho_0 - [w + \rho^* + L] \leqslant 0 < \rho_1 - [w + \rho^* + L]$$

if the budget constraint is binding. That is, at the cutoff, the net pledgeable income, $\rho_0 - (w + \rho)$, is smaller than the opportunity cost L of continuation; the net value, $\rho_1 - (w + \rho)$, in contrast is greater than this opportunity cost.

Suppose now that investors' rights to L are no longer enforced: they cannot foreclose L (or sell the firm to a raider). Consider a shock ρ such that

$$\rho > \rho^* \quad \text{and} \quad \rho + w < \rho_0;$$

such shocks may exist if $\rho_0 - (w + \rho^*) > 0$.[56] Investors are deprived of their earlier right to liquidate and collect proceeds L (a right that was conferred on them since $\rho > \rho^*$); furthermore, the pledgeable income (ρ_0) exceeds the cost of continuing ($\rho + w$) and so investors are better off letting the firm continue when they cannot seize L.

Hence, with positive probability, managers and workers who both receive a quasi-rent in the case of continuation are *ex post* in favor of a law restricting creditors' rights (or takeovers[57]). Needless to say, we could then perform an analysis similar to that of Section 16.4.1 and thereby see how political majorities endogenously emerge in favor of or against such regulations.

Remark (related literature). Perotti and von Thadden (2004) emphasize how the law reallocates control rights between shareholders (who benefit from risky choices) and creditors (who want to play it safe). In their model, workers side with creditors, since the latter's choice is not about liquidation, but rather between a risky and a safe ongoing strategy for the firm. Put differently, their jobs are less jeopardized by a safe but relatively unprofitable conservative strategy.

In Cespa and Cestone (2002), a firm faces a takeover threat that would remove management. Stakeholders may collude with management so as to reduce the probability of takeover in exchange for managerial concessions benefitting the stakeholders. Collusion is less likely when governance rules are weak since management may be able to use antitakeover defenses and prevent the takeover without colluding with stakeholders. Stakeholders may then favor an active market for corporate control. Stakeholders and small shareholders thus have congruent views on corporate governance, but disagree on issues for which profitability conflicts with stakeholder welfare.

In Pagano and Volpin (2005b), the motivation of workers on the job is provided by either managerial monitoring or high wages. Because managers bear the entire cost of monitoring workers and share with investors the financial cost of high wages, they have a bias towards granting high wages to workers. At the same time, committing to pay high wages makes the company less appealing to potential raiders and thereby protects the rents that managers can extract from corporate control. This creates an implicit alliance between workers and managers to reduce the occurrence of takeovers.

56. Let μ denote the shadow price of the investors' breakeven constraint. Simple computations show that

$$\rho^* = \frac{\rho_1 + \mu\rho_0}{1 + \mu} - (w + L)$$

and so

$$\rho_0 - (w + \rho^*) = L - \frac{\rho_1 - \rho_0}{1 + \mu}.$$

And so, if, for example, $L \geqslant \rho_1 - \rho_0$, the condition in the text is satisfied (since, generally, one must account for the fact that μ is a decreasing function of L).

57. The political alliance between management and employees is particularly stressed in Hellwig (2000), an early paper in this literature.

Supplementary Sections

16.5 Contracting Institutions, Financial Structure, and Attitudes toward Reform

This part of the supplementary sections demonstrates in more detail than Section 16.2 how enforcement affects collateral pledging, liquidity, and

the allocation of control rights, and how preferences regarding enforcement vary across borrowers.

16.5.1 Contracting Institutions and Collateral Pledging

Relative to the first illustration, we add an extra dimension of contracting: the entrepreneur can pledge an amount C,

$$0 \leqslant C \leqslant C^{\max},$$

of collateral in the case of failure (as in Section 4.3.4, it is not optimal to pledge collateral in the case of success). Collateral pledging is costly to the extent that investors value collateral C at only βC, where $\beta < 1$. We assume that the pledge is enforced with probability $\hat{e} < 1$ (the law and the judicial systems presumably have an important say in the determination of $\hat{e}$). The probability of nondiversion of profits is still e.

The NPV of a project that is funded is equal to the NPV in the absence of collateral pledging, $p_{\mathrm{H}}R - I$, minus the deadweight loss, $(1-\beta)C$, incurred when investors seize the collateral, which has probability $(1-p_{\mathrm{H}})\hat{e}$:

$$U_{\mathrm{b}} = p_{\mathrm{H}}R - I - (1-p_{\mathrm{H}})(1-\beta)\hat{e}C.$$

The funding condition becomes

$$p_{\mathrm{H}}eR_{\mathrm{l}} + (1-p_{\mathrm{H}})\hat{e}\beta C \geqslant I - A,$$

while the incentive compatibility constraint can be written as

$$(\Delta p)[[eR_{\mathrm{b}} + (1-e)R] + \hat{e}C] \geqslant B.$$

This incentive constraint is, from Assumption 16.1, irrelevant.[58]

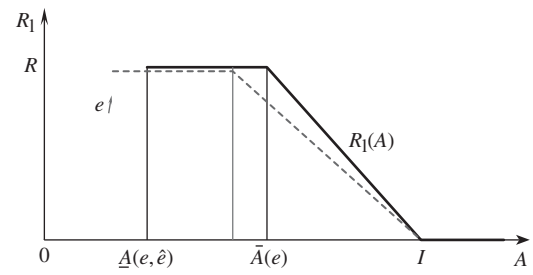
First, note that if $A \geqslant \bar{A}(e)$, where $\bar{A}(e)$ is given by (16.4), the firm can borrow without pledging collateral. It thereby obtains the highest feasible NPV, $p_{\mathrm{H}}R - I$. And so, for $A \geqslant \bar{A}(e)$,

$$C(A) = 0 \quad \text{and} \quad U_{\mathrm{b}}(A) = p_{\mathrm{H}}R - I.$$

When $A < \bar{A}(e)$, the firm must pledge collateral.

To cut the number of cases to be considered, let us assume that borrowers cannot pledge an amount of collateral so large that the NPV becomes negative.

58. Recall that Assumption 16.1 states that $(1-e)R > B/\Delta p$, and so the incentive constraint holds for any $R_{\mathrm{b}}, C \geqslant 0$.



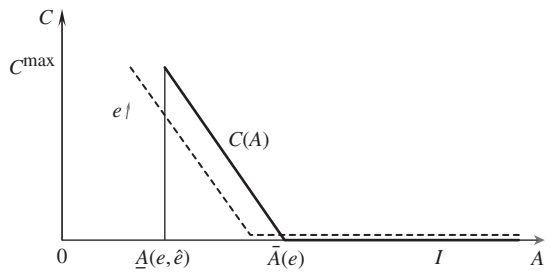


Figure 16.6

Assumption 16.2. $p_{\mathrm{H}}R - I - (1-p_{\mathrm{H}})(1-\beta)\hat{e}C^{\max} \geqslant 0$.

Borrowers minimize the deadweight loss and therefore choose the lowest C that is consistent with the investors' breakeven condition. The latter reveals that optimally $R_{\mathrm{l}} = R$ when $A < \bar{A}(e)$ (pledging income is cheaper than pledging assets) and so

$$p_{\mathrm{H}}eR + (1-p_{\mathrm{H}})\hat{e}\beta C(A) = I - A,$$

as long as $C(A) \leqslant C^{\max}$, or

$$A \geqslant \underline{A}(e,\hat{e}),$$

where

$$p_{\mathrm{H}}eR + (1-p_{\mathrm{H}})\hat{e}\beta C^{\max} = I - \underline{A}(e,\hat{e}).$$

Figures 16.6 and 16.7 describe the comparative statics of the optimal contract when contracting institutions $(e,\hat{e})$ change.

Claims on income. When entrepreneurs have more difficulty diverting profits (e increases in Figure 16.6), funding is more widely available (as earlier), and less collateral is pledged. Thus, a stronger enforcement of income claims raises NPV even when funds are available.

Claims on assets. When courts and the law make it easier for borrowers to seize assets ($\hat{e}$ increases in

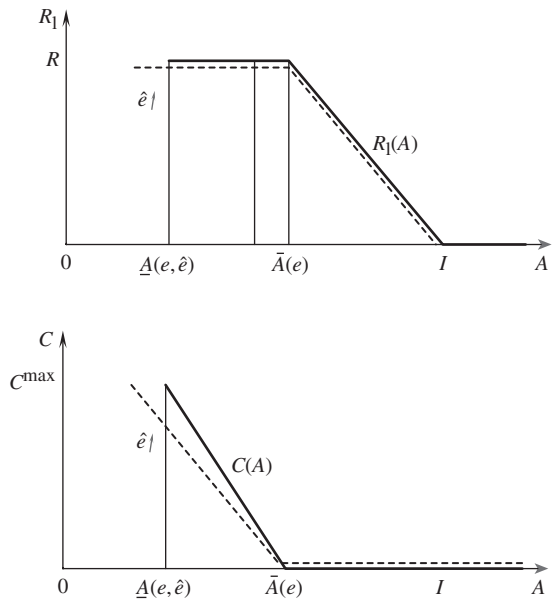


Figure 16.7

Figure 16.7), funds are more widely available. Hence, financing is facilitated. By contrast, conditional on receiving financing, a change in the enforcement of claims on assets has no impact on NPV, because all that matters for NPV and pledgeable income is the expected amount of collateral seized ($\hat{e}C$).

We can again illustrate the topsy-turvy principle. Firms with weak balance sheets benefit the most from a stronger enforcement of claims on income and on assets because they either gain access to funding or else need to pledge a lower amount of collateral to attract investors.

From an *ex post* perspective, though, firms with weak balance sheets have issued more claims on income (R_1) and more claims on collateral (C). They are therefore the strongest advocates for weaker contracting institutions.

16.5.2 Contracting Institutions and Liability Maturity Structure

To analyze the impact of contracting institutions on liability maturity, let us add imperfect enforcement to the canonical model of debt maturity developed in Section 5.2.

The timing is summarized in Figure 16.8.

As indicated in bold in the figure, imperfect enforcement is modeled as two indices of diversion, $1-e$ and $1-\mathring{e}$. That is, the investors recoup the long-term profit with probability e and the short-term profit with probability $\mathring{e}$.

For the moment, we assume that diversion is infeasible in the short run:

$$\mathring{e}=1.$$

We will later observe that the ability to divert money in the short term is likely to be less problematic than the ability to do so in the long term.

Letting, as in Section 5.2, $F(\rho)$ denote the cumulative distribution of liquidity shocks, and ρ^* the cutoff under which continuation is funded, and maintaining Assumption 16.1,[59] and assuming that the firm pledges the entire income R in the case of success (Assumption 16.1 implies that such pledging is consistent with incentive compatibility), the pledgeable income is

$$\begin{aligned}\mathcal{P}(\rho^*,e)&=r+\int_0^{\rho^*}(\hat{\rho}_0-\rho)\,\mathrm{d}F(\rho)\\&=r+F(\rho^*)\hat{\rho}_0-\int_0^{\rho^*}\rho\,\mathrm{d}F(\rho),\end{aligned}$$

where

$$\hat{\rho}_0\equiv ep_{\mathrm{H}}R$$

is the date-2 pledgeable income under imperfect enforcement.

The borrower's utility (the NPV) is

$$\begin{aligned}U_{\mathrm{b}}(\rho^*)&=r+\int_0^{\rho^*}(\rho_1-\rho)\,\mathrm{d}F(\rho)-I\\&=r+F(\rho^*)\rho_1-\int_0^{\rho^*}\rho\,\mathrm{d}F(\rho)-I.\end{aligned}$$

Firms with strong balance sheets. $U_{\mathrm{b}}(\rho^*)$ is maximized when the continuation policy is efficient: $\rho^*=\rho_1$. And so,

$$\text{if } \mathcal{P}(\rho_1,e)\geqslant I-A, \text{ then } \rho^*=\rho_1.$$

This optimal liquidity management can be implemented (see Section 5.2) through

- a dilution right, and

59. Recall that this assumption states that

$$(1-e)R>\frac{B}{\Delta p}$$

and guarantees that the incentive compatibility constraint is satisfied even if the entrepreneur is granted no nominal stake in the final profit.

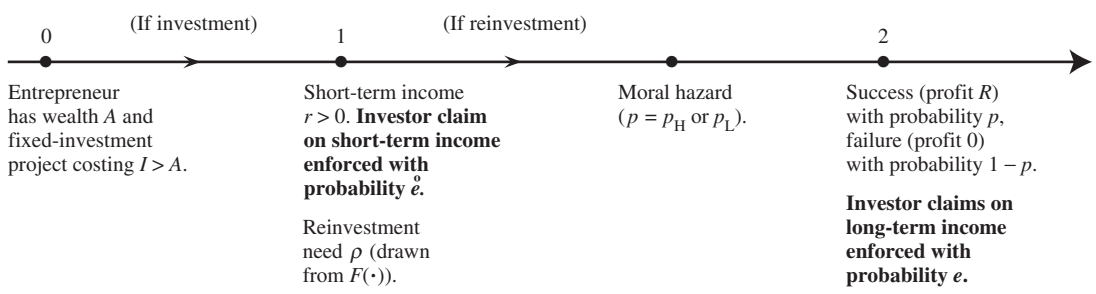


Figure 16.8

- a short-term debt level d (a credit line if negative) leaving enough cash in the firm to make up for credit rationing:

$$\hat{\rho}_0 + [r - d] = \rho^* = \rho_1.$$

That is, the firm can raise up to the pledgeable income of continuation, $\hat{\rho}_0$, by raising new securities. Date-1 cash on hand, $r - d$, complements dilution to provide the firm with enough liquidity. Note that for firms with strong balance sheets, the short-term debt increases with the quality of enforcement. This is due to the fact that a better enforcement makes it easier to return to the capital market at date 1.

Lastly, note that the utility of entrepreneurs with strong balance sheets is not affected by a small change in the strength of enforcement.

Firms with weak balance sheets. As in the case of perfect enforcement, firms with weaker balance sheets (provided that they receive funding) must content themselves with less liquidity, i.e., must issue more short-term debt. That is, if

$$\mathcal{P}(\rho_1, e) > I - A \geqslant \mathcal{P}(\hat{\rho}_0, e),$$

then

$$\hat{\rho}_0 < \rho^* < \rho_1.$$

The cutoff ρ^* is given by

$$r + F(\rho^*)\hat{\rho}_0 - \int_0^{\rho^*} \rho \, \mathrm{d}F(\rho) = I - A.$$

One has

$$\frac{\partial \rho^*}{\partial \hat{\rho}_0} = \frac{F(\rho^*)}{f(\rho^*)(\rho^* - \hat{\rho}_0)} > 0.$$

A weaker enforcement calls for a lower amount of liquidity and therefore for a larger probability of early termination (ρ^* increases with e).

As for firms with strong balance sheets, optimal liquidity management can be implemented through a combination of short-term debt d and dilution rights, where

$$\rho^* = \hat{\rho}_0 + [r - d].$$

The weaker the balance sheet, the higher the amount of short-term debt.

The impact of enforcement on the level of short-term debt is in general ambiguous. If the density of ρ is constant or decreasing (F is concave), though, then $F(\rho^*) > f(\rho^*)(\rho^* - \hat{\rho}_0)$ and so short-term debt decreases when enforcement improves. In other words, the "*pledgeability effect*" (the fact that the firm need no longer substitute short-term debt for (the lack of) pledgeable long-term income) dominates the "*seasoned offering effect*" (an increase in the quality of enforcement implies that the firm can raise more money in the capital market at date 1 and therefore needs fewer retained earnings). Only the latter effect exists for firms with strong balance sheets.

Who gains most from a stronger enforcement? Recall that firms with strong balance sheets are not affected by the strength of enforcement. By contrast, for a firm with a weak balance sheet,

$$\frac{\mathrm{d}U_b}{\mathrm{d}e} = \frac{\mathrm{d}U_b}{\mathrm{d}\rho^*} \frac{\partial \rho^*}{\partial \hat{\rho}_0} \frac{\partial \hat{\rho}_0}{\partial e} = \frac{\rho_1 - \rho^*}{\rho^* - \hat{\rho}_0} F(\rho^*)(p_H R) > 0.$$

After the liquidity need has been met, though, these firms have pledged $R_1 = R$, while firms with strong balance sheets have promised $R_1 < R$.[60]

60. We assume here that the strong-balance-sheet firms return the entire short-term profit to investors, and enjoy the "slack" in the investors' participation constraint through a nominal claim on long-term income. The point holds more generally if this slack translates into both a claim on short-term income and one on long-term income.

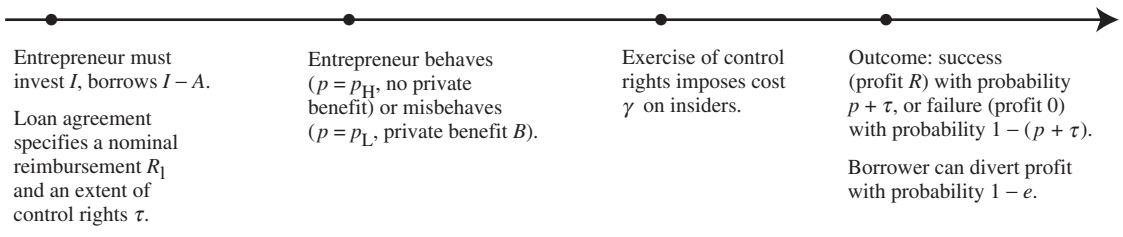


Figure 16.9

Hence, the topsy-turvy principle holds: the firms with the weak balance sheet are *ex post* the most vocal lobbyists in favor of a weakening in enforcement.

Remark (enforcement of claims on intermediate cash flow). We assumed that date-1 income could not be diverted. What happens if $\mathring{e} < 1$? Without supplying a complete analysis, let us note that date-1 diversion may not be as costly to the firms (from an *ex ante* viewpoint) as date-2 diversion. To see this, let the contract specify that if d is not paid to investors at date 1, then the firm is liquidated.[61] If $\rho \leqslant \rho^*$ and $r < (1 - e)p_H R$, the borrower has no incentive to divert date-1 income.[62] By contrast, imperfect enforcement is costly when $\rho > \rho^*$, since the borrower then has nothing to lose (this results in a reduction of pledgeable income equal to $[1 - F(\rho^*)](1 - \mathring{e})r$). The reader familiar with Section 4.7 and with the Bolton and Scharfstein (1990) model will here recognize the theme that the carrot of continuation (or the stick of early termination) alleviates concerns about early diversion of cash by the borrower.

16.5.3 Contracting Institutions and Control Rights

As in Chapter 10, we now assume that the concession takes the form of control rights allocated to investors. To simplify the exposition, we consider the continuum of control rights version. This version can be summarized (see Exercise 10.9) by the total increase, $\tau \geqslant 0$, in the probability of success and the total cost, $\gamma(\tau)$, for the insiders attached to these control rights, with $\gamma(0) = 0$, $\gamma' > 0$, $\gamma'' > 0$.

Figure 16.9 illustrates the timing with imperfect enforcement of claims on income (recall that, given separability of the production function, it does not matter whether moral hazard occurs before or after the exercise of control rights).

In Figure 16.9, we assume that there is no uncertainty as to whether investors will be able to exercise their control rights. The analysis with imperfect enforcement of control rights is more complex and will be briefly discussed later on.

The borrower's utility is then

$$U_b(\tau) = (p_H + \tau)R - \gamma(\tau) - I;$$

and the investors' breakeven condition is

$$(p_H + \tau)eR \geqslant I - A.$$

We keep making Assumption 16.1 so as to shorten the exposition (recall that the incentive compatibility constraint is then automatically satisfied).

Let τ^{FB} denote the first-best allocation of control rights:

$$\gamma'(\tau^{FB}) = R.$$

Because the transfer of control rights to investors is costly while that of income (by assumption) creates no deadweight loss, the entrepreneur first gives cash-flow rights and limited control rights ($\tau = \tau^{FB}$) to investors; if this does not create enough pledgeable income to allow investors to recoup their investment, the entrepreneur gives all cash-flow rights (R) as well as extended control rights ($\tau > \tau^{FB}$) to investors.

And so, if $A \geqslant \bar{A}(e)$, where

$$(p_H + \tau^{FB})eR = I - \bar{A}(e),$$

61. More generally, one would want the liquidation decision itself to be subject to enforcement problems.

62. The reader may wonder whether the contract is renegotiation-proof, as the investors might want to refinance anyway when $\rho < \hat{\rho}_0$. But for weak long-term enforcement ($\hat{\rho}_0$ close to 0), this is not an issue.

the borrower relinquishes only those control rights that are efficiently allocated to investors.

Firms with weak balance sheets must surrender more control rights, i.e.,

$$\tau(A) > \tau^{FB},$$

where

$$[p_H + \tau(A)]eR = I - A.$$

It can further be shown[63] that *firms with weaker balance sheets benefit more, from an ex ante viewpoint, from an enhanced enforcement of claims on income* (an increase in e); for, a weak enforcement forces the firm to make up for pledgeable income by surrendering very costly control rights to investors.[64]

Finally, let us briefly discuss the enforcement of the exercise of control rights, focusing on firms with weak balance sheets, which transfer all cash-flow rights (R) as well as extended control rights ($\tau > \tau^{FB}$) to investors. Suppose that, with probability $1 - e'$ with $e' < 1$, the investors do not get to exercise their control rights. Rather, entrepreneurs choose *ex post* the level of τ. This results in an expected increase in the probability of success $\tau_b(e) < \tau^{FB}$, and expected cost for insiders $y_b(e) = y(\tau_b(e))$. It is still optimal for the entrepreneur to allocate all cash-flow rights to investors. Then[65]

$$y'(\tau_b(e)) = (1 - e)R.$$

The investors' breakeven condition for firms with weak balance sheets becomes[66]

$$[p_H + e'\tau(A) + (1 - e')\tau_b(e)]eR = I - A.$$

A weaker enforcement of control rights (e' decreases) forces the firm to relinquish more control rights and hurts borrowers.[67] Furthermore, firms with weak balance sheets suffer more from a weaker enforcement of control rights.[68]

A weaker enforcement of claims on income has two opposite effects: first, the standard, direct effect of lowering pledgeable income; second, an increased-accountability effect—because the borrower receives more of the final profit, her exercise of control rights when those of investors are not protected becomes more congruent with investors' preferences (τ_b decreases with e). This increased-accountability effect raises the pledgeable income, but it cannot, however, make a weak enforcement of income claims a good thing; for, if it dominated the direct effect, then the borrower could achieve the same outcome under strong enforcement by giving a smaller income claim to investors.[69]

16.6 Property Rights Institutions: Are Privately Optimal Maturity Structures Socially Optimal?

Another illustration of the common-agency externalities (discussed in Section 16.3) is provided by the choice of liability maturity structures. This section investigates whether the maturity structure that is optimal for individual firms is socially optimal when the government cannot commit to future policies, that is, whether the government could increase welfare by encouraging shorter or longer maturity structures.[70]

63.
$$\frac{dU_b}{de} = [y'(\tau(A)) - R]\frac{p_H + \tau(A)}{e},$$
and so
$$\frac{\partial}{\partial A}\left(\frac{dU_b}{de}\right) < 0$$
since $y'' > 0$ and $\tau' < 0$.

64. *Ex post*, in contrast, firms with weak balance sheets have more to gain from a lack of enforcement of claims on income since they, being subject to a stricter governance, are successful with a higher probability. (Also, firms with very strong balance sheets pledge $R_l < R$ and so have weaker incentives to lobby for repudiation.)

65. We also assume that the events in which investors' control rights and claims on income are not enforced are not correlated. This is probably an unreasonable assumption, but the analysis is straightforwardly extended to allow for correlation.

66. The NPV's new expression is
$$U_b = [p_H + e'\tau(A) + (1 - e')\tau_b(e)]R - [e'y(\tau(A)) + (1 - e')y(\tau_b(e))] - I.$$

67. Simple computations, making use of the investors' breakeven condition, show that
$$\frac{\partial U_b}{\partial e'} = y'(\tau(A))[\tau(A) - \tau_b(e)] - [y(\tau(A)) - y(\tau_b(e))] > 0$$
since y is convex.

68.
$$\frac{\partial}{\partial A}\left(\frac{\partial U_b}{\partial e'}\right) = y''(\tau(A))\frac{d\tau}{dA}[\tau(A) - \tau_b(e)] < 0.$$

69. Namely, comparing e_W and e_S, $e_W < e_S$, consider giving claim $R_l < R$ to investors, such that
$$(1 - e_W)R = (1 - e_S)R + e_S(R - R_l).$$
The investors' and the borrower's stakes are then unchanged.

70. An interesting question is whether the government is indeed capable of manipulating the firms' maturity structure. Suppose, for instance, that the government levies a tax on short-term debt repayments. The firms in general can evade this tax without altering their liquidity management: they can offset short-term debt repayment by

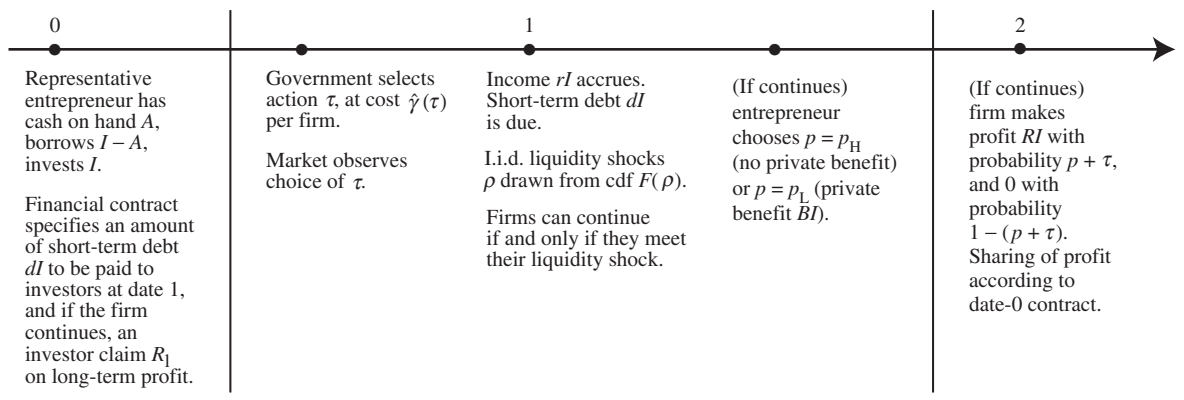


Figure 16.10

Let us return to the optimal-maturity-structure model of Section 5.2, but with a variable investment size, and append an interim government action as we did in the Section 16.3.3. The timing is summarized in Figure 16.10.

The new feature is the introduction of a firm-specific, investment-proportional liquidity shock $\rho I \in [0, \infty)$ that must be covered by the firm in order to continue. This shock is not known at date 0 and is distributed according to cumulative distribution function $F(\rho)$ with density $f(\rho)$. We assume that the distribution has a monotone hazard rate:[71]

$$\frac{f(\rho)}{F(\rho)} \text{ is decreasing.}$$

Recall from Chapter 5 that, in order to meet their liquidity shocks, firms can use their "retained earnings" $[r - d]I$, i.e., what is not distributed to investors at date 1. They can further dilute initial investors by issuing new claims in a seasoned offering.

The model is otherwise that of the Section 16.3.2. The government selects a level τ of profit-friendly policy, at cost $\hat{\gamma}(\tau)$ per firm that has invested. The probability of success of firms that are not liquidated is then $p + \tau$ ($p_H + \tau$ in equilibrium). As earlier, it is convenient to change variable and let

$$a \equiv \frac{\tau}{p_H} \quad \text{and} \quad \gamma(a) \equiv \hat{\gamma}(p_H a).$$

The (per-unit-of-investment) continuation value is then $(1 + a)\rho_1$ and the (per-unit-of-investment) continuation pledgeable income $(1 + a)\rho_0$, with

$$\rho_1 \equiv p_H R \quad \text{and} \quad \rho_0 \equiv p_H\left(R - \frac{B}{\Delta p}\right).$$

For simplicity (but this is not crucial at all), we will assume that the cost $\gamma(a)I$ per continuing firm is entirely borne by the entrepreneur whose firm continues.

Lastly, we assume that the government cares solely about entrepreneurs:

$$w_1 = 0.$$

This assumption makes government opportunism particularly salient. While the government would like to *ex ante* commit to be investor friendly so as to enable its corporate friends to raise funds, it finds it hard to abide by its promise later on. That is, the time-consistency problem is severe.

The key feature of the timing described in Figure 16.10 is that the policy choice is made before firms need to refinance. A policy that is less investor friendly (a lower τ, or equivalently a lower a) makes it more difficult for firms to raise funds in a seasoned offering. Hence, more firms are liquidated. The threat of liquidation and the fact that entrepreneurs enjoy quasi-rents (namely, $(1 + a)(\rho_1 - \rho_0)I$ when their firm continues) imposes some discipline on the government. The harder question, though, is,

reducing dilution rights, keeping the reinvestment policy constant. (If dilution rights reach the zero level, investors must further check that the entrepreneur does not use the full retained earnings to finance continuation.) Provided that investors can control dilution rights (and that excess cash in the firm is not wasted), short-term debt repayments can always be deferred while keeping total liquidity payments constant.

71. This monotone-hazard-rate condition is satisfied by most familiar distributions (e.g., uniform, normal, logistic, chi-squared, exponential, and Laplace) and is usually made in order to guarantee the quasi-concavity of objective functions in maximization problems.

How does the firms' maturity structure impact this discipline?

As in Section 5.2, we first derive the optimal cutoff ρ^* under which the initial contract lets the firm continue, and then consider implementation of the optimal contract through a liability maturity structure.

Let a^* denote the equilibrium value of the government's policy. At date 0, entrepreneurs and investors anticipate this value and so the investors' breakeven condition is

$$I - A = \left[r + F(\rho^*)(1 + a^*)\rho_0 - \int_0^{\rho^*} \rho \, \mathrm{d}F(\rho) \right] I.$$

The representative entrepreneur's utility is equal to the NPV:

$$U_b(\rho^*) \equiv \left[r + F(\rho^*)[(1 + a^*)\rho_1 - \gamma(a^*)] - \int_0^{\rho^*} \rho \, \mathrm{d}F(\rho) - 1 \right] I,$$

where we use the assumption that the cost of the government policy is borne by continuing entrepreneurs.[72]

Following the steps of the analysis of Chapter 5, the cutoff that maximizes value is given by

$$\rho^* = (1 + a^*)\rho_1 - \gamma(a^*);$$

the cutoff that maximizes pledgeable income is (provided that γ is not too large) smaller:

$$\rho^* = (1 + a^*)\rho_0.$$

The optimal cutoff, obtained by using the investors' breakeven constraint to determine I as a function of ρ^* and substituting into the NPV equation, therefore satisfies[73]

$$(1 + a^*)\rho_0 < \rho^* < (1 + a^*)\rho_1 - \gamma(a^*).$$

As in Chapter 5, the optimal contract can be implemented through a combination of

- short-term debt d^*I due at date 1 (or the availability of a credit line, if $d^*I < 0$), and
- dilution rights, i.e., the ability to conduct a seasoned offering, with

$$\rho^* = [r - d^*] + (1 + a^*)\rho_0. \tag{16.16}$$

The first term on the right-hand side is the financial cushion created by the partial distribution of short-term earnings to investors. The second term represents the maximum that can be collected by returning to the capital market at date 1.

Let us now turn to the government's optimal policy at date 1. Let a denote the actual choice of policy (we will be primarily interested in small deviations around the equilibrium policy a^* since we want to determine the first-order condition for this policy). A deviation by the government away from the equilibrium policy changes the amount that firms can raise through a seasoned offering. Namely, they can raise $(1 + a)\rho_0 I$. And so the new cutoff is

$$\rho^*(a) = [r - d^*] + (1 + a)\rho_0$$

or

$$\rho^*(a) = \rho^* + (a - a^*)\rho_0.$$

Remembering that the government aims at maximizing the entrepreneurs' aggregate welfare ($w_1 = 0$), the date-1 choice of a solves

$$\max_{\{a\}} \{F(\rho^*(a))[(1 + a)(\rho_1 - \rho_0) - \gamma(a)]I\},$$

where

- the investment I is fixed at date 1;
- due to the quasi-rent transfer, the entrepreneurs' financial stake in their firms is only $(1 + a)(\rho_1 - \rho_0)I$;
- by assumption, the total cost of the policy is $\gamma(a)I$ per continuing firm and is borne by entrepreneurs.

Taking the first-order condition (in log derivatives) and imposing the equilibrium condition ($a = a^*$):

$$\frac{\gamma'(a^*) - (\rho_1 - \rho_0)}{(1 + a)(\rho_1 - \rho_0) - \gamma(a^*)} = \frac{f(\rho^*)}{F(\rho^*)} \rho_0. \tag{16.17}$$

(The monotone-hazard-rate assumption and the convexity of $\gamma(\cdot)$ further imply that the (log of the) government's objective is quasi-concave.)

72. Note that γ is only in the NPV equation, not in the breakeven condition, since the entrepreneur incurs this cost whether she shirks or not.

73. As in Chapter 5, the optimal cutoff minimizes the unit cost of bringing on average 1 unit of investment to completion:

$$\rho^* \text{ minimizes } c(\rho^*) = \frac{1 - r + \int_0^{\rho^*} \rho \, \mathrm{d}F(\rho)}{F(\rho^*)}.$$

As usual, constant returns to scale imply that the range of allowable parameters must be restricted so that there is investment and this investment is not infinite.

We are now in a position to state the main result. Using the monotone-hazard-rate assumption, conditions (16.16) and (16.17) imply that

$$\frac{\mathrm{d}a^*}{\mathrm{d}\rho^*} < 0 \quad \text{or} \quad \frac{\mathrm{d}a^*}{\mathrm{d}d^*} > 0.$$

A shortening of the liability maturity structure (an increase in the firms' level of short-term debt) disciplines the government. Intuitively, more short-term debt makes the firms more fragile as the cushion they accumulate by not fully distributing short-term profits shrinks. They become more dependent on returning to the capital market, which forces the government to make investor claims on firms more valuable.

This increase in discipline is often a good thing from an *ex ante* viewpoint. Investors are not affected since (a) they always break even at date 0, and (b) we assumed that the incidence of the government policy was entirely on entrepreneurs. A sufficient condition for entrepreneurs to be made better off is that the density f be nonincreasing.[74]

Remark (endogenous uncertainty about government policy). The government's policy is perfectly predictable in the deterministic model described above; and so a deterministic amount of debt is *one* way of implementing the optimal management of liquidity. Suppose in contrast that the government's policy is random as $\gamma(a) = \gamma_0(a) + \varepsilon a$, where ε is a random variable that is learned by the government at date 1 (before choosing policy a). The analysis above can easily be generalized (see Tirole 2003). The key difference is that deterministic debt is no longer optimal. Rather, we have the following two points:

- The optimal debt is (negatively and linearly) indexed on the stock index, $d^* = d_0 - d_1 a$, in order to take advantage of the new information about the firm's prospects: if the government adopts a value- and investor-friendly policy (because it learns that this policy is cheap), then the firm should take advantage of this. Dilution rights become more valuable, but they are optimally complemented by a lengthening of the maturity structure.
- State-contingent debt makes the government policy more investor friendly, precisely because it increases the firms' reinvestment sensitivity to public policy.

74. From an *ex ante* point of view, and for an arbitrary policy a, let $I(a, \rho^*)$ be defined by the breakeven condition:

$$I - A = rI + F(\rho^*)(1 + a)\rho_0 I - \left[\int_0^{\rho^*} \rho \, \mathrm{d}F(\rho)\right] I.$$

The representative entrepreneur's utility can be expressed as

$$U_\mathrm{b}(a, \rho^*) \equiv F(\rho^*)[(1 + a)(\rho_1 - \rho_0) - \gamma(a)]I(a, \rho^*) - A.$$

The optimal contract maximizes $U_\mathrm{b}(a, \rho^*)$ over ρ^* for a given a. Around the equilibrium values (ρ^*, a^*), and making use of the government's first-order condition and of the optimality condition for ρ^* ($\rho^* = c(\rho^*)$, see footnote 73),

$$\frac{\mathrm{d}\log(U_\mathrm{b} + A)}{\mathrm{d}\rho^*} \propto \left[\frac{F(\rho^*)}{f(\rho^*)} - [\rho^* - (1 + a)\rho_0]\right] \frac{\mathrm{d}a^*}{\mathrm{d}\rho^*},$$

where "$\propto$" means "proportional to." So, if $f' \leqslant 0$ (a condition that is more stringent than the monotone-hazard-rate condition, $f'F \leqslant f^2$),

$$\frac{F(\rho^*)}{f(\rho^*)} \geqslant \rho^*.$$

Because $\mathrm{d}a^*/\mathrm{d}\rho^* < 0$,

$$\frac{\mathrm{d}\log(U_\mathrm{b} + A)}{\mathrm{d}\rho^*} < 0.$$

16.7 Exercises

The first exercise is inspired by a paper by Gertler and Rogoff (1990).

Exercise 16.1 (borrowing abroad). Consider a small country with a mass 1 of identical entrepreneurs. There is a single (tradable) good. The representative entrepreneur has initial wealth A and a variable-investment constant-returns-to-scale project. A project of size $I \in [0, \infty)$ at date 1 yields at date 2 verifiable revenue RI with probability p and 0 with probability $1 - p$. The probability p is not subject to moral hazard. There is moral hazard, though: instead of investing I in the firm, the entrepreneur can invest it abroad and get private return μI, where $\mu < 1$. The investors are unable to seize the return from this alternative investment. Everyone is risk neutral, has discount factor 1 (i.e., has utility equal to the undiscounted sum of consumptions at dates 1 and 2), and the entrepreneur is protected by limited liability.

One will assume that

$$pR > 1 > pR - \mu.$$

(i) Compute the representative entrepreneur's borrowing capacity and utility. Show that the outcome is the same as in a situation in which the entrepreneur cannot divert funds and invest them abroad,

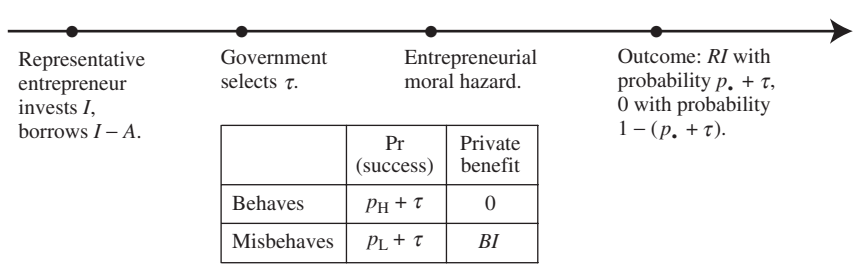


Figure 16.11

but can enjoy a private benefit per unit of investment $B = \mu$. Explain why.

(ii) Adopt the convention that the payment to investors, R_1, is a debt payment. Suppose that the entrepreneurs' projects are independent and that the government imposes a per-unit-of-income tax on successful projects and offers a guarantee/compensation σ on private debt (so τRI is the tax on successful projects and σR_1 is the investors' payoff in the case of bankruptcy). Show that the borrowing capacity and entrepreneur utility are the same as in (i).

In contrast, compute the impact on entrepreneurs when the government starts at date 1 with an inherited public debt outstanding to foreign lenders equal to D ($\leqslant A$) per entrepreneur and must finance it through an income tax on successful projects.

(iii) Coming back to question (i), suppose that the government can through its governance institutions or other policies affect the return μ on investments abroad. There are two levels $\mu_L < \mu_H$ (where both levels satisfy the conditions in (i)). The choice between the two levels involves no cost (but affects behavior!). The government's objective function is to maximize the representative entrepreneur's welfare.

Assuming that all borrowing is foreign borrowing, what is the representative entrepreneur's utility when

(a) the government can commit to μ before foreign investors invest;
(b) the government chooses μ after they have invested (but before the entrepreneurs select their action)?

(iv) Suppose now that the output RI (in the case of success) is in terms of a nontradable good (but the endowment A and the investment I are in tradable goods). Another sector of the economy (the "export sector") will receive $\mathcal{R}$ in tradable goods at date 2. All domestic agents have utility from date-2 consumptions c and c^* of nontradable and tradable goods equal to $c + c^*$ (so the two goods are perfect substitutes for domestic residents, while foreigners consume only the tradable good). Define the date-2 exchange rate $e \geqslant 1$ as the price of tradables in terms of nontradables. Compute the borrowing capacity and the exchange rate. (One will, for example, assume that funds fraudulently invested abroad cannot be reimported and must be consumed abroad. So they yield μ rather than $e\mu$.)

Exercise 16.2 (time-consistent government policy). Consider a unit mass of identical entrepreneurs with variable-investment projects. The timing is summarized in Figure 16.11.

The cost of the policy for the country is $\gamma(\tau)I$ (where $\gamma'(0) = 0$, $\gamma'(\tau) > 0$, for $\tau > 0$, $\gamma'(1 - p_H) = \infty$, $\gamma'' > 0$).

All investors are domestic investors (there are no foreign lenders and, when choosing τ, the government maximizes social welfare, equal to entrepreneurs' welfare plus investors' welfare).

Assume that

$$(p_H + \tau)R > 1 > (p_H + \tau)\left(R - \frac{B}{\Delta p}\right)$$

in the relevant range of values of τ, and that it is never optimal to induce entrepreneurs to misbehave. Everyone is risk neutral, and the entrepreneurs are protected by limited liability.

(i) • Show that, when expecting policy τ, entrepreneurs invest

$$I(\tau) = \frac{A}{1 - (p_H + \tau)(R - B/\Delta p)}.$$

• What is the equilibrium value τ^*?

Table 16.1

	Date 0	Date 1		
	Government selects g^* (commitment)	Government selects g^* (noncommitment)		
nt			SI	Exchange rate determined
t	Entrepreneur borrows $I - A$	Entrepreneur takes private benefit BI, or none	Outcome RI or 0	

(ii) What value would the government choose if it selected τ *before* entrepreneurs borrow?

(iii) Informally explain how your answer to (i) would change if investors were foreign investors and the government discounted their welfare relative to that of domestic residents.

Exercise 16.3 (political economy of exchange rate policies). Consider a country that has liberalized its capital account. There are two goods: a tradable good (the only one consumed by foreigners) and a nontradable good.

- The only investors are foreign investors, with preferences over date-0 and date-1 consumptions

$$c_0^* + c_1^*,$$

where an asterisk refers to the tradable good.

- The country is populated by a unit mass of domestic entrepreneurs endowed with a constant-returns-to-scale technology. The representative entrepreneur (1) invests I units of tradables in equipment (where I is endogenous), (2) produces RI units of tradables in the case of success, and 0 in the case of failure, and SI units of nontradables for certain. We assume that firms' outcomes are independent (there is no macroeconomic shock).

The model is a variation on the standard variable-investment model:

- Each entrepreneur is initially endowed with A units of tradables (her only wealth), borrows $I - A$.
- There is moral hazard. The probability of success in the tradable-good activity is p_{H} if the entrepreneur behaves, and p_{L} otherwise. The entrepreneur receives private benefit BI in *tradables* by misbehaving and 0 otherwise.
- An entrepreneur's utility is $c_1 + u(c_1^*) + v(g^*)$, where c_1 is the consumption of nontradables, c_1^* the consumption of the tradable good, and g^* the level of public good supplied by the government. u and v are concave.

We add a government. The government has international reserves $\mathcal{R}^*$, of which it consumes g^* to produce a public good. The rest, $\mathcal{R}^* - g^*$, is dumped on the currency market at the end. So, e, the price of tradables in terms of nontradables, is given *ex post* by

$$p_{\mathrm{H}} RI + \mathcal{R}^* - g^* = c_1^*(e) + d^* + \frac{d}{e},$$

where I is the representative entrepreneur's investment, d^* is the entrepreneurs' average reimbursed debt in tradables and d is the average reimbursed debt in nontradables. The government cares only about the welfare of entrepreneurs, i.e., does not internalize that of the foreigners.

The timing is summarized in Table 16.1, where "t" and "nt" stand for "tradables" and "nontradables," respectively.

Consider financing contracts in which

- investors receive $R_{\mathrm{I}}^* = RI - R_{\mathrm{b}}^*$ in tradables in the case of success, and 0 in the case of failure;
- investors have nominal claims $R_{\mathrm{I}}^{\mathrm{S}}$ and $R_{\mathrm{I}}^{\mathrm{F}}$ in nontradables in the cases of success and failure, respectively.

(i) Relate (d, d^*) and $(R_{\mathrm{I}}^*, R_{\mathrm{I}}^{\mathrm{S}}, R_{\mathrm{I}}^{\mathrm{F}})$.

(ii) Fixing an expected exchange rate e, determine the investment I of the representative entrepreneur in this constant-returns-to-scale model assuming that $\rho_0 \equiv p_{\mathrm{H}}(R - B/\Delta p) < 1 - (S/e)$ in the relevant range.

Show that $R_{\mathrm{I}}^{\mathrm{F}} = SI$ and that

$$I = \frac{A}{1 - [(S/e) + \rho_0]}.$$

(iii) Compare the exchange rate and the welfare of entrepreneurs when the government chooses

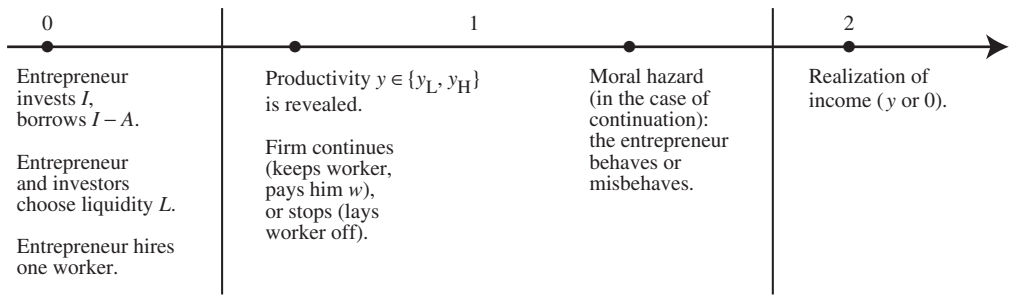


Figure 16.12

g^* after the private sector borrows abroad ("non-commitment") and when the government can commit to g^* before entrepreneurs borrow abroad ("commitment").

Assume that the exchange rate depreciates as government expenditures g^* grow. Show that $v'(g^*) > e$ under commitment (underspending) and $v'(g^*) < e$ under noncommitment (overspending).

(iv) Show that there is an externality among borrowers when the government cannot commit.

Exercise 16.4 (time consistency and the soft budget constraint). A firm is run by a risk-neutral entrepreneur with wealth A, and has a fixed-size project with investment cost I. The project, if undertaken at date 0, will deliver a verifiable income, $y \in \{y_L, y_H\}$ in the case of success and 0 in the case of failure, at date 2, provided that one worker is employed in the firm. The project yields nothing if it is interrupted (the worker is laid off). $y = y_H$ with probability ρ and $y = y_L < y_H$ with probability $1 - \rho$.

Moreover, in the case of "continuation" and regardless of the value of y, the entrepreneur may behave (the income is y for certain, the entrepreneur receives no private benefit) or misbehave (the income is y with probability p_L and 0 with probability $1 - p_L$, the entrepreneur receives private benefit B). The entrepreneur is protected by limited liability. Let

$$\mathcal{R} \equiv \frac{B}{1 - p_L}.$$

(One will assume that B is small enough that it is worth inducing the entrepreneur to behave in the case of continuation.) The (risk-neutral) worker is paid w in the case of continuation and 0 otherwise. He obtains unemployment benefit paid by the state $w_u < w$ when laid off. We take w and w_u as given. (Note: they could be endogenized through some efficiency wage and incentive-to-search stories, but take these as exogenous for this exercise.)

Assume that the interest rate in the economy is 0 and that

$$w < y_L < w + \mathcal{R}$$

and

$$I - A \leqslant \rho(y_H - w - \mathcal{R}) + (1 - \rho)(y_L - w - \mathcal{R}).$$

(i) Write the firm's NPV depending on whether the firm continues ($x = 1$) or stops ($x = 0$) when productivity is low ($y = y_L$). Show that $x^* = 1$. Assuming a perfectly functioning capital market at date 1, what is the amount of liquidity that is needed to complement capital market refinancing?

(ii) Introduce a government that can at date 1 bring a subsidy $s \geqslant 0$ to the firm (it is a pure subsidy: the government takes no ownership stake in exchange). The shadow cost of public funds is λ, and so the cost of subsidy s for the taxpayers is $(1 + \lambda)s$. The government maximizes total welfare (entrepreneur, investors, worker, taxpayers). Assuming that

$$\lambda[(w - w_u) + \mathcal{R}] \leqslant (1 + \lambda)y_L$$

and that the government selects its subsidy at date 1 (having observed the realization of y), what is the liquidity L chosen by entrepreneur and investors at date 0?

How would the government (contingent) choice of s be affected if the government could commit to s at date 0, before the investors and the entrepreneur write their contract?

References

Acemoglu, D. and S. Johnson. 2003. Unbundling institutions. National Bureau of Economic Research Working Paper 9934.

Aghion, P. and P. Bolton. 1991. Government debt and the risk of default. In *Capital Markets and Debt Management* (ed. R. Dornbusch and M. Draghi). Cambridge, MA: MIT Press.

Aghion, P. and B. Hermalin. 1990. Legal restrictions on private contracts can enhance efficiency. *Journal of Law, Economics, & Organization* 6:381–409.

Athey, S., A. Atkeson, and P. Kehoe. 2005. The optimal degree of discretion in monetary policy. *Econometrica* 73: 1431–1475.

Atkinson, A. B. and J. Stiglitz. 1976. The design of tax structure: direct and indirect taxation. *Journal of Public Economics* 6:55–75.

Bagwell, K. and R. Staiger. 2000. GATT-think. Mimeo, Columbia University, and University of Wisconsin.

Barro, R. 1973. The control of politicians: an economic model. *Public Choice* 14:19–42.

Barro, R. and D. Gordon. 1983. Rules, discretion and reputation in a model of monetary policy. *Journal of Monetary Economics* 12:101–121.

Bernheim, D. and M. Whinston. 1986a. Menu auctions, resource allocation, and economic influence. *Quarterly Journal of Economics* 101:1–33.

———. 1986b. Common agency. *Econometrica* 54:923–942.

Biais, B. and T. Mariotti. 2003. Credit, wages and bankruptcy laws. IDEI Working Paper 231, Toulouse.

Biais, B. and E. Perotti. 2002. Machiavellian privatization. *American Economic Review* 92:240–258.

Bolton, P. and H. Rosenthal. 2002. Political intervention in debt contracts. *Journal of Political Economy* 110:1103–1134.

Bolton, P. and D. Scharfstein. 1990. A theory of predation based on agency problems in financial contracting. *American Economic Review* 80:93–106.

Bulow, J. and K. Rogoff. 1989a. A constant recontracting model of sovereign debt. *Journal of Political Economy* 97: 155–178.

———. 1989b. Multilateral negotiations for rescheduling developing country debt: a bargaining theoretic framework. In *Analytical Issues in Debt* (ed. J. Frenkel, M. Dooley, and P. Wickham). Washington, D.C.: IMF.

Calvo, G. A. 1996. *Money, Exchange Rates, and Output*. Cambridge, MA: MIT Press.

Calvo, G. A. and S. Wellisz. 1978. Supervision, loss of control, and the optimal size of the firm. *Journal of Political Economy* 86:943–952.

Cespa, G. and G. Cestone. 2002. Stakeholder activism and the "congruence of interests" between small shareholders and stakeholders. Mimeo, Universitat Pompeu Fabra.

Coase, R. 1960. The problem of social cost. *Journal of Law and Economics* 3:1–44.

Faure-Grimaud, A. and D. Martimort. 2003. Regulatory inertia. *RAND Journal of Economics* 34:413–437.

Ferejohn, J. 1986. Incumbent performance and electoral control. *Public Choice* 50:5–26.

Grossman, G. and E. Helpman. 1994. Protection for sale. *American Economic Review* 84:833–850.

Gertler, M. and K. Rogoff. 1990. North–South lending and endogenous domestic capital market inefficiencies. *Journal of Monetary Economics* 26:245–266.

Hellwig, M. 2000. On the economics and politics of corporate finance and corporate control. In *Corporate Governance: Theoretical and Empirical Perspectives* (ed. X. Vives), Chapter 3. Cambridge University Press.

Jappelli, T., M. Pagano, and M. Bianco. 2005. Courts and banks: effect of judicial costs on credit market performance. *Journal of Money, Credit, and Banking* 37:223–244.

Kroszner, R. 1999. Is it better to forgive than to receive? Repudiation of the gold indexation clause in long-term debt during the Great Depression. Working Paper, University of Chicago.

Kroszner, R. and P. Strahan. 1999. What drives deregulation? Economics and politics of the relaxation of bank branching restrictions. *Quarterly Journal of Economics* 114:1437–1467.

Kydland, F. and E. Prescott. 1977. Rules rather than discretion: the inconsistency of optimal plans. *Journal of Political Economy* 85:473–491.

Laffont, J. J. and J. Tirole. 1991. The politics of government decision making: a theory of regulatory capture. *Quarterly Journal of Economics* 106:1089–1127.

———. 1993. Commitment and political accountability. In *A Theory of Incentives in Procurement and Regulation*, Chapter 16. Cambridge, MA, and London: MIT Press.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1997. Legal determinants of external finance. *Journal of Finance* 52:1131–1150.

———. 1998. Law and finance. *Journal of Political Economy* 107:1113–1155.

Lindbeck, A. and J. Weibull. 1987. Balanced-budget redistribution as the outcome of political competition. *Public Choice* 52:273–297.

Martimort, D. 1991. Multi principaux avec sélection adverse. Mimeo, Institut d'Economie Industrielle, Toulouse.

Maskin, E. and J. Tirole. 2004. The politician and the judge: accountability in government. *American Economic Review* 94:1034–1054.

Matsuyama, K. 1990. Perfect equilibria in a trade liberalization game. *American Economic Review* 80:480–492.

North, D. 1981. *Structure and Change in Economic History*. New York: W. W. Norton.

Pagano, M. and P. Volpin. 2005a. The political economy of corporate governance. *American Economic Review* 95: 1005–1030.

———. 2005b. Workers, managers, and corporate control. *Journal of Finance* 60:841–868.

———. 2005c. Shareholder protection, stock market development, and politics. Presented as the Marshall Lecture, European Economic Association Meeting, August 27, 2005.

Pauly, M. V. 1974. Overinsurance and public provision of insurance: the roles of moral hazard and adverse selection. *Quarterly Journal of Economics* 88:44–62.

Perotti, E. and E. L. von Thadden. 2001. The political economy of bank- and market dominance. Mimeo, University of Amsterdam and University of Lausanne.

Persson, M., T. Persson, and L. Svensson. 1987. Time consistency of fiscal and monetary policy. *Econometrica* 55: 1419–1432.

Persson, T. and L. Svensson. 1989. Why a stubborn conservative would run a deficit: policy with time inconsistent preferences. *Quarterly Journal of Economics* 65:325–346.

Persson, T. and G. Tabellini. 2000. *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.

———. 2003. *The Economic Effect of Constitutions*. Cambridge, MA: MIT Press.

Rajan, R. and L. Zingales. 2003. The great reversals: the politics of financial development in the 20th century. *Journal of Financial Economics* 69:5–50.

Rogoff, K. 1985. The optimal degree of commitment to an intermediate monetary target. *Quarterly Journal of Economics* 100:1169–1190.

Shapiro, C. and J. Stiglitz. 1984. Equilibrium unemployment as a worker discipline device. *American Economic Review* 74:433–444.

Shavell, S. 2004. *Foundations of Economic Analysis of Law*. The Belknap Press of the Harvard University Press.

Stole, L. 1990. Mechanism design under common agency. Mimeo, Department of Economics, MIT.

Tabellini, G. and A. Alesina. 1990. Voting on the budget deficit. *American Economic Review* 80:37–49.

Tirole, J. 2003. Inefficient foreign borrowing: a dual- and common-agency perspective. *American Economic Review* 93:1678–1702.

Tornell, A. 1991. Time inconsistency of protectionist programs. *Quarterly Journal of Economics* 106:963–974.

Wagner, W. 2001. International diversification, governmental incentives, and the home bias in portfolio investment. Mimeo, Tilburg University.