A Distinction between Business Groups and Conglomerates: The Limited Liability Effect

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Abstracts:

A subsidiary of a business group is a legal entity which can raise its own external fund with limited liability while a division of a conglomerate is not. In spite of the difference between business groups and conglomerates, prior studies often focus on conglomerates or do not clearly distinguish them. We directly compare business groups and conglomerates, especially in investment strategies and firm values. Because of the limited liability, a business group is likely to choose a risky project more than a conglomerate and that strategy brings a payoff advantage to a business group when the success probability is high. Our model also considers tunneling of business groups and the portfolio of matching single firms. While the participant of new-shareholders and the firm value of a business group decreases with tunneling, when the success probability is low the group value can be higher than the matching single firms.

Keywords: business groups, conglomerates, limited liability, bankruptcy risk
JEL Classification: G300, G320, D820

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I. Introduction

Business groups are typical organization form not only in developing counties[1] but also in Europe. Similar to the diversification discount issue in conglomerates[2], we can see both the bright and dark side of business groups in literature. While efficient business groups reduce the financing constraints (Khanna and Palepu (2000), Shin and Park (1999)), tunneling is an evidence of minority shareholder exploitation (Johnson et al. (2000), Bae, Kang, and Kim (2002)). Business groups and conglomerates are similar in their diversity of composing units, but a subsidiary of a business group is a legal entity which can raise its own external fund with limited liability while a division of a conglomerate is not. In spite of the difference between business groups and conglomerates, prior studies often focus on conglomerates or regard both forms as the same organization type, and do not clearly distinguish conglomerates and business groups.

Strands of literature have investigated business groups, especially business groups

[1] Related issues are reviews in Khanna (2000).
[2] In this paper, a conglomerate is a legal entity which has multi-divisions. On the other hand, a business group has multi-subsidiaries, and each subsidiary is a legal entity.

in developing countries. Business groups have many interesting characteristics, and there are various types of business group, e.g. family owned *chaebol*[3] in Korea, main bank centered *keiretsu*[4] in Japan, and pyramidal structured groups in India[5]. In emerging market, business groups are regarded as an efficient form of company to manage internal resource. Indian business groups affiliates, especially highly diversified groups, have superior performance (Tobin's q and ROA) to non group firms, and business groups add value by replicating the functions of institutions (Khanna and Palepu (2000)). Shin and Park (1999) show the low and insignificant investment-cash flow sensitivity of *chaebols*, and argue that the internal capital market reduces the financing constraints of the *chaebol*.

Business groups also have a dark side, for instance, tunneling is observed in several literatures. Johnson et al.(2000) use the term tunneling, "to describe the transfer of assets and profits out of firms for the benefit of those who control them." There are various ways to do tunneling, and a merger is one of them. From mergers between affiliates of *chaebol*, Bae, Kang, and Kim (2002) show that minority shareholders lose from the acquisition because of bidder's negative return and the controlling shareholders gain from the positive return of other firms in the same *chaebol*.

[3] Bae, Kang, and Kim (2002) note tunneling in cross share holding *chaebol*.
[4] Close bank relationship mitigates information problems (Hoshi et al. (1991)).
[5] Khanna and Palepu (2000) examine the performance of affiliates of business groups.

Baek, Kang, and Lee (2006) suggest tunneling evidence from private securities offerings in *chaebol*. They find that *chaebol* issuers (member acquirers) realize higher (lower) announcement return when they sell private securities at a premium to other member firms, and when the controlling shareholders receive positive net gains from equity ownership in issuers and acquirers.

Regarding the usage of internal capital in business group, whether it adds or destroys values is similarly discussed issue in literature of conglomerates-or diversified firms, and it is still controversial[6]. Theoretical analyses usually focus on the internal capital of conglomerates. In Stein (1997), efficient internal capital markets enable winner-picking and headquarter can create value. On the other hand, Scharfstein and Stein (2000) and Rajan, Servaes and Zingales (2000) argue that resources are inefficiently allocated to divisions with poor investment opportunities because of internal power struggle and divisional rent-seeking. Business groups and conglomerates are similar in their diversity of composing units and internal capital utilization, but each has different characteristics, especially a subsidiary of a business group is an independent legal entity while a division is not. Nevertheless, many

[6] Empirical evidences are various. Lang and Stulz (1994) and Berger and Ofeck (1995) find that diversification is negatively related with firm value by comparing values of segments of diversified firms with those of single firms in matching industries. However, Villalonga (2004) and Whited (2001) point out data problems and find no evidence for the existence of a diversification discount.

literatures regard them the same and do not distinguish.

Some recent literatures suggest separate business group theories. Cestone and Fumagalli (2005) focus on the limited liability of each subsidiary and assume no joint liability of subsidiaries, and note individual subsidiaries' external finance. Depending on the amount of internal resources, the headquarter channel resources to either more- or less- profitable units. While they note the agency problem between managers and headquarter in a business group, we focus on the relation between new-shareholders (outside investors) and headquarter. Almeida and Wolfenzon (2006a) compare a pyramidal structure group and a horizontal structure one under the assumption that the investor protection is imperfect and new businesses are added to the group over time. When a new subsidiary is expected to yield low-security benefits the family chooses the pyramidal structure and share security benefits of new one to maintain the access to all of the cash of the original firm. While Cestone and Fumagalli (2005) show that the internal capital market can make group subsidiaries' strategy aggressive and Wolfenzon (2006) suggests the rationale for the pyramidal structure group, both models do not compare business groups and conglomerates directly.

We focus on the organization form itself and suggest direct comparisons between business groups and conglomerates, especially in investment strategies and firm values.

Because of the limited liability, a business group is likely to choose a risky project more than a conglomerate and that strategy brings a payoff advantage to a business group when the success probability is high. On the other hand, when the success probability is low, the results are the other way around. In addition, our model also considers tunneling of business groups and the portfolio of matching single firms in analysis. The participant of new-shareholders decreases with tunneling, and the firm value of a business group becomes lower than that of matching single firms. However, when the success probability is low, the investment strategy of a business group is less risky than a single firm and the firm value can be higher than that of a single firm.

The rest of the paper is organized as follows. Section II describes and develops a formal model. Section III shows a benchmark model and suggests investment decision and firm value comparisons, and we discuss the implications of the results in Section IV. Finally, Section V concludes.

II. A Formal Model Description

We study a business group and a conglomerate composed of two same units. The basic model is based on Cestone and Fumagalli (2005) except the agency problem setting between managers and headquarters since that agency problem is a similarity not a critical difference. We focus on the difference of two organization type and the limited liability is the main difference between a subsidiary of a business group and a division of a conglomerate. To clarify the difference we also consider a single firm which is the same as each unit.

Each unit has two kinds of investment opportunities: risky project and safe project. Safe project gives a certain gross return π_s. On the other hand, risky project gives gross return π_r^H with probability p, and gross return π_r^L with probability 1-p. Each unit can realize only one investment opportunity and each project needs investment *I*. While headquarters needs 2*I* to realize two projects for each unit, we assume that internal capital (A) is not enough to start both projects: A < 2I. Therefore, headquarter of a conglomerate and each subsidiary should seek additional funds from outside investors (new-shareholders) and contracts the share of returns (α_i) with them. New-shareholders invest for break even payoff.

Each unit has to pay debt and its face value is D/2, and a conglomerate should pay

D for two units. To reflect the limited liability effect, we assume the relative scale as $D > \pi_r^H > \pi_s > \frac{D}{2} > \pi_r^L > 0$: the failure of risky project results in the bankruptcy of any type of firm. Figure 1 shows the timing of events according to each organization type. We can observe the only difference among them in a business group time line that each subsidiary raises I-A_i on external capital market since each is an independent legal entity.

[Figure 1]

Now, from the maximization of old-shareholders' payoff we can see the investment decision of each organization type: a single firm, a conglomerate, a business group. Let us examine each in turn.

Single firm investment decision: We consider a single firm which is the same as a subsidiary of a business group, and a single firm has the amount of A/2 internal capital as its asset. A single firm can choose either risky project or safe project. Table 1 shows the participant condition of new-shareholders and the payoff of old-shareholders. R represents a risky project and S represents a safe project choice.

< Table 1>

For maximization of old-shareholders' payoff based on Table 1 results, the investment decision of a single firm is shown in Lemma 1.

***Lemma 1**: A single firm chooses a safe project if* $p < \frac{2\pi_s - D}{2\pi_r^H - D}$, *and chooses a risky project if* $p \geq \frac{2\pi_s - D}{2\pi_r^H - D}$.

When $p = \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$, NPV of the two projects are the same, and when $p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$, the NPV of safe project is higher than risky project. Therefore, if $\frac{2\pi_s - D}{2\pi_r^H - D} \leq p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$, a single firm does not choose a safe project even though the NPV of that is higher than risky project (see Figure 2). Because of the limited liability, a firm need not pay debt when the risky project fails, and debt overhang problem (Myers, 1977) occurs.

<Figure 2>

Conglomerate investment decision: Let us examine the investment decision and the following payoff in a conglomerate (see Table 2). Since a conglomerate has two units, there are three ways of investment choices: RR, RS, and SS. Each R represents a risky project and S represents a safe project choice.

<Table 2>

For maximization of old-shareholders' payoff based on Table 2 results, the investment

decision of a conglomerate is shown in Lemma 2.

***Lemma 2**: A conglomerate chooses two safe projects if* $p < \frac{2\pi_s - D}{\pi_r^H + \pi_s - D}$, *chooses one safe project and one risky project if* $\frac{2\pi_s - D}{\pi_r^H + \pi_s - D} \le p < \frac{\pi_r^H + \pi_s - D}{2\pi_r^H - D}$, *and chooses two risky projects if* $p \ge \frac{\pi_r^H + \pi_s - D}{2\pi_r^H - D}$.

Now, since two units constitute a conglomerate and the failure of a project can affect the bankruptcy of the whole firm, headquarter is more sensitive to risk than a single firm. As we have seen before, at $p = \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$ NPV of safe project and risk project are the same, but according to the failure return π_r^L size, we can divide $p = \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$ line into three cases. Figure 3 shows the investment decisions with three NPV comparison lines.

<Figure 3>

Since a conglomerate maximize the whole payoff (the sum of two projects) not each division, the investment decision is balanced between the limited liability effect and the bankruptcy risk. For example, when the failure return of risky project is high

($D - \pi_s < \pi_r^L$), headquarter is likely to choose safe projects even though the NPV of risky project is higher to decrease the bankruptcy risk. On the other hand, when the failure return of risky project is low ($0 < \pi_r^L < D - \pi_r^H$), headquarter is likely to choose risky projects even though the NPV of safe project is higher because of the limited liability effect.

Business group investment decision: We consider tunneling in a subsidiary of a business group, and it differentiates a subsidiary from a single firm. When the risky project fails, tunneling from failed unit to the other one is possible in a business group[7]. The portion of tunneling is represented as *k*. Even though each subsidiary is an independent legal entity headquarter pursues the whole group value maximization. There are also three ways of investment decisions: RR, RS, and SS. Table 3 summarizes the investment choices and the following payoffs in a business group.

< Table 3>

Similar to a conglomerate, Figure 4.(a) shows investment decisions based on the success probability range of risky project. Since the probability formula is not convenient to compare with other formulas, we use converted formula as in Figure 4.(b)

[7] There are various ways of tunneling. However, since the main objective of tunneling is to transfer of assets and profits for those who control them regardless of the method, this simple design is enough to describe tunneling. Headquarter will not do tunneling from success unit to failed unit, since debt holders have all the claims.

to ease calculations and comparisons. The results are shown in Lemma 3.

***Lemma 3**: A business group chooses two safe projects if* $p < \frac{2\pi_s - D - 2(1-p)k\pi_r^L}{2\pi_r^H - D}$,

chooses one safe project and one risky project if

$\frac{2\pi_s - D - 2(1-p)k\pi_r^L}{2\pi_r^H - D} \le p < \frac{2\pi_s - D + 2(1-2p)(1-p)k\pi_r^L}{2\pi_r^H - D}$, *and chooses two*

risky projects if $p \ge \frac{2\pi_s - D + 2(1-2p)(1-p)k\pi_r^L}{2\pi_r^H - D}$.

III. Investment Decisions and Firm Value Comparisons

In this section, we compare investment strategies and firm values of a single firm, a conglomerate, and a business group based on the results from Section II. First, we examine a benchmark case which has no tunneling. Because of the limited liability, a business group (matching single firms) is likely to choose a risky project more than a conglomerate and the firm value is higher when the success probability is high. After that, we show the analysis results with tunneling case. When the success probability is low, the investment strategy of a business group is less risky than a single firm and the firm value can be higher than matching single firms.

III.A. Benchmark Case (k = 0)

When the tunneling does not exist (k=0), a subsidiary of a business group is the same as a single firm, and the investment decision is also the same. From Lemma 3, when k=0, a business group chooses two safe projects(SS) if $p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$, and chooses two risky projects(RR) if $p \geq \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$. Now, Figure 5 shows different investment decisions of a conglomerate (C) and a business group (G) based on the success probability range.

<Figure 5>

As we can see in Figure 5, a business group is likely to choose risky project more than a conglomerate. Since each subsidiary of a business group is a legal entity, even though a subsidiary goes bankrupt its risk does not affect the other affiliates. On the other hand, failure of a project directly results in bankruptcy of the whole conglomerate, since each division is not a legal entity and a conglomerate cannot utilize the limited liability between its divisions. While a business group chooses two safe projects if $p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$, a conglomerate chooses two safe projects if $p < \frac{2\pi_s - D}{\pi_r^H + \pi_s - D}$. For $\frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L} < \frac{2\pi_s - D}{\pi_r^H + \pi_s - D}$, we can easily bring the following result Lemma 4.

Lemma 4: *Without tunneling, a business group is likely to choose risky projects more.*

Now, Proposition 1 summarizes the firm value comparisons, and the results come from Figure 5 directly.

Proposition 1*: Without tunneling,*

(i) The value of a business group (matching single firms) is higher or at least the same as that of a conglomerate if $D - \pi_r^H < \pi_r^L$ *and* $p \geq \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$.

(ii) The value of a conglomerate is higher or at least the same as that of a business group (matching single firms) if $p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$.

When the success probability is high, the aggressive attitude on the risk is an advantage for a business group and the firm value is higher than a conglomerate. On the other hand, if the success probability is low, the result is the other way around. In addition, the value of a single firm and its comparison results are the same as those of a business group when we consider a portfolio of matching single firms.

III.B. Tunneling Case (k > 0)

Now, we divide two cases according to the success probability to ease the comparison: p ≥ 1/2 and p < 1/2. As we can see in Lemma 3, the investment decision of a business group is different for each.

With tunneling, when p ≥ 1/2: A business group chooses two risky projects (RR) if $p \geq \frac{2\pi_s - D + 2(1-2p)(1-p)k\pi_r^{\ L}}{2\pi_r^{\ H} - D} \equiv \phi$, and when p ≥ 1/2, $\phi \leq \frac{2\pi_s - D}{2\pi_r^{\ H} - D}$. A single firm chooses a risky project if $p \geq \frac{2\pi_s - D}{2\pi_r^{\ H} - D}$, and a conglomerate chooses risky projects if $p \geq \frac{\pi_r^{\ H} + \pi_s - D}{2\pi_r^{\ H} - D}$. Therefore, we can easily see the characteristic of a business group as shown in Lemma 5 since $\phi \leq \frac{2\pi_s - D}{2\pi_r^{\ H} - D} < \frac{\pi_r^{\ H} + \pi_s - D}{2\pi_r^{\ H} - D}$. The firm value comparison results are summarized in Proposition 2. In comparison, we consider a portfolio of matching single firms.

Lemma 5: *With tunneling when p≥1/2, a business group is likely to choose risky project more than a conglomerate and a single firm.*

Proposition 2*: With tunneling, when p≥1/2,*

(i) The values of a business group and a portfolio of matching single firms are

the same if $p \geq \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$, *and are higher or at least the same as that of a conglomerate.*

(ii) The value of a conglomerate is higher or at least the same as those of others if $p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$.

(iii) The value of a portfolio of matching single firms is higher than that of a business group if $\frac{2\pi_s - D - 2(1-p)k\pi_r^L}{2\pi_r^H - D} < p < \frac{2\pi_s - D}{2\pi_r^H - D}$ *and p > 1/2.*

Similar to Proposition 1, when the success probability is high, the limited liability in a business group and single firm results in the aggressive investment attitude on the risk, and it is an advantage to them. On the other hand, if the success probability is low, the result is the other way around. In addition, the value of a business group is lower than a portfolio of matching single firms because of tunneling. While headquarter can transfer some assets by tunneling, it obstructs the participant of new-shareholders and brings the decrease of firm value.

With tunneling, when p < 1/2: In this case, interesting results come out in firm value comparison. Even though tunneling obstructs the participant of new-shareholders, the firm value of a business group can be higher than that of matching single firms. We let

$\frac{2\pi_s - D + 2(1-2p)(1-p)k\pi_r^{\ L}}{2\pi_r^{\ H} - D} \equiv \phi$ as before. Because p < 1/2, we can see that $\phi > \frac{2\pi_s - D}{2\pi_r^{\ H} - D}$ and there exist a range that a business group chooses a risky project and a safe project (RS) while a single firm chooses only a risky project. According to the relative size of ϕ, Figure 6 shows the investment strategy comparison diagram based on the success probability.

<Figure 6>

The low success probability makes the less aggressive investment of business group since headquarter pursues the maximization of the whole group value. While a business group chooses two risky projects (RR) if $p \geq \phi$, a single firm chooses a risky project (R) if $p \geq \frac{2\pi_s - D}{2\pi_r^{\ H} - D}$, and a conglomerate chooses risky projects (RR) if $p \geq \frac{\pi_r^{\ H} + \pi_s - D}{2\pi_r^{\ H} - D}$. Therefore, we can easily see the characteristic of a business group as shown in Lemma 6 since $\frac{2\pi_s - D}{2\pi_r^{\ H} - D} < \phi < \frac{\pi_r^{\ H} + \pi_s - D}{2\pi_r^{\ H} - D}$.

Lemma 6*: With tunneling, when p < 1/2, a business group is likely to choose risky project more than a conglomerate, but less than a single firm.*

Proposition 3 summarizes the comparison results based on the firm value of a

conglomerate, and the results come from Figure 6 directly.

Proposition 3*: With tunneling, when p < 1/2*

(i) The value of a conglomerate is higher or at least the same as those of others if

$$p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}.$$

(ii) The value of a conglomerate is lower or at most the same as those of others if

$$p \geq \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}.$$

Similar to Proposition 1 and 2, when the success probability is high, the limited liability in a business group and single firm results in the aggressive investment attitude on the risk, and it is an advantage to them. When the success probability is low, the value of a conglomerate is higher than other types because of its less aggressive attitude on the risk.

Now, Proposition 4 summarizes the firm value comparison between a business group and a portfolio of matching single firms. This shows an interesting result that the value of business group can be higher in spite of tunneling.

Proposition 4*: With tunneling, when p < 1/2,*

(i) when $\frac{2\pi_s - D}{\pi_r^H + \pi_s - D} < \phi$ *, the value of a business group is higher than that of a portfolio of matching single firms*

if (a) $D - \pi_s < \pi_r^L$ *and* $\frac{2\pi_s - D}{2\pi_r^H - D} < p < \frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}$ *or*

if (b) $D - \pi_s > \pi_r^L$ *and* $\frac{2\pi_s - D}{2\pi_r^H - D} < p < \min[\frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}, \phi]$ *.*

(ii) when $\frac{2\pi_s - D}{\pi_r^H + \pi_s - D} \geq \phi$ *, the value of a business group is higher than that of a portfolio of matching single firms*

if (c) $D - \pi_s < \pi_r^L$ *and* $\frac{2\pi_s - D}{2\pi_r^H - D} < p < \min[\frac{\pi_s - \pi_r^L}{\pi_r^H - \pi_r^L}, \phi]$ *or*

if (d) $D - \pi_s > \pi_r^L$ *and* $\frac{2\pi_s - D}{2\pi_r^H - D} < p < \phi$ *.*

(iii) Otherwise, the value of a portfolio of matching single firms is higher or the same.

Tunneling makes the result that the firm value of a business group is lower than a portfolio of matching single firms. While tunneling makes it possible to transfer some assets and profits, tunneling also obstructs the participant of new-shareholders and brings the firm value decrease. However, when the success probability is low, a business group chooses a less risky investment decision than a single firm does. As a

result, the firm value of a business group can be higher than that of matching single firms as shown in Proposition 4.

IV. Discussion

Little literature has concerned the distinction between a business group and a conglomerate, but Morck, Wolfenzon, and Yeung (2005) mentioned the existence rationale of pyramidal groups rather than conglomerates. Space for the promotion, better monitoring, resolution of information asymmetries, weak investor protection, and etc. can be the reasons. While we focus on the limited liability property in a business group, Almeida and Wolenzon (2006a, b) focus on the weak investor protection in a business group. Because of weak investor protection, the family of a business can expropriate the payoff of other shareholders and investment opportunities of other firms in the economy. They suggest the rationale for the pyramidal structure of a business group and inefficiency of capital allocation in economy-level rather than distinction between a business group and a conglomerate. We compare business groups and conglomerates and more focus on the organization type itself.

One of the important factors which bring the analysis results is the limited liability

effect. Brander and Lewis (1986) show the limited liability effect in oligopoly and financial structure. Because of the limited liability a leverage firm performs a more aggressive output stance. As firms takes on more debt, firms takes on more risky output strategies that they raise returns in good states and lower returns in bad states. While they more focus on the linkages of product markets and financial markets, we regard the limited liability as the property for organization type. Weather it is an output strategy or investment strategy, the limited liability commits a leverage firm to more aggressive attitude on the risk. In addition, Cestone and Fumagalli (2005) also assume the limited liability (no joint liability) among subsidiaries, but the strategic impact (winner picking or subsidy) of internal resource flexibility is the main interests and results of them.

In our model, the investment opportunity condition is set on the success probability of a risky project. For example, when the success probability is high, a business group which is likely to choose risk has an advantage on a conglomerate. Success probability range can be understood as industry characteristics or firm productivity. Maksimovic and Phillips (2002) argue that the efficient firm type (conglomerate or single-segment firm) is different based on differences in industry fundamentals and firm productivity. For instance, specialization is optimal if the firm is more productive in

one industry than the other, while diversification is optimal if the productivities are similar. In other view point, we can think the success probability as the industry life cycle or market condition (recession or boom). Maksimovic and Phillips (2008) examine long-term changes of industry and suggest that organizational forms' comparative advantages differ across industry conditions. In their result, the positive benefit of internal capital markets is the highest for conglomerate firms in Growth industries[8]. While above literature examine a single-segment firm and conglomerate focused on the internal capital utilization, we look at a business group and conglomerate more based on the limited liability effect, therefore we cannot match the implications exactly and cannot check the results consistently. However, the point that industry characteristics and organizational types are related is a noticeable aspect.

We do not focus on the minor-shareholder and the control family confliction, and assume that minor-shareholders of each subsidiary are completely passive. Weak investor protection problem can be another story but that problem is not the main interest of us. However, this paper is one of the first attempts to model the distinction between a business group and a conglomerate by investigating the limited liability effect on the different organization types. As far as we know, there is little literature that

[8] They define Growth industries as the industry that the change in long-run shipments and number of firms both are above the median industry change.

studies this issue.

V. Conclusion

In spite of the clear difference between business groups and conglomerates, prior studies often focus on conglomerates or do not clearly distinguish them. Business groups and conglomerates are similar in their diversity of composing units, but a subsidiary of a business group is an independent legal entity which can raise its own external fund with limited liability while a division of a conglomerate is not. We compare business groups and conglomerates, especially in investment strategies and firm values.

First, we examine a benchmark case which has no tunneling. Without tunneling, both a subsidiary of a business group and a single firm have the same investment strategy. Because of the limited liability, a business group (a single firm) is likely to choose a risky project more than a conglomerate and the firm value is higher when the success probability is high. On the other hand, if the success probability is low, the firm value of a conglomerate is higher than other types. After that, our model includes tunneling of business groups from failed subsidiary to the other one, and the portfolio of

matching single firms is also considered in comparisons. Since the participant of new-shareholders decreases with tunneling, the firm value of a business group becomes lower than that of matching single firms. However, when the success probability is low, the investment strategy of a business group is less risky than a single firm and the firm value can be higher than that of matching single firms.

We look at a business group and a conglomerate more focused on the limited liability effect and organization type itself rather than internal capital allocation. We do not focus on the minor-shareholder and the control family conflictions. However, the internal capital and minor-shareholder problem is not a critical difference between a conglomerate and a business group, since both firm types have similar problems in these aspects. Above all, as far as we know, there is little literature that studies the distinction between a business group and a conglomerate, and we investigate the limited liability effect in different organization type comparisons. In addition, further research on industry characteristic and its comparative advantage in each organization type will be helpful to understand the rationale for existence of each organization form.

	New-shareholder participant	Old-shareholder payoff
R	$\alpha_S[p(\pi_r^{\ H} - \frac{D}{2})] = I - \frac{A}{2}$	$(1-\alpha_S)[p(\pi_r^{\ H} - \frac{D}{2})]$ $= [p(\pi_r^{\ H} - \frac{D}{2})] - (I - \frac{A}{2})$
S	$\alpha_S(\pi_s - \frac{D}{2}) = I - \frac{A}{2}$	$(1-\alpha_S)(\pi_s - \frac{D}{2})$ $= (\pi_s - \frac{D}{2}) - (I - \frac{A}{2})$

<Table 1> Participant condition and old-shareholder payoff in a single firm

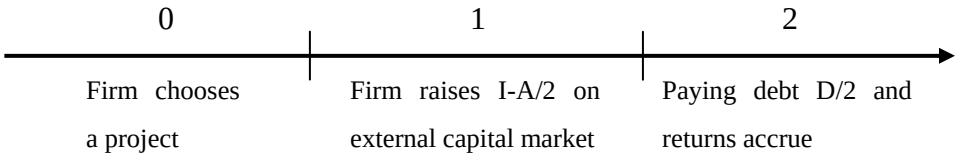
	New-shareholder participant	Old-shareholder payoff
RR	$\alpha_C[p^2(2\pi_r{}^H - D)] = 2I - A$	$(1-\alpha_C)[p^2(2\pi_r{}^H - D)]$ $= p^2(2\pi_r{}^H - D) - (2I - A)$
RS	$\alpha_C[p(\pi_r{}^H + \pi_s - D)] = 2I - A$	$(1-\alpha_C)[p(\pi_r{}^H + \pi_s - D)]$ $= p(\pi_r{}^H + \pi_s - D) - (2I - A)$
SS	$\alpha_C(2\pi_s - D) = 2I - A$	$(1-\alpha_C)(2\pi_s - D)$ $= (2\pi_s - D) - (2I - A)$

<Table 2> Participant condition and old-shareholder payoff in a conglomerate

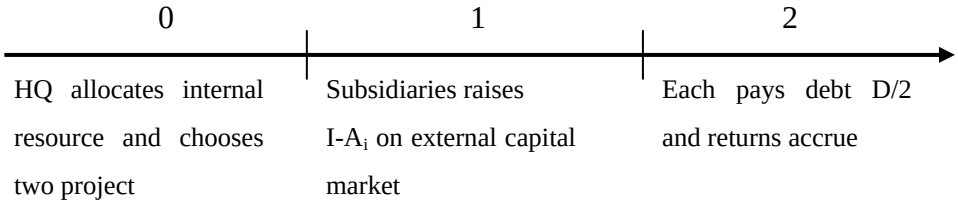
	New-shareholder participant	Old-shareholder payoff
RR	$\alpha_{Gi}[p^2(\pi_r^H - \frac{D}{2}) + p(1-p)(\pi_r^H - \frac{D}{2} + k\pi_r^L)] = I - A_1$	$p(2\pi_r^H - D) + 2p(1-p)k\pi_r^L - (2I - A)$
RS	$\alpha_{G1}p(\pi_r^H - \frac{D}{2}) = I - A_1$ $\alpha_{G2}[(\pi_s - \frac{D}{2}) + (1-p)k\pi_r^L] = I - A_2$	$p(\pi_r^H - \frac{D}{2}) + (\pi_s - \frac{D}{2}) + (1-p)k\pi_r^L - (2I - A)$
SS	$\alpha_C(2\pi_s - D) = 2I - A$	$(2\pi_s - D) - (2I - A)$

<Table 3> Participant condition and old-shareholder payoff in a business group

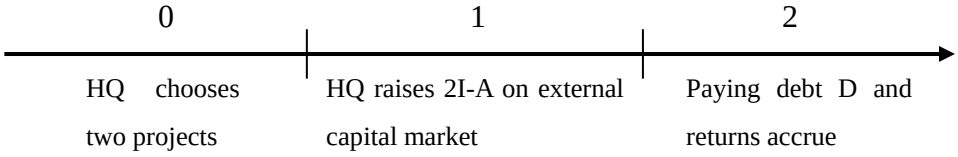
Single firm time line



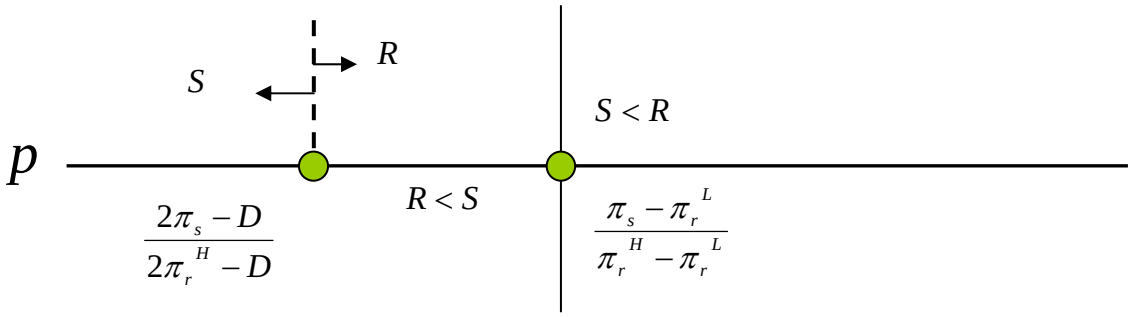
Business group time line



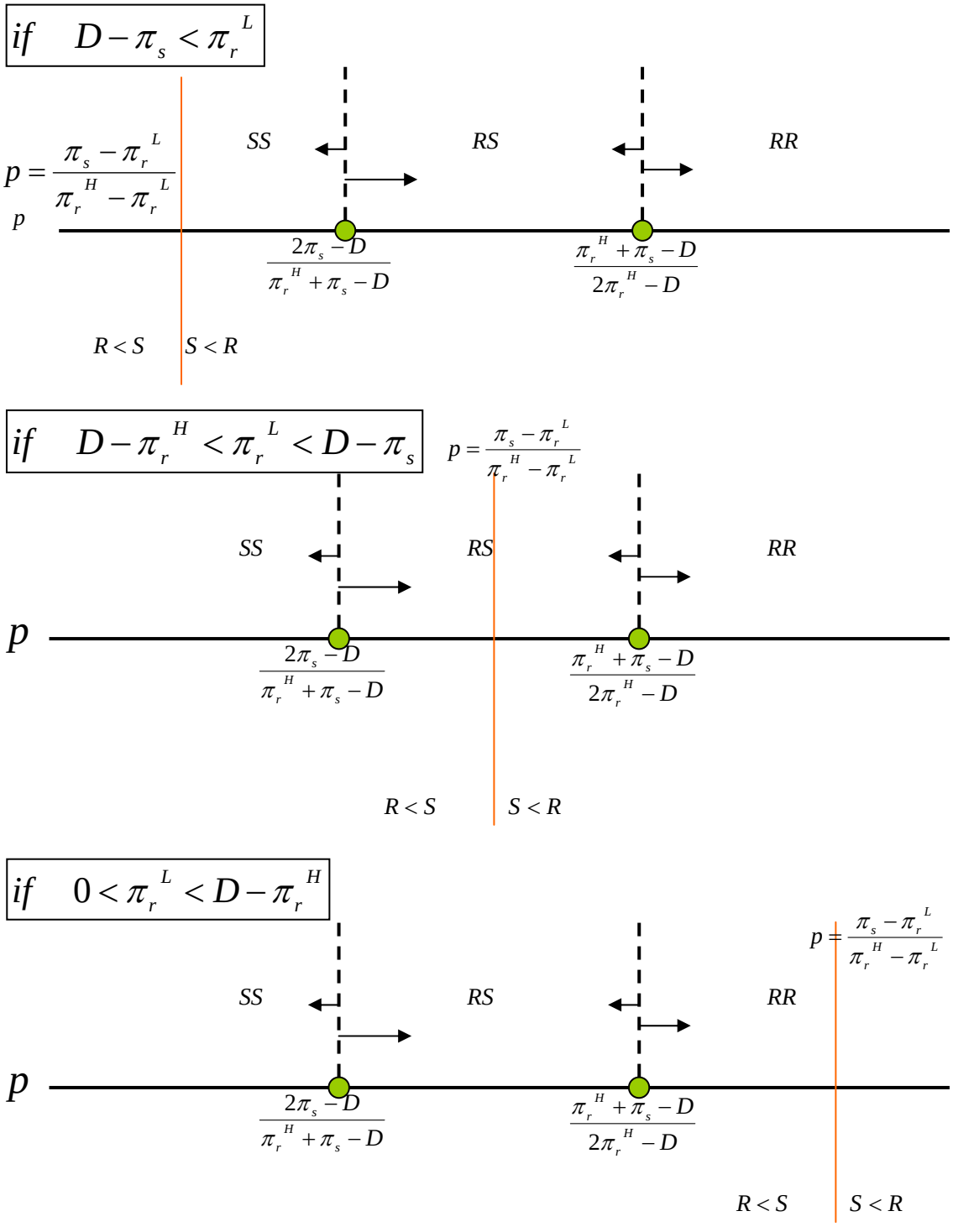
Conglomerate time line



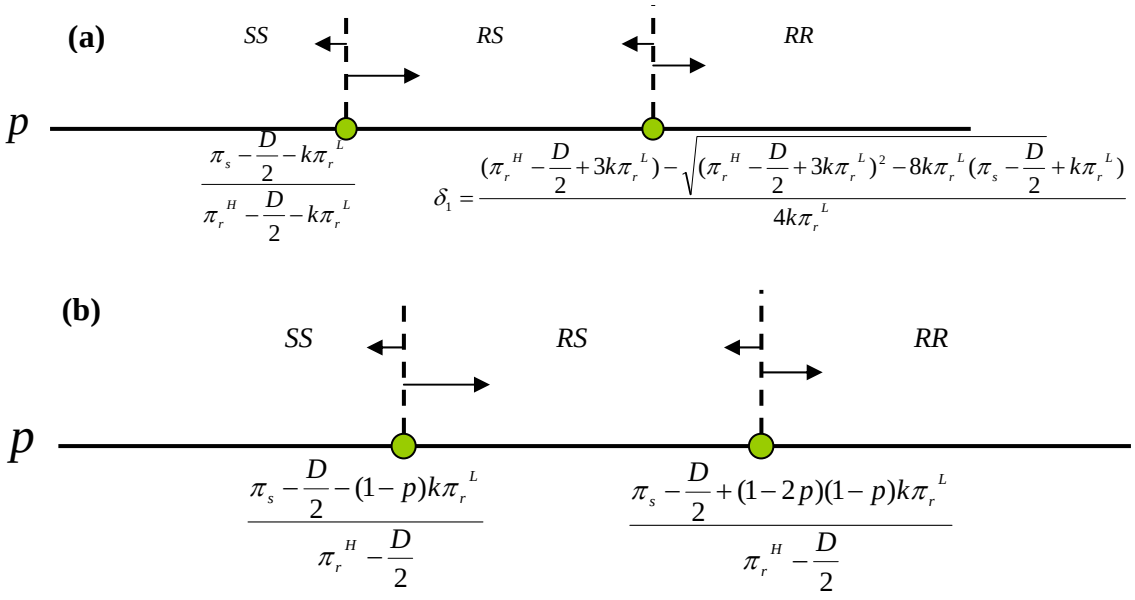
<Figure 1> Time line for each organization type



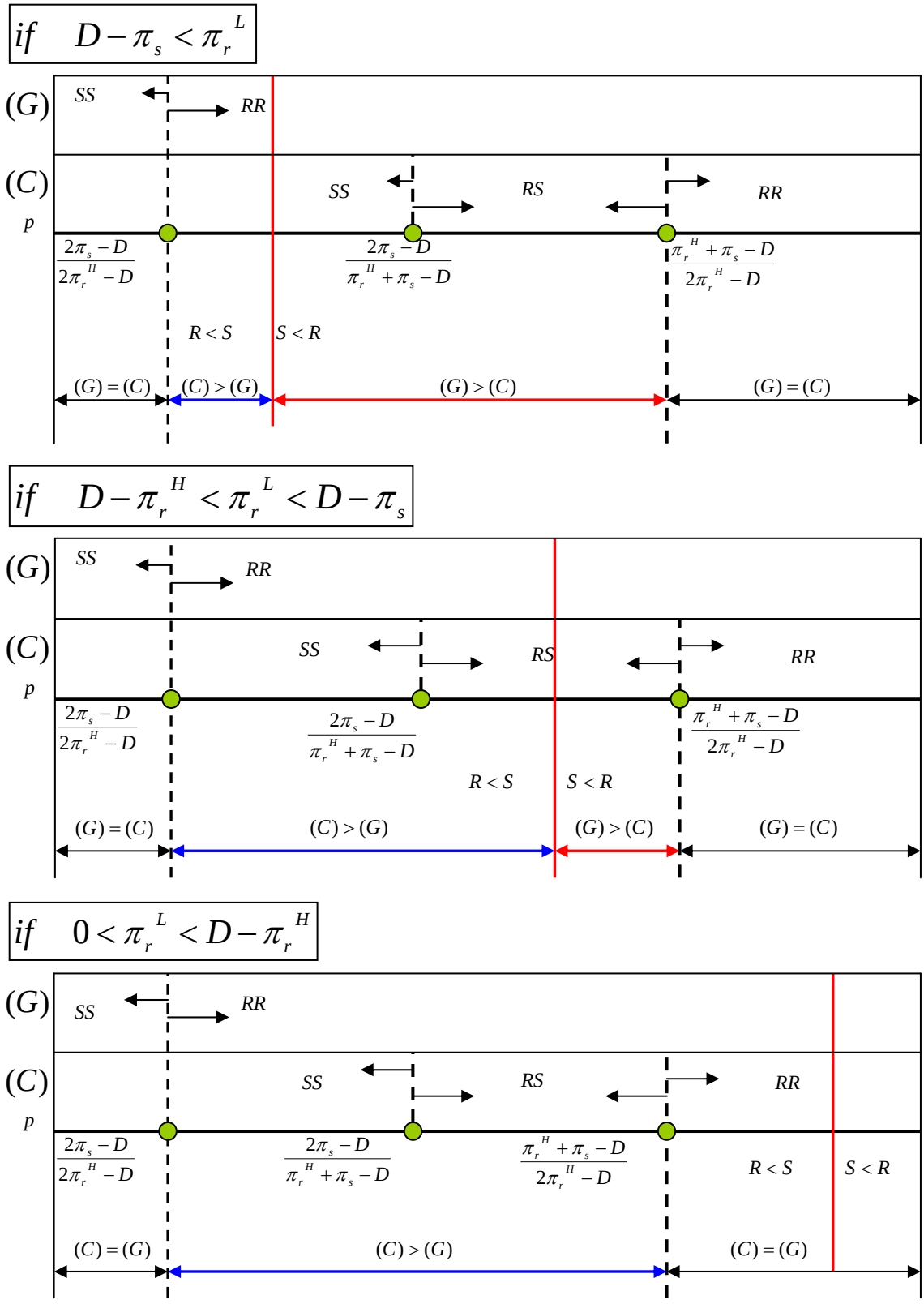
<Figure 2> Investment decision of a single firm



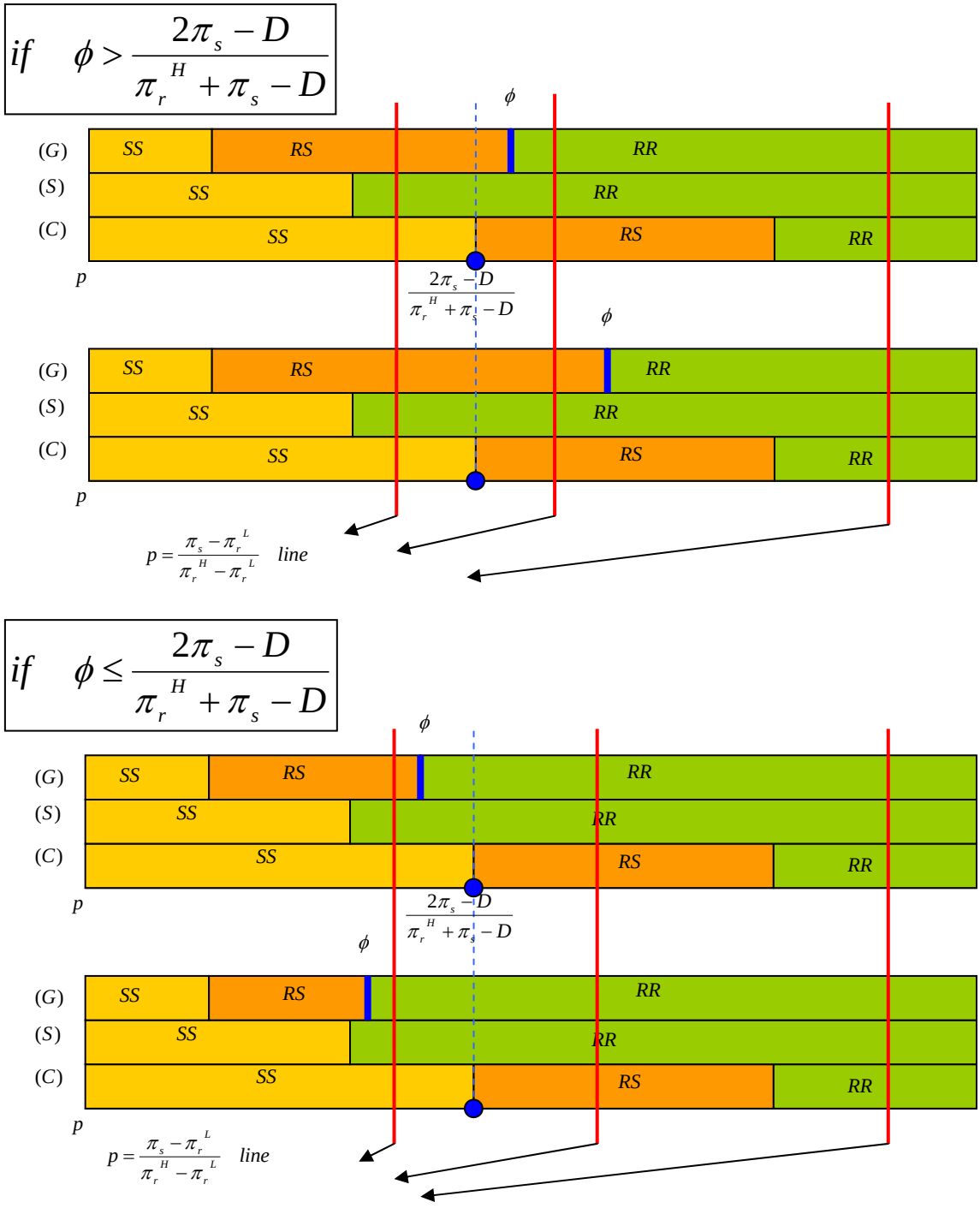
<Figure 3> Investment decision of a conglomerate



<Figure 4> Investment decision of a business group



<Figure 5> Benchmark case (k=0) comparisons



<Figure 6> Tunneling case (k>0) comparison when p < 1/2

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