Boundaries of the Firm

• Firms are economic units that make decisions, produce, sell, etc.

• What determines the optimal size of a firm? Should two plants be organized as two independent firms or as two divisions in one firm?

• Traditional economic analysis is silent about these issues, and takes the size of the firm as given.

• Moral hazard theory, with the exception of its multitasking part, also takes the size of the firm as given.
Grossman and Hart (1986): Incomplete Contracts and Property Rights

• Some states of the world cannot be contracted upon:
  o Agents cannot think about all contingencies.
  o They cannot communicate and negotiate about all possibilities.
  o They cannot write a clear contract that courts can then enforce.

• If contracts cannot fully specify the usage of the asset in every state of the world, then who gets the right to choose?
• The owner can decide on the usage, when unspecified by contract.
  o Contracts provide specific property rights, while ownership provides **residual property rights**.

• The owner of an asset will have a stronger incentive to make asset-specific investments, knowing that he has residual property rights.

• Transferring ownership of an asset from one party to another has a benefit – encouraging investment by the acquirer – and a cost – discouraging investment by the acquired. The tradeoff generates implications for ownership structures and firm boundaries.
A Basic Model (Hart, Ch. 2)

- There are two assets, $a1$ and $a2$, and two managers, $M1$ and $M2$.

- $a2$ in combination with $M2$ can supply a unit of input to $M1$, who, in combination with $a1$, can use it to produce a unit of output and sell it on the market.

- There are two dates, 0 and 1:
  
  - At date 0, $M1$ and $M2$ make (human-capital) investments to improve productivity. Those are denoted as $i$ and $e$, respectively.
• At date 1, $M1$ and $M2$ decide whether to conduct the transaction between them or go to the market.

• At date 0, it is too costly to write a contract on the date-1 use of the assets. The owner of an asset will have the right to choose.

• Three ownership structures are considered:
  - Non-integration: $M1$ owns $a1$ and $M2$ owns $a2$.
  - Type-1 integration: $M1$ owns $a1$ and $a2$.
  - Type-2 integration: $M2$ owns $a1$ and $a2$. 
Date-1 Payoffs and Surplus

- At date 1, $M1$ receives:
  - If trade occurs between $M1$ and $M2$, $M1$ receives $R(i) - p$.
  - If trade does not occur, $M1$ buys the input in the market and receives: $r(i, A) - \bar{p}$.
    - The revenue is different for the lack of $M2$’s human capital.
    - $A$ denotes the assets that $M1$ owns, and can be \{a1\}, \{a1, a2\}, or $\emptyset$. 
• Similarly, for $M2$:
  
  o If trade occurs between $M1$ and $M2$, $M2$ receives $p - C(e)$. 
  o If trade does not occur, $M2$ sells the input in the market and receives: $\bar{p} - c(e, B)$. 
    - $B$ denotes the assets that $M2$ owns: $\{a2\}$, $\{a1, a2\}$, or $\emptyset$. 
  
• The surplus in case of trade is $R(i) - C(e)$, while in case of no trade it is $r(i, A) - c(e, B)$. 

• Assuming gains from trade: For all $i$ and $e$ and $A$ and $B$:
  
  $R(i) - C(e) \geq r(i, A) - c(e, B)$. 

Date-1 Division of Surplus

• Ex-post, at date-1, for a given ownership structure and investments, the parties can negotiate. Hence, they choose to trade.

• It is assumed that the gains from trade \([(R - C) - (r - c)]\) are divided half-half, as in the Nash bargaining solution.

• The profits of \(M1\) and \(M2\) are then:

\[
\pi_1 = R - p = r - \bar{p} + \frac{1}{2} [(R - C) - (r - c)]
\]

\[
= -\bar{p} + \frac{1}{2} (r + R - C + c),
\]
\[ \pi_2 = p - C = \bar{p} - c + \frac{1}{2} [(R - C) - (r - c)] \]

\[ = \bar{p} - \frac{1}{2} (r - R + C + c). \]

- The price is given by: \[ p = \bar{p} + \frac{1}{2} [(R - r) - (c - C)]. \]

  - Note that integration involves transformation of ownership of physical capital, but not of human capital (e.g., under type-1 integration, \( M1 \) controls \( a2 \), but has no say on what \( M1 \) does).

  - The division of surplus is independent of ownership structure.
Return on Investment

- Key assumption is that marginal return on investment is increasing in how many assets in the relationship the investor has access to.

- For $M1$:

$$ R'(i) > r'(i, \{a1, a2\}) \geq r'(i, \{a1\}) \geq r'(i, \emptyset), $$

  o where $R', r' > 0; R'', r'' < 0$.

- Similarly, for $M2$:

$$ |C'(e)| > |c'(e, \{a1, a2\})| \geq |c'(e, \{a2\})| \geq |c'(e, \emptyset)|, $$

  o where $C', c' < 0; C'', c'' > 0$. 
First-Best Investment

• If the two parties could coordinate their investment decisions, they would reach a solution that maximizes the total surplus:

$$R(i) - i - C(e) - e.$$  

• Denoting the first-best solution by \((i^*, e^*)\), we get:

$$R'(i^*) = 1,$$

$$|C'(e^*)| = 1.$$  

• Yet, the parties are not able to coordinate or write a contract on their investment levels. These are observable but not verifiable.
Investment Choice

- *M1* and *M2* choose their investments non-cooperatively, each one maximizing his expected utility, taking the other’s investment as given (Nash Equilibrium).

- *M1* chooses $i$ to maximize:

  \[ \pi_1 - i = -\bar{p} + \frac{1}{2} \left( r(i, A) + R(i) - C(e) + c(e, B) \right) - i, \]

  Leading to the following first-order condition:

  \[ \frac{1}{2} \left( r'(i, A) + R'(i) \right) = 1. \]
• \(M2\) chooses \(e\) to maximize:

\[
\pi_2 - e = \bar{p} - \frac{1}{2} \left( r(i, A) - R(i) + C(e) + c(e, B) \right) - e,
\]

leading to the following first-order condition:

\[
\frac{1}{2} (|c'(e, B)| + |C'(e)|) = 1.
\]

• We can immediately see that the equilibrium levels of \(i\) and \(e\) are below the first-best:

\[
\circ \ r'(i, A) < R'(i) \quad \text{and} \quad |c'(e, B)| < |C'(e)|.
\]
Why We Don’t Achieve First-Best?

• The parties do not internalize the full benefit of the investment.
  
  o When $M1$ invests, the return increases by $R'$.
  
  o However, $M1$ realizes only:
    
    ▪ $r'$: direct benefit.
    
    ▪ $\frac{1}{2} (R' - r')$: share in surplus.
  
  o The sum of $r'$ and $\frac{1}{2} (R' - r')$ is lower than $R'$. This is a reflection of a **hold-up** problem.
The Effect of Ownership

• The ownership structure determines the return a party gets on its investment in the case of no trade.

• Using subscripts 0, 1, and 2, to denote no integration, type-1 integration, and type-2 integration, respectively, we get that:

\[ \begin{align*}
i^* & > i_1 \geq i_0 \geq i_2, \\
e^* & > e_2 \geq e_0 \geq e_1, \end{align*} \]

• Giving ownership to one party increases its investment and reduces the other party’s investment.
Optimal Ownership

- Optimal ownership maximizes the total surplus.

- We choose between:

  \[ S_0 = R(i_0) - i_0 - C(e_0) - e_0, \]
  \[ S_1 = R(i_1) - i_1 - C(e_1) - e_1 \]
  \[ S_2 = R(i_2) - i_2 - C(e_2) - e_2. \]

- We can easily imagine establishing optimal ownership if one party is unique and is offering the reservation utility to the other party.
Implications

- Overall, optimal ownership finds the balance between the effect on $M_1$’s investment and the effect on $M_2$’s investment.
  - In general, transferring ownership from one party to another increases one type of investment and decreases the other.

- If $M_1$’s ($M_2$’s) investment is inelastic, such that he chooses the same investment under all ownership structures, then type-2 (type-1) integration is optimal.
• No point of giving ownership to someone who doesn’t respond to incentives.

• If $M^1$’s ($M^2$’s) investment is relatively unproductive, then type-2 (type-1) integration is optimal.

  o Investment being relatively unproductive can be captured by surplus decreasing to $\theta(R(i) - i)$, and $\theta$ being sufficiently small.

  o No point of giving ownership to someone whose investment is not important.
• If assets $a1$ and $a2$ are independent, $r'(i, \{a1, a2\}) = r'(i, \{a1\})$ and $c'(e, \{a1, a2\}) = c'(e, \{a2\})$, then non-integration is optimal.
  
  o There is no benefit, only cost, from shifting ownership on $a1$ from $M1$ to $M2$.

• If assets $a1$ and $a2$ are strictly complementary, $r'(i, \{a1\}) = r'(i, \{\emptyset\})$ or $c'(e, \{a2\}) = c'(e, \{\emptyset\})$, then some form of integration is optimal.
  
  o Once a party does not control one asset, there is no additional cost, only benefit, from taking the other asset out of his control.
• Complementary assets should be owned by the same party (but not under joint ownership).

• If one party’s human capital is essential, e.g., for $M1$, $c'(e, \{a1, a2\}) = c'(e, \emptyset)$, he should own both assets.

  o No point in giving ownership to a party when the other party is essential for the relationship.

• If both human capitals are essential, all ownership structures are equally good.

  o In this case, no party benefits from ownership without trade.
Hart and Moore (1990): Extending the Property-Rights Theory

- The Grossman-Hart model reviewed above may seem a bit special as it only talks about the incentives of managers/entrepreneurs.
- Hart and Moore (1990) consider broader implications by asking what ownership does to employees’ incentives.
- The identity of the owner of the assets will affect the incentives of employees, who are linked to the assets.
Basic Setup

• The economy consists of a set $S$ of $I$ risk neutral individuals, and a set $A$ of $N$ assets $(a_1, \ldots, a_N)$.

• There are two dates. At date 0, agent $i$ makes a human-capital investment $x_i$ ($x = (x_1, \ldots, x_I)$) At date 1, agents produce and trade.

• The cost of investment is $C_i(x_i)$, where $C'_i(x_i) > 0$ and $C''_i(x_i) > 0$.

• Agents decide on investments non-cooperatively, and then, given investments, gains from trade are determined via bargaining.
Date-1 Coalitions and Surplus

- At date 1, agents can form coalitions to use the assets in their control.

- Coalition $S$ of agents, controlling subset $A$ of assets, generates value of $v(S, A|x)$.

  - Assets controlled by coalition $S$ denoted as $\alpha(S)$.

  - Control means either that an agent in the coalition owns the assets or that agents in the coalition together have majority.
• Value is increasing in assets and agents in the coalition, so optimal value ex-post for a given $x$ is $v(S, A | x) \equiv V(x)$.

• Agents achieve this via negotiation.

• They split the value among them according to Shapley values:

$$B_i(\alpha | x) = \sum_{S | i \in S} p(S) [v(S, \alpha(S) | x) - v(S \{i\}, \alpha(S \{i\}) | x)]$$

○ The logic is to compensate the agent for his marginal contribution to a coalition, and calculate an average across all coalitions.
Here, \( p(S) = \frac{(s-1)!(I-s)!}{I!} \) is the probability of ending up in coalition \( S \) with random ordering.

- \( s \) is the number of agents in coalition \( S \).

\( v(S, \alpha(S)|x) \) is the value achieved by the coalition when agent \( i \) is included, and \( v(S\setminus\{i\}, \alpha(S\setminus\{i\})|x) \) is the value achieved when the agent is excluded.

- From every coalition, the agent gets the difference between the two, which summarizes his marginal contribution.
**Date-0 Investment**

• In Coalition $S$, agent $i$'s marginal return on investment is:

$$\frac{\partial v(S,A|x)}{\partial x_i} = v^i(S,A|x)$$

- $v^i(S, A|x) \geq 0$ and $v^{ii}(S, A|x) \leq 0$. 

- $v^i(S, A|x) = 0$ if $i \notin S$. 

- $\frac{\partial v^i(S,A|x)}{\partial x_j} \geq 0$ for all $j \neq i$.

- $v^i(S, A|x) \geq v^i(S', A'|x)$ for all $S' \subseteq S$ and $A' \subseteq A$. 
Social Optimum

• The first-best solution maximizes surplus assuming that the grand coalition $\mathcal{S}$ will form:

$$\max_x W(x) \equiv V(x) - \sum_{i=1}^{I} C_i(x_i)$$

• Hence, the first order condition for all $i$ characterizing the first best $x^*$ is:

$$v^i(S, A|x^*) = C'_i(x_i).$$
Investment in a Non-Cooperative Equilibrium

- Agent $i$ chooses investment to maximize the difference between his return (based on Shapley value) and cost. This yields the following first-order condition given the equilibrium behavior of others $x^e(\alpha)$:

$$\frac{\partial B_i(\alpha|x)}{\partial x_i} = \sum_{S|i \in S} p(S)v^i(S, \alpha(S)|x^e(\alpha)) = c'_i(x^e_i(\alpha))$$

- The right-hand side is clearly below $v^i(S,A|x)$ for a given $x$, and this reflects under-investment.
• Based on this observation, Hart and Moore show that the equilibrium vector of efforts will exhibit under-investment.

• The intuition is similar to that in Grossman and Hart (1986):
  
  o When deciding on his level of investment, an individual doesn’t consider the full benefit, but rather only what additional benefit the investment will give him in the bargaining process.
  
  o Hence he ignores the externality and ends up under-investing.

• Ownership affects what agents internalize and how much they invest.
Optimal Ownership: Some Results

- When only one agent makes investment, he should own all assets.
  - As in Grossman and Hart (1986), shifting ownership from one agent to another decreases the investment of the first and increases the investment of the other.
    - An agent’s incentive to invest is affected by the assets controlled by coalitions he is part of.
  - When only one agent is investing there is no tradeoff.
• For any coalition of agents, an asset should be owned by the coalition or its complement.
  
  o Since incentive to invest comes from assets owned by a coalition, there is waste in leaving an asset ‘not owned’.
  
  o A direct implication is that not more than one agent should have veto power over an asset.

  ▪ Otherwise, if two agents are not in the same coalition and they share control, the asset is not owned by the coalition or its complement.
• If an agent is *indispensable* to an asset, then he should own it.

  o The definition is that without agent $i$ in the coalition, the asset has no effect on the marginal product of investment for the other members of the coalition:

  \[ v^j(S, A) = v^j(S, A\{a_n\}) \text{ if } i \notin S. \]

  o The asset encourages investment only when it is owned by a coalition that has agent $i$. To maximize such coalitions, we let the agent own the asset.

  o This shows the effect of ownership on the investments of others.
• If an agent is *dispensable* and makes no investment, he should not have any control rights.

  o The definition is that other agents’ marginal product from investment is unaffected by whether the agent is in the coalition or not:

\[
v^j (S, A) = v^j (S \setminus \{k\}, A) \text{ if } j \in S, j \neq k
\]

  o Reducing the agent’s ownership will not reduce others’ investments by the above definition.

  o The agent himself is not investing.
• Complementary assets should always be controlled together.

  o Definition is that the two assets are unproductive unless they are used together:

\[ v^i(S, A\{a_m\}) = v^i(S, A\{a_n\}) = v^i(S, A\{a_m, a_n\}) \text{ if } i \in S. \]

  o The idea is that by grouping the two assets in the same ownership, we make sure that in all coalitions with one asset, the other one will be as well.

  o Otherwise, there is waste, since each asset makes a contribution only with the other one on board.
Clarifying the Role of Employees: Example

- Suppose that there are two assets $a_1$ and $a_2$.

- Each asset has a big worker (potentially employer) and a small worker (employee).
  - Big workers are denoted as $m_1$, $m_2$, and small ones as $w_1$, $w_2$.

- Suppose that small workers are only productive if they work with the assets they are linked to. We ignore synergies across workers.

- We will study the effect of ownership on small workers’ incentives.
• Suppose that we consider two ownership structures: non-integration ($m_1$ controls $a_1$ and $m_2$ controls $a_2$) and type-1 integration ($m_1$ controls $a_1$ and $a_2$).

• The FOC for $w_1$ under non-integration is:

$$\frac{1}{3}v^{w_1}(\{m_1, m_2\}, \{a_1, a_2\}) + \frac{1}{6}v^{w_1}(\{m_1\}, \{a_1\}) = C'_{w_1}(x^e_{w_1})$$

While under integration it is:

$$\frac{1}{3}v^{w_1}(\{m_1, m_2\}, \{a_1, a_2\}) + \frac{1}{6}v^{w_1}(\{m_1\}, \{a_1, a_2\}) = C'_{w_1}(x^e_{w_1})$$

Recall that $w_1$ cares only about coalition with $a_1$. 
• The FOC for $w_2$ under non-integration is:

$$\frac{1}{3}v^{w_2}({m_1, m_2}, \{a_1, a_2\}) + \frac{1}{6}v^{w_2}({m_2}, \{a_2\}) = C'_{w_2}(x_{w_2}^e)$$

While under integration it is:

$$\frac{1}{3}v^{w_2}({m_1, m_2}, \{a_1, a_2\}) + \frac{1}{6}v^{w_2}({m_1}, \{a_1, a_2\}) = C'_{w_2}(x_{w_2}^e)$$

• Comparison:

  o Type-1 integration is good for $w_1$, while for $w_2$ the effect is ambiguous.
For $w_1$, the productivity of investment is determined only by coalitions with $a_1$, which is controlled by $m_1$. When $m_1$ also controls $a_2$, $w_1$ is getting a boost to productivity when matched with $m_1$.

- This effect represents better **coordination**.

For $w_2$, the better coordination is also present under integration, since whenever he is matched with $a_2$ he gets a boost to productivity from the presence of $a_1$.

- But, $w_2$ is losing some connection to $m_2$, which might be costly.
Internal Capital Markets

• A different angle on the question of the boundaries of the firm comes from analyzing the optimality of **internal capital markets**.

• Internal capital markets develop when a firm has multiple divisions, potentially in different industries, and transfers resources across divisions. This is what happens in conglomerates.

• The question is what is the benefit from putting various (potentially unrelated) divisions under the same ownership.
Stein (1997)

- Stein (1997) develops a model, where divisions are constrained in their ability to raise external financing for their projects due to an agency problem.

- Having an internal capital market can help mitigating the problem, as the headquarters can raise the financing and allocate them more efficiently across divisions.

- Stein analyzes when this is optimal and sheds light on the trade-offs in choosing the size and scope of the internal capital market.
Basic Setup

- A project started by a *founder* requires a *manager* and a *financier*.
- The amount of investment in the project can be 1 or 2.
- There are two states of the world $B$ and $G$.
- In state $B$, investment of 1 yields $y_1$, and investment of 2 yields $y_2$, where:

  $$1 < y_1 < y_2 < 2.$$ 

  Hence, in this state, the optimal investment is 1.
• In state $G$, investment of 1 yields $\theta y_1$, and investment of 2 yields $\theta y_2$, where $\theta > 1$, and:

$$\theta(y_2 - y_1) > 1.$$ 

Hence, in this state, the optimal investment is 2.

• The ex-ante probability of state $G$ ($B$) is $p$ ($1-p$).

• The realization is known only to managers, but there is a problem with their incentive to tell the truth as they also receive a non-verifiable private benefit, which is a proportion $s$ of gross return.
Credit Rationing

- Eliciting information from managers will be costly when $s$ is sufficiently large. Then, financiers and founders will have to make decisions without knowing the realization.

- If the amount financed is 1, the expected return is

  \[(p\theta + (1 - p))y_1 - 1.\]

- If the amount financed is 2, the expected return is

  \[(p\theta + (1 - p))y_2 - 2.\]
• Then, when $p$ is sufficiently small, investing 1 is more desirable, and this creates **credit rationing**:
  
  o Credit is rationed in good states of the world because of the lack of ability to convey information.

• As a side, note that compensation contracts could be designed to elicit information.

• However, the cost of eliciting information is $(1 - p)s(y_2 - y_1)$, while the benefit is $p(\theta(y_2 - y_1) - 1)$, and hence this is not desirable when $s$ is sufficiently large.
Corporate Headquarters and the Internal Capital Market

- Suppose that a few projects are grouped together and headquarters raises financing. A few assumptions about corporate headquarters:
  - It can acquire information about projects’ prospects.
  - It has no financial resources of its own.
  - It can capture a fraction $\phi$ of private benefits at the cost of diluting incentives, so that cash flows fall by a fraction $k < 1$.
  - It has the authority to redistribute resources across projects.
The Role of Headquarters in a Two-Project Example

- There is no role for headquarters with only one project.
  - There will be reduction in cash flows due to reduced incentives, and no better information revelation since headquarters have the incentives of managers to misreport.

- Suppose there are two uncorrelated projects as described above.

- Suppose that headquarters can perfectly tell their states.

- Suppose that the overall credit constraint is not eased, so that headquarters can raise only 2 for the two projects.
• The potential benefit from the headquarters is its ability to reallocate resources from a project in a bad state to a project in a good state. This is beneficial as long as:

\[ \theta(y_2 - y_1) > y_1 \]

• Headquarters will have an incentive to do this to maximize private benefits.

• Additional efficiency comes from the headquarters’ broader span of control which allows it to derive private benefits from several projects simultaneously.
• Summarizing the trade off:

  o The expected net output under external market is:

    \[ EM = 2(y_1 (p\theta + (1 - p)) - 1) \]

  o The expected net output under internal market is:

    \[ IM = 2(1 - p)^2 ky_1 + 2p^2 k\theta y_1 + 2p(1 - p)k\theta y_2 - 2 \]

  o By moving to an internal capital market, we sacrifice efficiency at a factor of \( k \), but in situations where the projects are in different states, we get better allocation of resources.
Noisy Information and Scope

• A question that often comes up is what is the optimal scope of an internal capital market: How correlated the different divisions should be.

• Stein provides an argument for focus:
  
  o When information is noisy, headquarters might make mistakes in allocating resources.

  o When the projects are close to each other, noise tends to be correlated, and then relative rankings are not harmed.
Adjusting the Assumptions

• For each project, headquarters observes information that is either $H$ (high) or $L$ (low).

• The informativeness of the signal is captured by $q$:

\[
prob(H^i/G^i) = prob(L^i/B^i) = q, \text{ where } 1/2 < q < 1.
\]

• A false low (high) signal in one project makes a false low (high) signal in the other project more likely. This is captured by the parameter $\alpha$ which summarizes the degree of correlation:
\[
prob(L^i/G^i, G^j, L^j) = (1 - q)(1 + \alpha) > \prob(L^i/G^i) = (1 - q)
\]
\[
prob(H^i/B^i, B^j, H^j) = (1 - q)(1 + \alpha) > \prob(H^i/B^i) = (1 - q)
\]

- Note that the probability of observing a false (low) signal in what project does not change the probability of observing a false (high) signal in the other project.

- Now, there are 16 possible realizations (2 signals and 2 states for each project).

- Payoffs and probabilities are shown in the following table:
<table>
<thead>
<tr>
<th>Outcome/Signal Configuration</th>
<th>Probability</th>
<th>Payoff: External Market</th>
<th>Payoff: Internal Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GGGH</td>
<td>( p^2(q^2 + \alpha(1 - q)^2) )</td>
<td>( 2\theta y_1 )</td>
<td>( 2\theta y_1 )</td>
</tr>
<tr>
<td>2. GBHH</td>
<td>( p(1 - p)q(1 - q) )</td>
<td>( y_1(1 + \theta) )</td>
<td>( y_1(1 + \theta) )</td>
</tr>
<tr>
<td>3. BGIII</td>
<td>( (1 - p)p(1 - q)q )</td>
<td>( y_1(1 + \theta) )</td>
<td>( y_1(1 + \theta) )</td>
</tr>
<tr>
<td>4. BBIII</td>
<td>( (1 - p)^2(1 - q)^2(1 + \alpha) )</td>
<td>( 2y_1 )</td>
<td>( 2y_1 )</td>
</tr>
<tr>
<td>5. GGIIL</td>
<td>( p^2(q(1 - q) - \alpha(1 - q)^2) )</td>
<td>( 2\theta y_1 )</td>
<td>( \theta y_2 )</td>
</tr>
<tr>
<td>6. GBHL</td>
<td>( p(1 - p)q^2 )</td>
<td>( y_1(1 + \theta) )</td>
<td>( \theta y_2 )</td>
</tr>
<tr>
<td>7. BGHL</td>
<td>( (1 - p)p(1 - q)^2 )</td>
<td>( y_1(1 + \theta) )</td>
<td>( y_2 )</td>
</tr>
<tr>
<td>8. BBHL</td>
<td>( (1 - p)^2(q(1 - q) - \alpha(1 - q)^2) )</td>
<td>( 2y_1 )</td>
<td>( y_2 )</td>
</tr>
<tr>
<td>9. GGLH</td>
<td>( p^2(q(1 - q) - \alpha(1 - q)^2) )</td>
<td>( 2\theta y_1 )</td>
<td>( \theta y_2 )</td>
</tr>
<tr>
<td>10. CBLH</td>
<td>( p(1 - p)(1 - q)^2 )</td>
<td>( y_1(1 + \theta) )</td>
<td>( y_2 )</td>
</tr>
<tr>
<td>11. BGLH</td>
<td>( (1 - p)pq^2 )</td>
<td>( y_1(1 + \theta) )</td>
<td>( \theta y_2 )</td>
</tr>
<tr>
<td>12. BBLII</td>
<td>( (1 - p)^2(q(1 - q) - \alpha(1 - q)^2) )</td>
<td>( 2y_1 )</td>
<td>( y_2 )</td>
</tr>
<tr>
<td>13. GGLL</td>
<td>( p^2(1 - q)^2(1 + \alpha) )</td>
<td>( 2\theta y_1 )</td>
<td>( 2\theta y_1 )</td>
</tr>
<tr>
<td>14. GBLLL</td>
<td>( p(1 - p)(1 - q)q )</td>
<td>( y_1(1 + \theta) )</td>
<td>( y_1(1 + \theta) )</td>
</tr>
<tr>
<td>15. BGLL</td>
<td>( (1 - p)pq(1 - q) )</td>
<td>( y_1(1 + \theta) )</td>
<td>( y_1(1 + \theta) )</td>
</tr>
<tr>
<td>16. RBLIL</td>
<td>( (1 - p)^2(q^2 + \alpha(1 - q)^2) )</td>
<td>( 2y_1 )</td>
<td>( 2y_1 )</td>
</tr>
</tbody>
</table>
• The result is that the benefit from an internal capital market increases in the degree of focus $\alpha$ and that this effect strengthens when $q$ is smaller.

• The intuition comes from the fact that increasing focus increases the likelihood of configurations like GGHH and BBHH, and lowers the likelihood of configurations like GGHL and BBHL.

• This is good because there is no harm in a configuration like BBHH, as it causes no adverse implications for resource allocation. On the other hand, there is harm in configurations like GGHL and BBHL.