

CAES Working Paper Series

# Organizational Forms, Borrowing Capacity and Antitrust Law

Yasumasa Akabane  
Faculty of Economics  
Fukuoka University

WP-2011-011



**Center for Advanced Economic Study  
Fukuoka University  
(CAES)**

8-19-1 Nanakuma, Jonan-ku, Fukuoka,  
JAPAN 814-0180

# Organizational Forms, Borrowing Capacity and Antitrust Law

Yasumasa Akabane \*

2011/11/16

## Abstract

We analyze determinants of organizations in chain stores among three forms, *direct management form*, *franchise chain* and *voluntary chain*, especially focusing on their borrowing capacity and strength of antitrust law. If headquarters of a chain store own stores, they bear setup cost of stores, which weakening borrowing capacity through reduction of pledgeable income. If they contract with outside distributors, they can evade bearing setup cost. But when headquarters lose control over their stores, competition between stores would occur, reducing total profit of the chain store. Therefore avoiding competitions itself is preferable in this case. However, such activities are costly and reduce borrowing capacity since bearing the cost cuts down pledgeable income. In this paper, initial asset, avoidance cost and antitrust law are key factors in the determination of a chain store's organization, just because net payoff varies according to choices of organizational forms and the three factors.

**Keywords:** organizational form, pledgeable income, financial muscle, antitrust law, vertical relation, vertical restraint, moral hazard, competition between stores, chain store, corporate chain, franchise chain, voluntary chain.

## 1 Introduction

The purpose of this paper is to analyze relations between antitrust law and determination of organization in a chain store, especially by focusing on

---

\*Fukuoka University. E-mail: akabane-yasumasa@econ.fukuoka-u.ac.jp

financial muscle. In addition to that, we intend to predict how organization of a chain store will change when the strength of antitrust law intensifies.

Chain stores can be categorized into three groups in their forms. First, stores are owned and managed by headquarters, which is called a corporate chain in the United States, or a regular chain in Japan. Second, stores are held by owners outside the company but headquarters strongly control stores. This form is well known as a franchise chain. In a franchise chain, headquarters develop their products, efficient logistics, how to display their products well on each store's shelves, how to attract customers or advertisement and so on. These supervisions are provided in exchange for franchisee fee. Last case is called a voluntary chain, in which stores are also owned by outsiders but basically are not supervised by headquarters. This form is actually an alliance to have collective purchase of merchandise from suppliers. Each store is independent in management and usually makes decisions separately. They decide which and how much products they sell at what prices and at what range of time the store is open and so on.

There are two distinct differences between three forms. First, who owns stores? In a corporate chain, headquarters own their stores but in a franchise chain and a voluntary chain, stores are owned by outside distributors. Second, are stores' management considerably controlled by headquarters? In a corporate chain and a franchise chain, headquarters control stores in management, while in a voluntary chain, each owner have control right of his own management.

In incomplete contract approach, ownership is important since an agent who owns assets has residual right to use those assets when uncontracted events occur. Grossman and Hart (1986) shows determinants of boundaries of firms by focusing on residual control right and papers following it show rationale for existence of many organizational forms. In our model, we will discuss chain stores in *complete* contract approach, but partially adopt the idea of residual rights. We assume who owns a store has control rights in management unless explicit contract or implicit agreement would restrict his control rights. In a corporate chain, headquarters own stores, so that they can be thought to have fully control rights regarding the management of stores, on the other hand in a voluntary chain, outside distributors control their stores since they own stores. Only a franchise chain is an exception, because, even without ownership, headquarters can control stores due to explicit contracts and/or implicit contracts.

We assume in this paper that headquarters can partly control stores by bearing monetary costs even if outsiders own stores and antitrust law prohibit headquarters to abuse dominant position. In 2009, the Fair Trade Commission of Japan announced a cease and desist order that Seven-Eleven Japan

Co., Ltd. have not to abuse its dominant position over franchisees. Before that announcement, Seven-Eleven Japan Co., Ltd. had instructed its franchisees not to price-cut boxed lunches which were approaching the eat-by freshness date and to discard them when the date has expired, since price-cutting might foster competition between stores. After the announcement, however, almost franchisee didn't price-cut boxed lunches. The reasons that the company could prevent it were unobvious, but there were few possible reasons.

First, the contracts between the company and franchisees covered minute details relating to selling control. These provisions were complicated, so that many franchisees might violate them deliberately or without awareness. Therefore the company could threaten them tactically to cancel the franchising contract on the ground of breaching contracts when they did price-cuts. In fact, some franchisees that price-cut boxed lunches were said to be refused to renew the contracts for the reason that they failed to make a freshness control properly. Of course, the company denied retaliation.

Second, the company obliges each store to install POS system which tracked sales and customer data for future developments of services and commodities. The system could be used to monitor stores' activities because which, when and how much commodity was sold was recorded on the POS system. If a store price-cut some commodities, the company could detect it with ease. In addition to that, the system was effective to deter price-cutting, because it imposed costly activities on stores. If franchisees would like to price-cut commodities, then they should replace old price tags with new ones in order to be able to track sales records on the POS system. These activities were very costly for stores, especially at busy time when many customers came to stores.

These possible reasons might intertwine with each other and almost stores might not deviate from some implicit agreement to opportunistic price-cutting. Anyway, the company succeeded to block competition between stores even after the cease and desist order. From economic point of view, this story can be seen as implicit contract or governance in lawlessness<sup>1</sup>. Organizations which seek to maximize their total benefits would manage to make self-enforceable agreements. In this paper, we treat these attempts simply as monetary cost, but our model can be thought to be a reduced form of lawlessness. Headquarters in franchise chains who manage to control stores owned by outsider would invest excessively in their sales system for controlling them legitimately. These excess investments would increase as antitrust

---

<sup>1</sup>Dixit (2004) and its related papers, including Baker, Gibbons and Murphy(2002), research this field.

law strengthens.

In our model, a principal factor to determine chain store's organizations is headquarters' borrowing capacity which varies with a choice of forms and the strength of antitrust law. Jappelli, Pagano and Bianco (2005) show relations between borrowing capacity and the strength of court systems. In their model, weak court often fails to protect lenders' right and encourages borrowers to embezzle profit, some part of which has to be repaid to lenders. On the contrary, that has some disadvantage for borrowers, since lenders are naturally loath to lend their money to such a borrower and therefore they becomes hard to raise fund. In our model, on the other hand, it is assumed that stronger antitrust law makes borrowers incur more costs to avoid competitions between stores, which leads to a decrease in pledgeable income and become hard to raise fund. In short, the strength of law systems makes opposite effect on borrowing capacity between Jappelli, Pagano and Bianco (2005) and our model.

Nocke and Thanassoulis (2009) discuss borrowing capacity in vertical relations like ours. They show that vertical relationship eases financial constraint and play a role as a risk sharing device. These financial effects are similar to what we discuss in this paper. However they focus on financial market, especially determination of interest rate and retail prices. Our main concern is not how market works, but is determination of organizational form within an entity.

Many antitrust arguments have been made on industrial structure under which different organizations compete with each other and have tried to increase knowledge about mechanisms to foster competition<sup>2</sup>. In this paper, we will not analyze interactions between organizations, but how an organization can be affected by strength of antitrust law and also by financial muscle. In this regard, we may offer some new insight with respect to how law can influence organizational forms of firms.

Section 2 depicts a basic model and the time line where we definitize a manager's action. Section 3 analyzes a corporate chain that we call a direct management form. In the section, a key factor is set-up cost of stores. Section 4 introduces antitrust law and a possibility of competition between stores which are owned by outside distributors. In section 5, we will compare the manager's net utility and illuminate her choice of organizational form. Section 6 sums up our consequence obtained here.

---

<sup>2</sup>see Riordan(2008)

## 2 The Model

A manager  $M$  has headquarters with two chain stores. We call *direct management form* if  $M$  owns two stores and *outside distributors form* if outsiders own stores and contract with the manager on dealing with her products. Later, we will distinguish between two types of outside distributors forms according to whether stores are virtually controlled by the manager or not. In an outside distributors form, it is assumed that two stores are owned by different agents and they make decisions independently when they get chances to do so.

The time line of the basic model is depicted in figure 1.  $M$  has an initial asset  $A$  and raises  $F$  at date 1 from lenders to invest  $I$  in developments of her products, which will be distributed to two chain stores<sup>3</sup>. If this project succeeds at date 3, her products have a value of  $R/2 \times I$  for each store and if it fails, this value is 0.  $R$ , which has positive value, stands for marginal total profit of  $I$  in success. This implies that the value of the products is increasing in  $I$ . At date 2, the manager decides whether to make an effort. The probability of success  $p$  depends on her choice.  $p$  takes  $p_H$  when  $M$  makes an effort (or behaves) and  $p_L$  when she shirks (or misbehaves). Naturally, we assume that  $1 \geq p_H > p_L > 0$  and her effort is assumed to be unobservable to others, including lenders, and unverifiable to courts. On the other hand, the value of the products  $R$  or 0 is observable and verifiable. We assume that the manager incurs nothing when she makes an effort, while shirking enables her to save cost  $BI$ . Another interpretation of  $BI$  is that she enjoys the perks which has a value of  $BI$  when she misbehaves and otherwise nothing. This cost saving or perks is also increasing in  $I$  since her effort to carry out the project is larger, or perks increases as the project become larger. At date 3,  $R$  is divided between stakeholders, including lenders when the project succeeds.

All players are risk neutral and  $M$  faces limited liability. For simplifying analysis, capital market assumed to be perfectly competitive and interest rate is constant and assumed to be 0. This also means payoffs are represented in present value.

At date 2,  $M$  behaves only when her reward  $R_M$  in success satisfies the following incentive compatibility condition<sup>4</sup>.

$$p_H R_M \geq p_L R_M + BI \tag{1}$$

---

<sup>3</sup>We use the term "lenders" for simplification hers. Our analysis would be unchanged if  $M$  raises  $F$  from capital market or financial institutions.

<sup>4</sup>In failure, her reward should be zero because positive reward weakens her incentive to make an effort.

Define  $\Delta p = p_H - p_L$  and this inequality can be rewritten.

$$R_M \geq \frac{B}{\Delta p} I \quad (2)$$

We assume that net profit of the project per investment is positive only when the manager behaves. That is, expected net profit per investment satisfies the following inequalities.

$$p_H R - 1 > 0 \quad (3)$$

$$p_L R - 1 + B < 0 \quad (4)$$

The first inequality says that net present value of the project is positive if  $M$  behaves at date 2. The second one says that total welfare is negative if  $M$  misbehaves, which also implies the net profit of the project (i.e.  $p_L R - 1$ ) is also negative because  $B > 0$ . From this, the project cannot be financed if  $M$  could not be incentivized to make an effort. For instance, in the direct management form, if total pie is negative and the manager obtains positive net payoff, then the net payoffs of the lenders will be negative and they refuse financial contract with the manager at date 1. If the lenders get positive payoffs, then manager's net payoff is negative and she wouldn't like to implement such an unprofitable project. We conclude that if total pie is negative and all players are risk neutral, ex ante payoffs of some players are inevitably negative and the project cannot be taken. Similar reasoning can be applied to the outside distributors form. From above reasoning, inequalities (3) and (4) imply that, for all stakeholders,  $M$  should be incentivized for positive net payoff.

We will use notation  $\pi$  to refer to manager's marginal gross profit before repaying to the lenders.  $\pi$  is equal to  $R$  in the direct management form. In the outside distributors form,  $\pi$  may be less than  $R$  because the outside distributors would have bargaining power and obtain some part of  $R$  as their revenue. We will discuss it later.

We define pledgeable income as  $P$  which can be written by the following equality.

$$P = p_H \left( \pi - \frac{B}{\Delta p} \right) I$$

Because the manager faces limited liability, she cannot repay the lenders when the project fails, in which case gross profit of the project (before repayment) is zero. So, since the manager has to be rewarded  $BI/\Delta p$  in order to make her behave, expected repayment the lenders can receive is at best  $P$ . If

the lenders would obtain more than pledgeable income  $P$ , the manager would not be incentivized to behave and the expected profit would be negative, in which case the project was unable to be financed. As lenders are risk neutral and interest rate is zero, they would like to lend  $F$  if  $P \geq F$ . So,  $P$  indicate the maximum amount of fund the manager can raise from lenders.

At the end of the section, we assume that the following inequality is satisfied for ensuring equilibrium investment is finite.

$$1 > p_H \left( R - \frac{B}{\Delta p} \right) > 0$$

In our model, the production function  $RI$  is constant to scale and solutions may be infinite. This restriction is needed for ensuring interior solutions.

### 3 Direct Management Form

In this section, we will analyze the direct management form. First, we assume that the firm needs funds of  $S/2$  to set up a store at date 1<sup>5</sup>. The cost cannot be put as collateral for some reasons. After the manager procures land, building, and some equipment and so on, she and lenders wouldn't know well how to use another purpose. For example, if stores are located in unfamiliar area, real estate may be resold at lower prices when the firm goes bankrupt. We assume liquidation value of  $S/2$  is zero for simplifying analysis.

Under this assumption, the manager can invest at most  $A + F - S$  in developments of her products. Lenders will lend  $F$  at date 1 if expected value of reimbursement wouldn't be less than  $F$ . In other words, lenders will agree on lending  $F$  if  $F \leq P$ . Hence  $F$  needs to be satisfied with the following inequality.

$$F \leq p_H \left( R - \frac{B}{\Delta p} \right) I \tag{5}$$

$B/\Delta p$  in the right hand is rent for the manager per  $I$  obtained from inequality (1) and (2). Given  $F$ , she has  $A + F - S$  at hand and she can use it for investment  $I$  and saving  $a$ . That is,  $I + a = A + F - S$ . Inserting this, (5) can be modified and we have

$$I - (A - S - a) \leq p_H \left( R - \frac{B}{\Delta p} \right) I$$

---

<sup>5</sup>That is, total set-up cost is  $S$ .

Then, the investment  $I$  can be carried out if it satisfies with the following inequality.

$$I \leq \frac{1}{1 - p_H(R - B/\Delta p)}(A - S - a) \quad (6)$$

This inequality shows that, for borrowing capacity being limited, the scale of investment is also bounded by the right hand of inequality (6).

As capital market is competitive and the interest rate is assumed to be zero, the manager needs to repay  $Z$  that satisfies  $F = p_H Z$ . So, if she invest  $I = A + F - S - a$ , her expected net payoff at date 1 is

$$U = p_H(RI - Z) - A + a$$

We insert  $Z = F/p_H$  and  $F = I - A + S + a$  into this and we have

$$U = (p_H R - 1)I - S$$

This shows that, since  $U$  is increasing in  $I$ , the manager's expected net payoff is maximized when she raises funds as possible as she can and sets  $a = 0$ .

From inequality (5) and  $a = 0$ , the manager would raise  $F = p_H(R - B/\Delta p)I$  and invest

$$I^* = \frac{1}{1 - p_H(R - B/\Delta p)}(A - S) \quad (7)$$

We define  $\rho_0 = p_H(R - B/\Delta p)$ ,  $\phi_0 = p_H R - 1$  and define her equilibrium net payoff at date 0 as  $U^D$ . Her equilibrium net payoff can be written as

$$U^D = \frac{\phi_0}{1 - \rho_0}(A - S) - S$$

Note that her net payoff is increasing and linear in  $A$ . Figure 2 shows the relation of  $A$  to  $U^D$ .

We will see how the increase in  $S$  effects on the borrowing capacity and equilibrium investment. When  $S$  is more than her initial asset  $A$ , she cannot implement the project in a direct management form because  $A - S$  is negative and she cannot raise funds from lenders. If  $A$  is larger than  $S$  but less than  $\frac{\phi_0 + \rho_0 - 1}{\phi_0}S$ , she wouldn't prefer to implement the project, because

$\frac{\phi_0}{1 - \rho_0}(A - S)$ , net profit from investment, is less than  $S$  and her net payoff

at date 1 is negative. Only when  $S \geq \frac{\phi_0}{1 - \rho_0}(A - S)$ , her net profit of the project is nonnegative and she prefers from the project to doing nothing.

## 4 Outside Distributors Form

In this section, we will analyze a situation where the manager contracts distributorships with two outside agents who own their assets such as money, land, buildings, human resources and so on. Their assets are assumed to be perfectly liquidated as they can divert to another purpose properly. That is, their setup cost can be seen as zero.

We introduce two factors, competition between distributors and manager's activity to avoid it, into our model. Since total value of chain stores may decrease due to competition between distributors, manager would like to avoid competition. However, in some cases, she may not avoid it since this activity is costly. Without avoidance, each store has partly control rights of his own store. Voluntary chain is thought to be a type of a chain store where chain store is only an alliance to aim to boost their bargaining power, stocking up commodities at lower prices and each store is partly independent in its management. In our model, the case where the manager doesn't avoid competition is similar to voluntary chain since stores' self-determining activities are allowed. To the contrary, her avoidance of competition is similar to franchise chain where each store deals with the same goods as the same prices and outward appearance of each store looks similar to attract customers' attention.

### 4.1 Outside Distributors Have no Bargaining Powers without Competition

First, we will see a simple situation as a benchmark where outside agents have no bargaining power and their outside opportunity is zero. In addition to that, we assume that the manager has control rights over management, which means that all decisions concerning stores are determined by the manager. It is the same circumstances as if the manager actually owns both stores.

In the outside distributors form, manager doesn't bear the setup cost and all assets  $A$  can be allocated to enhance the value of her products. As she is able to raise  $F$  which is less than the pledgeable income, she will borrow  $F = I - A$  in equilibrium that satisfies the following equality.

$$I - A = p_H \left( R - \frac{B}{\Delta p} \right) I$$

Then, equilibrium investment  $I^{**}$  satisfies

$$I^{**} = \frac{A}{1 - p_H(R - B/\Delta p)}$$

Her equilibrium net payoff is

$$U^{**} = (p_H R - 1)I^{**} \quad (8)$$

Obviously,  $I^{**}$  is greater than  $I^*$  for given  $A$ . This is because, not bearing the cost to set up stores, all initial assets can be used to invest in developments of her products and her borrowing capacity becomes larger as  $I$  increases.

In the direct management form, manager whose initial assets  $A$  is no more than the setup cost  $S$  cannot run a chain store. Whereas a poor manager can have a chain store and develop her products in the outside distributors form. This is because she bears the set-up cost in the direct management form, but needn't in the outside distributors form.

## 4.2 Outside Distributors Have Bargaining Powers without Competition

In this subsection, we relax the assumption that the manager has all bargaining power. We assume for simplification that the manager and distributors divide ex post profit  $RI$  at a ratio of  $\beta$  to  $1 - \beta$ .  $\beta$  lies in interval  $(0, 1)$ . The manager's ex post profit in success is  $\beta RI$  and consequently pledgeable income is reduced to be  $p_H(\beta R - B/\Delta p)I$ , which implies borrowing capacity is also reduced. The manager can finance only  $F$  that satisfies the following inequality.

$$F \leq p_H \left( \beta R - \frac{B}{\Delta p} \right) I$$

As her net payoff is increasing in  $I$ , she would like to borrow as possible as she can. Noticing  $F = I - A$ , she invest  $I^{***}$  in equilibrium where

$$I^{***} = \frac{A}{1 - p_H(\beta R - B/\Delta p)}$$

or

$$I^{***} = \frac{1}{1 - \rho_1} A$$

where  $\rho_1 = p_H(\beta R - B/\Delta p)$ .

Equilibrium net payoff is

$$U^{***} = (p_H \beta R - 1)I^{***}$$

$U^{***}$  is smaller than  $U^{**}$  for two reasons. First,  $I^{***}$  is smaller than  $I^{**}$  because borrowing capacity decreases as the multiplier decreases from  $\rho_0$  to  $\rho_1$ . Second, the marginal profit of  $I$  in success for manager decreases from  $R$  to  $\beta R$ .

### 4.3 Outside Distributors Have Bargaining Powers with a Possibility of Competition between them

Next we introduce competition between distributors into our model. The time line of the model is depicted in figure 3. Distributors can choose whether to cooperate or to compete with each other only after observing the success of the project at date 3<sup>6</sup>. Competition includes price-cuts, unique services to lock customers in, advertisement and so on. When both distributors choose cooperation, nothing differs from the former situation. However if one of distributors chooses competing, then he enhances marginal profit from  $R/2$  to  $R/2 + \Delta R/2$  with incurring cost  $C/2 \times I$ <sup>7</sup>. But these actions damages the other to reduce his marginal profit to  $R/2 - \Delta R/2$ . If both distributors choose to compete, then increases of their marginal profits are canceled out but the cost  $C/2 \times I$  is left incurred. Assuming  $\Delta R > C$ , Nash equilibrium in the subgame is that both distributors choose to compete when the project succeeds. The pie manager obtains in success becomes  $\beta(R - C)I$ . Then pledgeable income reduce to  $p_H(\beta(R - C) - B/\Delta p)I$ . That is, for given  $I$ , pledgeable income decreases by  $p_H\beta CI$  compared to that without competition, which in turn leads to reduce borrowing capacity. This also hurts distributors. In these prisoners' dilemma situation, manager and distributors would like to avoid competition. However distributors would opportunistically compete each other to attract customers.

In case that antitrust law prohibits headquarters from controlling distributors by abuse of their dominant positions, stronger antitrust law might encourage distributors' opportunistic behaviors because headquarters cannot punish them sufficiently if they deviate from actions which have been implicitly agreed on. So, headquarters who manage to control distributors legitimately would bear more cost under stronger antitrust law. We define  $X$  as an index of strength of antitrust law and assume that the firm can avoid competition between distributors if she bears monetary cost  $XI$ . That is, the cost increases as antitrust law become stronger or  $I$  increases. To avoid competition legitimately, she would introduce some instruments like POS system. These instruments are more needed when antitrust law is stronger and these costs would become larger as the size of investment is larger. It is natural to think that what instruments are needed for legitimate avoidance

---

<sup>6</sup>In failure, the value of the chain stores is zero and their decisions to compete or not are meaningless.

<sup>7</sup>This means that the cost increases as scale of the business become larger. The cost might only after the success of the project, in which the value of the business is  $RI$ . So, the statement that the cost is increasing in  $I$  is equal to it being increasing in the scale of the business. This assumption is thought to be valid since the cost includes price-cuts

will become clear after the project succeeds. Then, we assume that the cost accrues to manager only when the project succeeds. In these assumptions, her gross profit in success (before repaying to lenders) is  $(\beta R - X)I$  when manager chooses to avoid for given  $I$ . If she chooses avoidance, pledgeable income is

$$p_H \left( \beta R - X - \frac{B}{\Delta p} \right) I \quad (9)$$

and otherwise

$$p_H \left( \beta(R - C) - \frac{B}{\Delta p} \right) I \quad (10)$$

because distributors choose to compete in Nash equilibrium of the subgame.

For notational simplification, we introduce  $\alpha$ , which takes value of  $X$  if manager chooses avoidance and value of  $\beta C$  if manager doesn't choose avoidance. We can rewrite pledgeable income (9), (10) and we have

$$P(\alpha) = \rho(\alpha)I$$

where  $\rho(\alpha) = p_H(\beta R - \alpha - B/\Delta p)I$ .

As financial market being perfectly competitive and interest rate being assumed to be zero, manager can borrow  $F = \rho(\alpha)I$  and invest  $A + F$ . Then her equilibrium investment  $I(\alpha)$  is

$$I(\alpha) = \frac{1}{1 - \rho(\alpha)} A$$

and her expected net payoff at date 1 is

$$U(\alpha) = \frac{\phi(\alpha)}{1 - \rho(\alpha)} A$$

where  $\phi(\alpha) = p_H(\beta R - \alpha) - 1$ . Notice that her payoffs is linear and increasing in  $A$  for given  $\alpha$  and  $\phi(\alpha)/(1 - \rho(\alpha))$ , slope of the line, is decreasing in  $\alpha$ . That is, her net payoff in avoidance is larger than that in tolerance for competition if  $X < \beta C$  and vice versa.

In the outside distributors form, the firm would like to avoid competition for smaller  $X$  than  $\beta C$ . However  $X$  becoming larger, she gives up control of distributors. Notice that manager's expected net payoff is linear in  $A$  and is less steep than that of the direct management form. In the next section, we will compare with her net payoffs between three forms by using these properties.

We will call the outside distributors form a *franchise chain* if the manager chooses avoiding competition. This is because she control stores like franchise chains. Similarly, we will call a *voluntary chain* if the manager doesn't choose avoidance. This is naturally because losing controls over stores looks like voluntary chains.

## 5 Comparison between Manager's Net Utility in Each Form

In order to see her equilibrium choice of forms (for example, at date 0), we will compare between the manager's net payoff in each form.

We will use the notation  $U^D$  as manager's expected net payoff at date 1 in the direct management form. Similarly, we will use  $U^F$  as net payoff in the franchise chain and  $U^V$  as one in the voluntary chain. Each net payoff can be represented by following equalities.

$$\begin{aligned} U^D &= \frac{\phi_0}{1 - \rho_0}(A - S) - S \\ U^F &= \frac{\phi(X)}{1 - \rho(X)}A \\ U^V &= \frac{\phi(\beta C)}{1 - \rho(\beta C)}A \end{aligned}$$

As already mentioned, we have assumed  $\phi_0 > 0$  and  $1 > \rho_0 > 0$ . We also assume here  $\phi(\alpha) > 0$  and  $1 > \rho(\alpha) > 0$  are satisfied. These new assumptions are not thought to be strict because these inequalities have to be satisfied if manager chooses outside distributors form. For any  $\alpha > 0$ ,  $\phi(\alpha)$  is always less than  $\phi_0$ . For sufficiently large  $\alpha$ ,  $\phi(\alpha)$  is negative, but in such a case, manager never choose that form because her net payoff is also negative. We can have similar reasoning about  $\rho(\alpha)$ . For any  $\alpha > 0$ ,  $\rho(\alpha)$  is smaller than 1 since  $\rho(\alpha)$  is smaller than  $\rho_0$ . For sufficiently large  $\alpha$ ,  $\rho(\alpha)$  is negative but that means pledgeable income is negative, so that manager cannot raise funds and her net payoff is zero. As we will focus on manager's choice among three forms, we assume here those new assumptions are satisfied. Of course, if  $\phi(\alpha)$  or  $\rho(\alpha)$  violate the assumptions, then manager never choose such a form and she would select among other forms or not to run the firm if her payoffs are negative in all forms<sup>8</sup>.

Then, for all forms, manager's payoff is linear in  $A$  whose slope is positive. These lines are depicted in figure 4.  $U^D$  and  $U^V$  is fixed line for given  $\beta$ , but  $U^F$  varies in  $X$ . Slope of  $U^F$  becomes less steep as  $X$  increases, which is easily verified by differentiating  $\phi(X)/(1 - \rho(X))$  with respect to  $X$ . We can check this property intuitively. Its numerator is decreasing in  $X$  and its denominator is increasing in  $X$ , which means the value of the fraction is decreasing in  $X$  and the slope of the line becomes less steep.

---

<sup>8</sup>If she doesn't run the firm, she only enjoys consuming her initial asset  $A$ . In that case, her *net* payoff is zero.

If initial assets  $A$  are no more than  $S$ , the manager cannot afford to establish her own stores. If  $A \in [S, (\phi_0 + \rho_0 - 1)/\phi_0)$ ,  $U^D$  is negative because the net profit of investment is positive but less than  $S$ . That is, she cannot earn from investment more than setup cost  $S$ . So, her expected net payoffs are negative.

If  $X < \beta C$ , then the slope of  $U^F$  is steeper than that of  $U^V$  and vice versa. That is, if  $X < \beta C$ , then  $U^F > U^V$  for any  $A > 0$  but if  $X > \beta C$ , then  $U^F < U^V$  for any  $A > 0$ .  $U^D$  and  $U^V$  are crossing at  $\bar{A}$  in Figure 4.  $U^D$  is greater than  $U^V$  when manager's initial assets  $A$  are larger than  $\bar{A}$ . That is, rich manager prefers a direct management form but poor manager prefers a voluntary chain. The same reasoning can be applied to the comparison between  $U^D$  and  $U^F$ . In Figure 4, they are crossing at  $A(X)$ , which varies as  $X$  changes. As  $X$  increases, the slope of  $U^F$  becomes less steep and therefore  $A(X)$  moves to the left. That is, as  $X$  increases, the range  $[A(X), \infty]$  where the manager prefers a direct management form expands and the range  $[0, A(X)]$  where she prefers a franchise chain shrinks. To sum up, under strong antitrust law, even poor manager tends to choose a direct management form.

We conclude that manager chooses franchise chain if  $X < \beta C$  and smaller  $A$  and chooses voluntary chain if  $X > \beta C$  and smaller  $A$  and chooses direct management form when she have enough money. The manager who chooses a franchise chain at first may make a behavioral change and chooses a direct management form when antitrust law is strengthen. On the other hand, the manager who chooses a voluntary chain remains unchanged even if antitrust law becomes tough. This is only because in a voluntary chain, she has already given up controlling outside distributor, so the antitrust authority will never intervene in her management.

## 6 Conclusions

We will discuss some conclusions obtained here. There are five main results. First, a financially muscular manager who has adequate  $A$  for given  $X$  and for given  $\beta$  chooses a direct management form among three forms. The reason is the following. In a direct management form, as she have the right to control stores, she need not to bear avoidance cost of competition or can keep off profit reduction occurred by competition between stores. Besides that, she doesn't share ex post gross profit  $RI$  with franchisees. So, return per investment is larger than other forms. Since the setup cost  $S$  is relatively smaller for larger  $A$ , her borrowing capacity is sufficiently large and ex ante net profit surpasses that of other forms.

Second, for given  $X$  which is smaller than  $\beta C$  and for given  $\beta$ , manager who has inadequate  $A$  chooses a franchise chain even when  $A$  is greater than  $S$  but smaller than some level of  $A$ , say  $A(X)$  in figure 4. This is because, for smaller  $A$ , losing  $S$  makes relatively serious effects on borrowing capacity. That results in smaller investment and smaller net payoffs. The manager who has small  $A$  prefer a franchise chain among forms if  $X \leq \beta C$ .

Third, for  $\bar{A}$  in figure 4, for given  $A \in [\bar{A}, \infty]$ , a manager prefers a franchise chain when  $X$  is sufficiently small, while she prefers a direct management form for sufficiently large  $X$ .  $U^F$  becomes less steep as  $X$  increases. Then,  $A(X)$  depicted in Figure 5 moves from  $A(X_1)$  to  $A(X_2)$  as  $X$  increases from  $X_1$  to  $X_2$ . The manager who has  $\hat{A}$  prefers a franchise chain when  $X = X_1$ , but prefers a direct management form for  $X = X_2$ . This is because larger avoidance cost reduces her borrowing capacity, so that she abandons exploiting outsiders' initial assets that economize on setup cost.

Fourth, If  $X$  is greater than  $\beta C$ , then manager chooses a direct management form or a voluntary chain. Manager who has initial assets  $A \geq \bar{A}$  chooses a direct management form but she chooses a voluntary chain when she has smaller  $A$  than  $\bar{A}$ , vice versa. This reason is similar to comparison between a franchise chain and a direct management form.

Finally, we remark on the case where  $\beta$  is small. Smaller  $\beta$  means that the manager has less bargaining power against outside distributors. Voluntary chains are said to be weak aggregates. This implies headquarters are weak and don't have sufficient right to control distributors. In our model, manager is more likely to choose voluntary chain when she has small  $A$  for given small  $\beta$ . That is, manager who is weak both in financial position and bargaining power tends to choose voluntary chain. These results fit the fact that in voluntary chain, stores are independent in management and headquarters that are passive in developments of their products play only a role as collective purchase from suppliers.

## References

Baker, Gibbons and Murphy(2002), "Relational Contracts and the Theory of the Firm", Quarterly Journal of Economics, 117, 39-84.

Dixit (2004), "Lawlessness and Economics: Alternative Modes of Governance", Princeton University Press.

Grossman and Hart (1986), "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", Journal of Political Economy, 691-719.

Hart (1995), "Firms, Contracts, and Financial Structures", Oxford University Press.

Holmstrom and Tirole (1997), "Financial Intermediation, Loanable Funds, and the Real Sector", *Quarterly Journal of Economics*, 663-691.

Jappelli, Pagano and Bianco (2005), "Courts and Banks: Effects of Judicial Enforcement on Credit Markets", *Journal of Money, Credit and Banking*, 223-244.

Nocke and Thanassoulis (2009), "Vertical Relations under Credit Constraints", mimeo

Riordan(2008), "Competitive Effects of Vertical Integration", *Handbook of Antitrust Economics*, The MIT Press, pp145-182.

Tirole (2006), "The Theory of Corporate Finance", Princeton University Press.

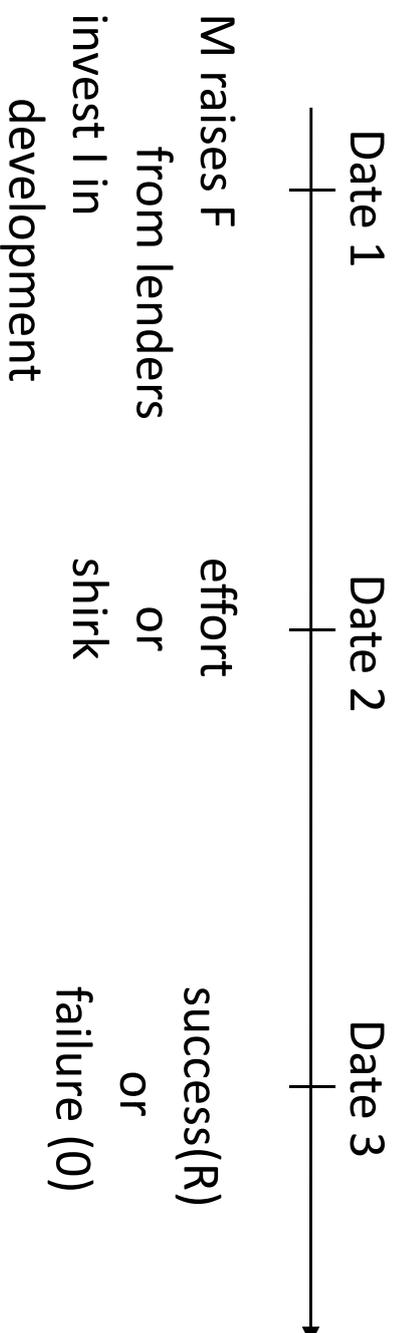


Figure 1

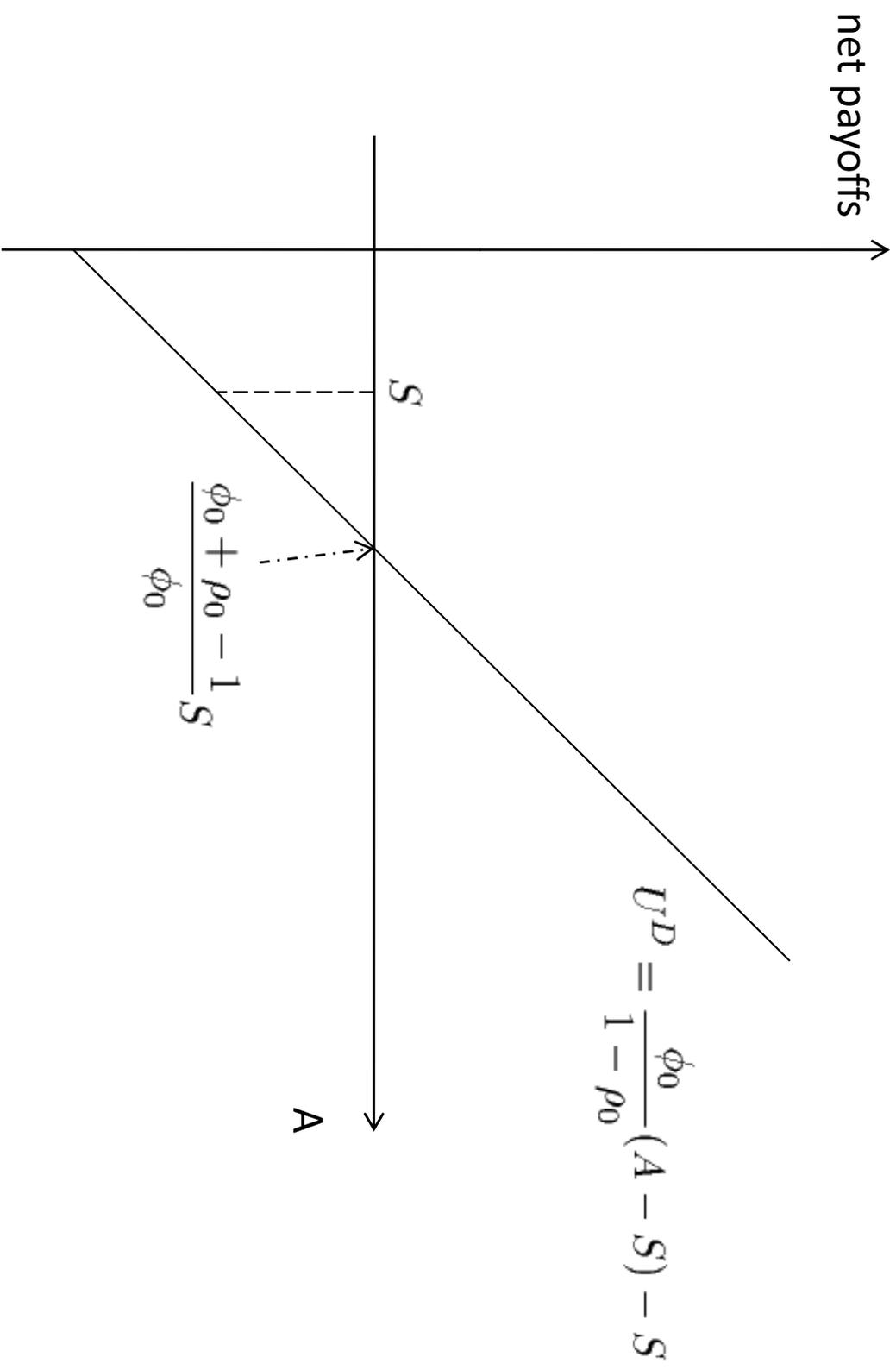


Figure 2

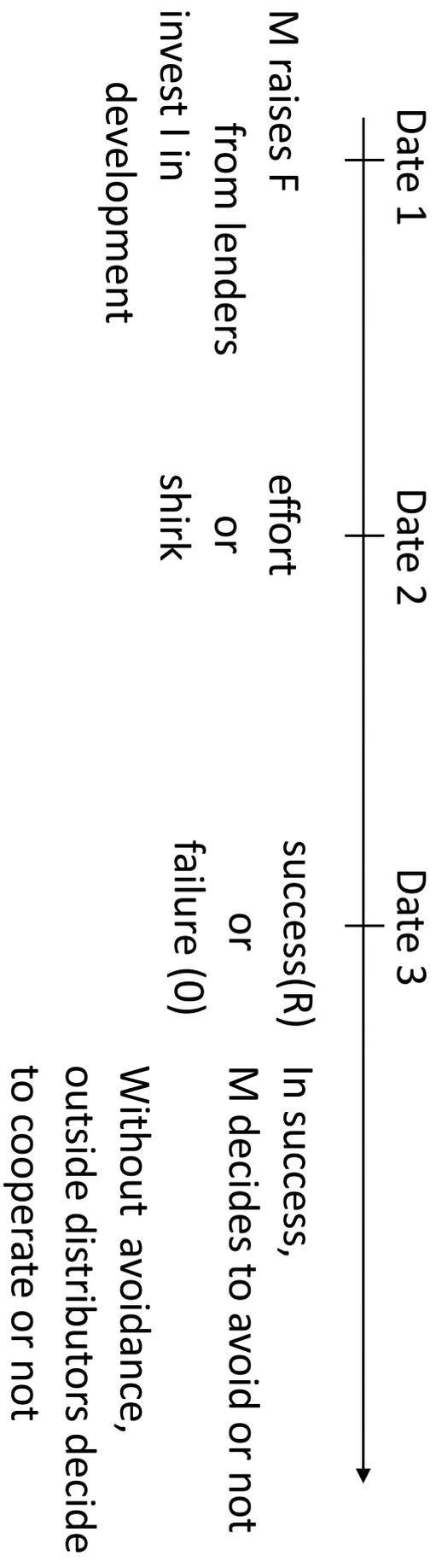


Figure 3

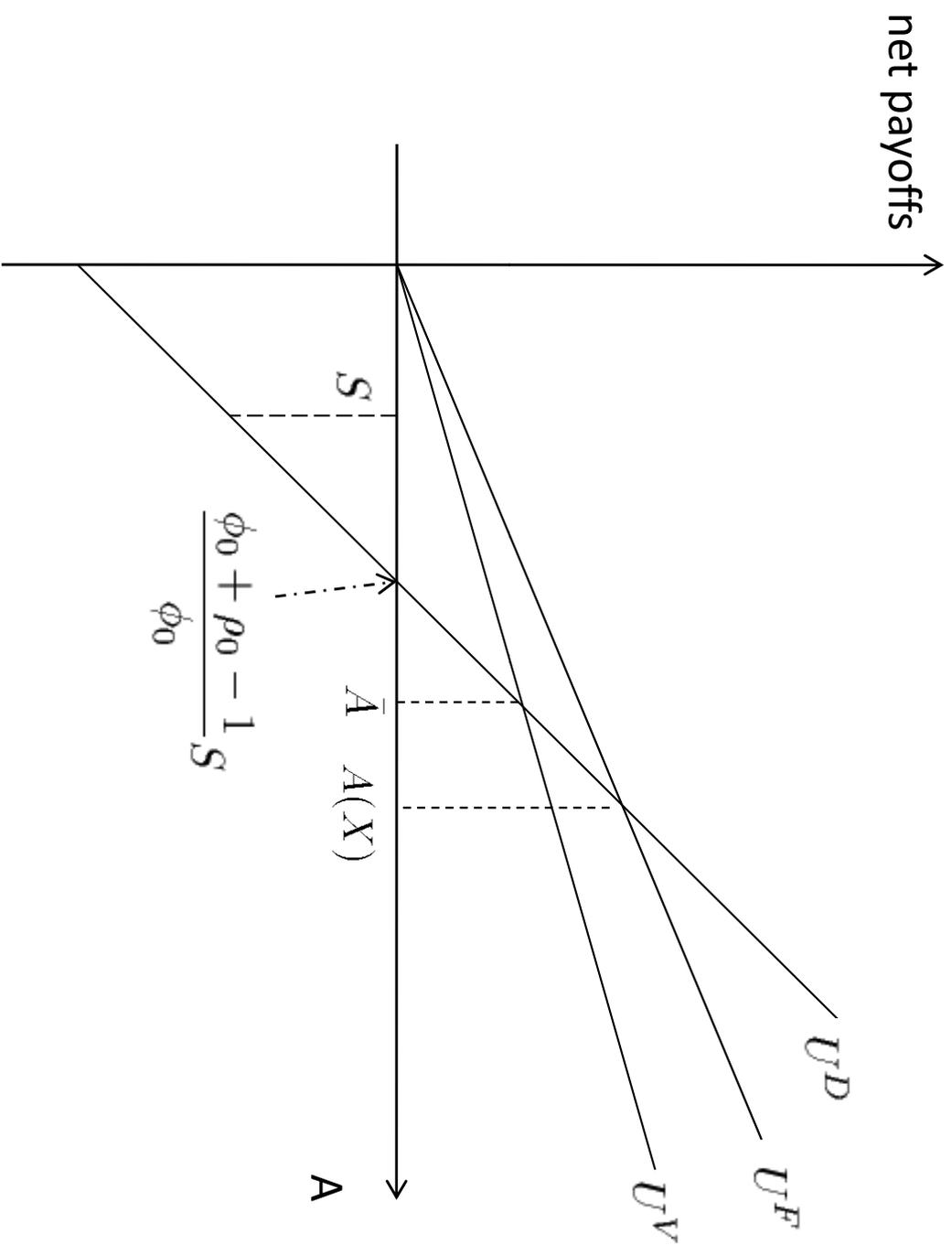


Figure 4

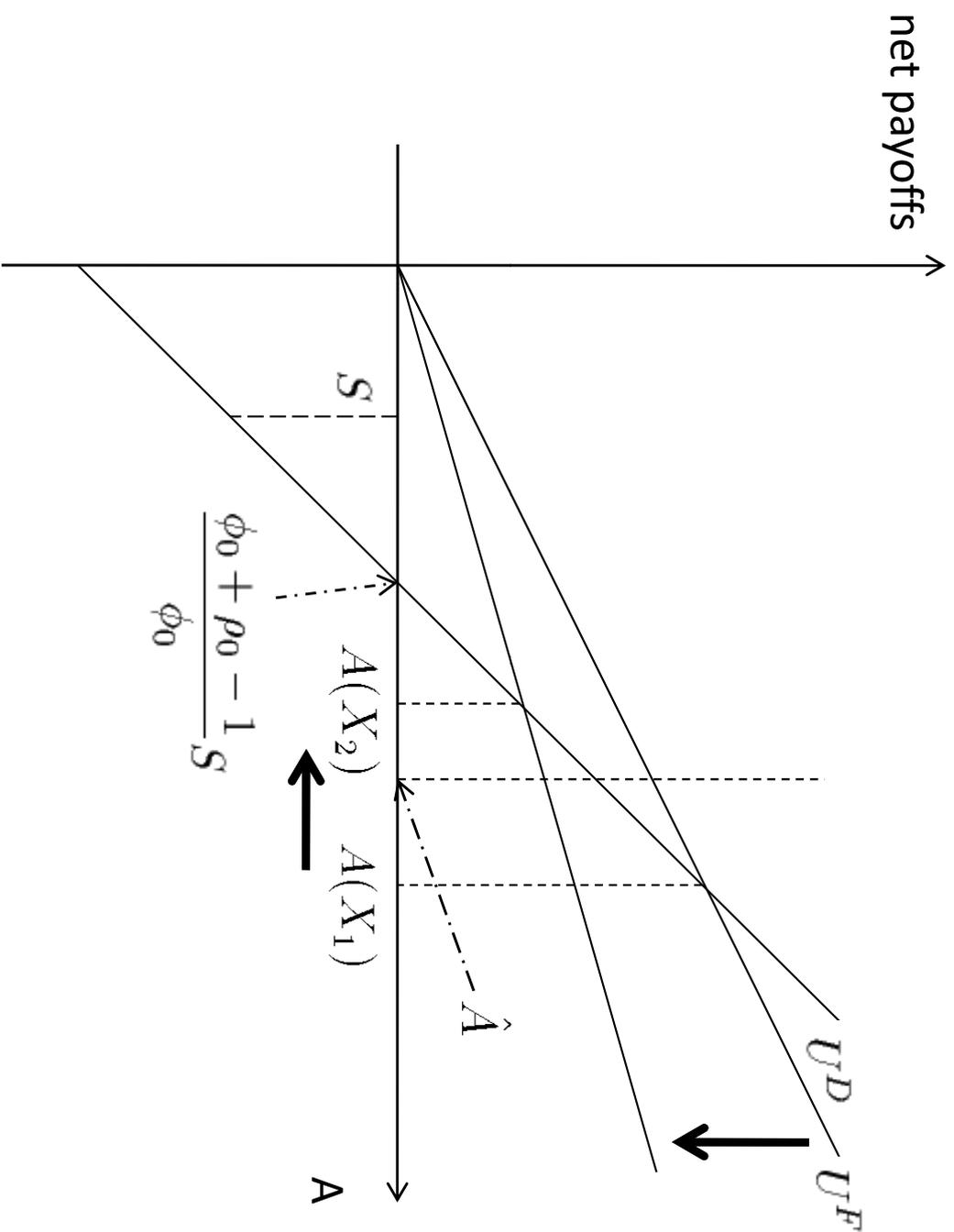


Figure 5