

Difference in Corporate Governance Regimes and the Welfare Consequence of International Competition

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1 Introduction

Much of the research has studied on the cause of the Japan's economic depression since 1990s. This paper aims at another explanation for it and argues the corporate governance of Japanese firms as much studies has ever done.

When corporate governance comes into question, it is likely that its financial aspect is focused¹. However, in the present paper, I analyze other economic consequence affected by the difference in corporate governance practices. It is commonly understood that the practice of corporate governance is stakeholder oriented in Japan, and I investigate the implication of it for the dynamic market structure where Japanese firms operate². In particular, I pick up the decision to merge of Japanese firms. In the present paper, the slump of the Japan's economy corresponds to the low profitability of Japanese firms, which is due to the price cutting competition by multiple firms in one common market. M&A could be one resolution to restore profits. But Japanese stakeholder oriented governance practice tends to prevent the firms from merge into one.

However, such a pro-stakeholder practice could not always harm Japanese firms and the world economy. First, the difficulty of M&A and dissolution works as a commitment device for the Japanese firms to drive out rivals

¹For example, Matsuyama(2005).

²Allen, Carletti and Marquez (2009) is a secure exception, which analyze a product market consequence of alternative corporate governance regimes consciously imaging Japanese firms, while it models Japanese firms in quite a different way from the present paper and has a contrasting result to this paper. Saint-Paul (2002), which focused on the employment protection, has yielded a somewhat similar result concernig the world wide impact of presence of firms like Japanese ones

without such a difficulty. It is shown that the competition between the firms with pro-stakeholder governance and pro-stockholder one is similar to the Hawk-Dove game and the Japanese firms behave as a Hawk. When the Japanese firms are minor in market, they can perform better than the other firms with pro-stockholder governance. As the share of the Japanese firms grows, however, a war of attrition among the Japanese firms harm them. Second, prevailing of the Japanese firms has two opposite effects on the welfare of world consumers. A war of attrition by the Japanese firms can lead production prices close to their marginal costs and mitigate the distortion of resource allocation. On the other hand, the difficulty of M&A means that some resource are wasted which can be saved as a common expenses when merger. When the operation of a firm requires relatively large fixed cost, the latter harmful effect exceed the former positive one.

2 Model

The world consists of two countries, A and J . Each country has a constant volume of human capital H_k ($k = A, J$), which could be devoted to the R&D activity. In addition the world is endowed with a constant volume of labor force L engaged in direct production. How L is shared between the two countries is irrelevant due to the assumption described later.

2.1 Preferences and technology

Time is continuous and all three types of consumers have the same preference represented by

$$U = \int_0^{+\infty} e^{-\rho t} u(C_t) dt, \quad (1)$$

where C_t is instantaneous consumption of unique final good of the economy. The final good is produced competitively with the production function

$$Y_t = \frac{L_t^{1-\alpha}}{\alpha} \int_0^1 x_t(v)^\alpha dv, \quad (2)$$

where L_t is the aggregate labor input and $x_t(v)$ is the total amount of intermediate input of variety v used at each instant of time t . The number of intermediate varieties potentially and commonly demanded by the final good producers at each instant of time is fixed to one and at each time there could be some varieties not available due to the lack of their blueprints for production. The blueprints of intermediate goods are invented by

R&D activities executed in both country A and J , while the composition of demanded varieties gradually changes throughout time as formulated later. At each time, by R&D some varieties come to be available. However gradual changes of the composition implies that varieties to be targeted by R&D are constantly generated at each time and the number of intermediate goods available for the final producers can never reach to one. At each time there exist such varieties that $x_t(v)$ have to amounts to 0.

Once invented, Intermediate goods are produced using the final good as its variable input with one for one technology. We assume that both final and intermediate outputs are completely tradable between the two countries. Therefore the marginal cost of each intermediate good equals to the common price of the final good, and sharing a same constant returns to scale technology for final good, in equilibrium, factor price equalization holds for the wage of production workers of both countries. This is the reason why the share of production workers between the two countries is irrelevant for our analysis. Since (2) exhibits constant returns to scale and final good producers are competitive, the demand for each variety v is obtained by maximizing net aggregate profits of the final good sector with $L_t = L$. With the price of the final good at each time fixed to unity as numeraire, the first order condition yields the following isoelastic demand function:

$$x_t^D(v) = p_t(v)^{-1/(1-\alpha)} L, \quad (3)$$

where $p_t(v)$ is the price of intermediate good v at time t .

In each country, R&D is performed by the human capital. Throughout it is assumed that there is free entry into research. And we assume that any individual or firm can employ one unit of the human capital at time t to generate a flow rate one of new blueprints. At each instant of time, R&D is being done with the aim of acquiring monopolistic profit from the varieties not yet available then. However R&D is uncertain activity and in some cases innovators invent a new intermediate good with the same attribute as the one another innovator has already invented. For simplicity we assume that the possibility that an invented blueprint is for a particular variety in the composition is completely equal among the composition. It does not depend on in which country precedent blueprints are invented. Since the measure of the composition is unity, this implies that employing one unit of the human capital at time t yields a flow rate one of new blueprints for a particular variety v in the composition.

Furthermore we assume that at any instant of time an existing variety in the composition becomes needless with flow probability δ and replaced by

another variety. This probability does not depend on whether the variety is available or not at that time.

When an innovator has successfully invented a variety not available until then, she starts as a monopolist. Since (3) is isoelastic, any monopolist v charge a same price equal to a markup over the marginal cost of production by α^{-1} :

$$p_t(v) = \alpha^{-1}. \quad (4)$$

In addition, we assume that the operation of intermediate production requires each firm a fixed amount of human capital input, f and that human capital is not tradable and the blueprint invented in a country has to employ the human capital of same country. Therefore the profit attained by a monopolistic producer of a particular variety in each country is given by

$$\pi = (1 - \alpha)a^{\alpha/(1-\alpha)}L - w_k f, \quad k = A, J. \quad (5)$$

where w_k stands for the wage of human capital in each country.

When there are multiple firms producing a same variety, Bertrand competition pulls down equilibrium price to the marginal cost of production. While gaining nothing by operation, these firms have to bear the fixed costs as long as continuing operation. Therefore profits of such firms are negative.

$$\pi = -w_k f, \quad k = A, J. \quad (6)$$

2.2 Corporate governance

Originally, facing to negative profit induces firms to exit from the industry. Or otherwise, in this case, merger is a Pareto improving resolution for the firms suffering from negative profits. However exit and M&A in themselves could be costly. Powerful stakeholders may prevent them and in some cases the firms which dare to do might have to incur public blame. After all availability of such resolution depends on the actual arrangement of institutions for corporate governance in each country. And we assume that country A and J are on contrastive positions.

Firms in country A can freely exit and merge in terms of profit. This implies that the corporate governance of the country A is rather pro-stockholder. In the following analysis A firms always behave as a pure profit maximizer. In contrast, firms in country J neither merge nor exit.

When multiple A firms (and no J firms) are on a same variety, they would immediately merge to a single monopolistic firm. And when a variety has both A and J firms, then J firms can not merge with A firms no matter

how A firms hope so. A firms immediately exit from the industry to keep away from negative profit forced by Bertrand competition. When multiple J firms are on a same variety, they can not merge to one and must suffer from negative profit. We assume that negative profit will continue until the variety becomes out-of-date. This implies that it is when the industry itself disappears that stockholders of J firms can dissolve their firms.

In accordance with the above arguments, we can conclude that in any equilibrium each industry is in one of the following four situations.

A Only a single A firm is operating.

J Only a single J firm is operating.

JJ Multiple J firms are operating.

ϕ not yet invented.

We let n_{At} , n_{Jt} , n_{JJt} and n_ϕ denote the number of varieties which are in each situation respectively. We obtain

$$n_{At} + n_{Jt} + n_{JJt} + n_\phi = 1 \quad (7)$$

In the case of A and J , instantaneous profit of monopolist is

$$\pi_{kt} = \hat{\pi} - fw_k, \quad k = A, J \quad (8)$$

where $\hat{\pi} = (1 - \alpha)\alpha^{\alpha/(1-\alpha)}$. On the other hand, in industry JJ , multiple firms compete with each other and Bertrand competition leads the price to the marginal cost. The profit in industry JJ is

$$\pi_{JJt} = -fw_J \leq 0 \quad (9)$$

2.3 Value functions

Next we specify the value functions of firms in each situations. First we let z_{At} and z_{Jt} represent the total amount of human capital devoted to research in each country at time t . Then note that a new blueprint for a particular variety generates with flow probability $z_{At} + z_{Jt}$ at time t .

Letting v_{At} denote the stock market value of a monopolistic A firm at time t , the net present value of expected profits of monopolistic A firm at time t can be written as

$$r_t v_{At} = \pi_{At} + \dot{v}_{At} - (\delta + z_{Jt} + z_{At}/2)v_{At}. \quad (10)$$

When a new comer from the country J arrived (with flow probability z_{Jt}), existing A firm would quit. In the case of new comer from the country A , the two A firms immediately merge to a single monopoly and shareholders of existing A firm can take half of the stock value of new single monopolist. In addition, with flow probability δ , the product itself becomes out-of-date and the firm's value falls to 0.

The value of single J firm is given by

$$r_t v_{Jt} = \pi_{Jt} + \dot{v}_{Jt} - \delta v_{Jt} - z_{Jt}(v_{Jt} - v_{JJt}), \quad (11)$$

where v_t^{JJ} stands for the stock market value of JJ firms. Similar as A firm, with flow probability δ , the value falls to 0. A new comer from A can not affect the situation of existing J monopolist since the new A firm immediately exits from the industry in expectation of negative profit forced by Bertrand competition. In the case of a new J innovator, the situation of the industry turns to JJ and existing J firm suffers from associated capital loss of $v_{Jt} - v_{JJt}$.

The value of JJ firms are simply represented by

$$r_t v_{JJt} = \pi_{JJt} + \dot{v}_{JJt} - \delta v_{JJt} \quad (12)$$

New comers can not affect the situation of this industry whether from A or J . A firms immediately quit and an additional J competitor never changes equilibrium outcome of the Bertrand competition. Ultimately a compositional change in the demanded goods by users finishes this situation and releases them from a war of attrition.

2.4 Transition equations

Given the volume of the human capital devoted to the research activities in each countries, the number of industries in each situation evolves in accordance with the following transition equations. First, the number of varieties not yet invented transits by

$$\dot{n}_{\phi t} = \delta(1 - n_{\phi t}) - (z_A + z_J)n_{\phi t}. \quad (13)$$

The transition of n_{At} is described as

$$\dot{n}_{At} = z_{At}n_{\phi t} - (z_{Jt} + \delta)n_{At}. \quad (14)$$

Next defining $\mu_{Jt} \equiv n_{Jt} + n_{JJt}$, μ_{Jt} evolves by

$$\dot{\mu}_{Jt} = z_{Jt}(1 - \mu_{Jt}) - \delta\mu_{Jt}. \quad (15)$$

Using μ_{Jt} , the transition of n_{Jt} is given by

$$\dot{n}_{Jt} = z_{Jt}(1 - \mu_{Jt}) - (z_{Jt} + \delta)n_{Jt}. \quad (16)$$

Finally, letting m_{Jt} denote the number of J firms operating at time t , its change is simply described by

$$\dot{m}_{Jt} = z_{Jt} - \delta m_{Jt}. \quad (17)$$

3 Equilibrium

Next we characterize equilibrium conditions of the economy.

3.1 Human capital market

Human capitals of each country is used as either research inputs to produce new blueprints or fixed inputs for the operation of existing firms. We obtain

$$z_{At} + f m_{At} = H_A, \quad (18)$$

$$z_{Jt} + f m_{Jt} = H_J, \quad (19)$$

where m_{At} denote the number of A firms operating at time t . Note that since A firms exist just as monopolists of their industries, the number of A firms equals to the number of industries monopolized by them, that is $m_{At} = n_{At}$.

In steady state equilibrium, each country realizes positive measure of research activity, $z_k > 0$. When $z_k = 0$, in accordance with the transition equations, m_k converges to 0 in steady state. This implies that demand for human capital as the fixed inputs of operating firms also falls to 0. This obviously breaks the labor market condition. We have already assumed a free entry into the research in both countries. And positive volume of research in equilibrium requires that the following no-arbitrage conditions hold for each country,

$$(n_{\phi t} + n_{At}/2) v_{At} = w_{At}, \quad (20)$$

$$(1 - \mu_{Jt}) v_{Jt} + \mu_{Jt} v_{JJt} = w_{Jt}. \quad (21)$$

3.2 Steady state

By setting $\dot{n}_{\phi t} = \dot{n}_{At} = \dot{\mu}_{Jt} = \dot{n}_{Jt} = \dot{m}_{Jt} = 0$, we recursively obtain steady state numbers of them given that the research volumes z_A and z_J are constantly predetermined.

$$n_{\phi} = \frac{\delta}{z_A + z_J + \delta}, \quad (22)$$

$$n_A = m_A = \frac{z_A}{z_J + \delta} n_{\phi} = \frac{z_A \delta}{(z_A + z_J + \delta)(z_J + \delta)}, \quad (23)$$

$$\mu_J = \frac{z_J}{z_J + \delta} \quad (24)$$

$$n_J = \frac{z_J}{z_J + \delta} (1 - \mu_J) = \frac{z_J \delta}{(z_J + \delta)^2} \quad (25)$$

$$n_{JJ} = \mu_J - n_J = \left(\frac{z_J}{z_J + \delta} \right)^2 = \mu_J^2 \quad (26)$$

$$m_J = \frac{z_J}{\delta} \quad (27)$$

Steady state volumes of research activities in each country are obtained by substituting m_A and m_J into (18) and (19).

$$z_A + f m_A = \left(1 + \frac{f n_{\phi}}{z_J + \delta} \right) z_A = H_A, \quad (28)$$

$$z_J + f m_J = (1 + f/\delta) z_J = H_J. \quad (29)$$

We let z_A^* and z_J^* denote respectively such z_A and z_J that satisfy (28) and (29). And substituting z_A^* and z_J^* into (22)-(27) complete steady state values denoted by $n_{\phi}^*, n_A^*, m_A^*, \mu_J^*, n_J^*, n_{JJ}^*$ and m_J^* are obtained. Furthermore by substituting z_A^* and z_J^* into (10), (11) and (12) and letting $\dot{v}_{At} = \dot{v}_{Jt} = \dot{v}_{JJt} = 0$, we obtain the following expressions concerning steady state value equations,

$$v_A = \frac{\hat{\pi}(\alpha) - f w_A}{r + \delta + z_J^* + z_A^*/2},$$

$$v_{JJ} = -\frac{f w_J}{\delta},$$

$$v_J - v_{JJ} = \frac{\hat{\pi}(\alpha)}{r + \delta + z_J^*}.$$

Applying these three expressions, no-arbitrage conditions in a steady state determine the associated equilibrium wages of human capital of both countries, which are the solution of,

$$w_A^* = (n_\phi^* + n_A^*/2) \frac{\hat{\pi}(\alpha) - fw_A^*}{r + \delta + z_J^* + z_A^*/2}$$

and

$$w_J^* = (1 - \mu_J^*) \frac{\pi}{r + \delta + z_J^*} - \frac{fw_J^*}{r + \delta}$$

4 Comparative statics

A steady state equilibrium is recursively described from human capital market conditions for each country. And total differentials of them yields

$$\left[1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*} \right) \frac{z_A^* f}{z_J^* + \delta} \right] dz_A^* + \left(\frac{\partial n_\phi^*}{\partial z_J^*} - \frac{n_\phi^*}{z_J^* + \delta} \right) \frac{z_A^* f}{z_J^* + \delta} dz_J^* = dH_A \quad (30)$$

and

$$(1 + f/\delta) dz_J^* = dH_J. \quad (31)$$

In the following analysis, we restrict total number of human capital, which is $H_A + H_J$ to \bar{H} over time. Therefore comparative statics concerning dH_J has to be followed by $dH_A = -dH_J$. From (30) and (31), we have

$$\frac{dz^*}{dH_A} = \frac{dz_A}{dH_A} = \frac{1}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*} \right) \frac{z_A^* f}{z_J^* + \delta}}$$

and

$$\frac{dz^*}{dH_J} = \frac{dz_A^*}{dH_J} + \frac{dz_J^*}{dH_J} = \frac{1}{1 + f/\delta} \left[1 - \frac{\left(\frac{\partial n_\phi^*}{\partial z_J^*} - \frac{n_\phi^*}{z_J^* + \delta} \right) \frac{z_A^* f}{z_J^* + \delta}}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*} \right) \frac{z_A^* f}{z_J^* + \delta}} \right].$$

When restricting $dH_A = -dH_J$, finally we obtain

$$\begin{aligned}
\frac{dz}{dH_J} &= \frac{1}{1+f/\delta} \left[1 - \frac{\left(\frac{\partial n_\phi^*}{\partial z_J^*} - \frac{n_\phi^*}{z_J^* + \delta}\right) \frac{z_A^* f}{z_J^* + \delta}}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*}\right) \frac{z_A^* f}{z_J^* + \delta}} \right] - \frac{1}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*}\right) \frac{z_A^* f}{z_J^* + \delta}} \\
&= \frac{1}{1+f/\delta} \frac{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*}\right) \frac{z_A^* f}{z_J^* + \delta} - \left(\frac{\partial n_\phi^*}{\partial z_J^*} - \frac{n_\phi^*}{z_J^* + \delta}\right) \frac{z_A^* f}{z_J^* + \delta} - (1+f/\delta)}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*}\right) \frac{z_A^* f}{z_J^* + \delta}} \\
&= \frac{f}{1+f/\delta} \frac{\left(\frac{n_\phi^*}{z_A^*} + \frac{n_\phi^*}{z_J^* + \delta}\right) \frac{z_A^* f}{z_J^* + \delta} - 1/\delta}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*}\right) \frac{z_A^* f}{z_J^* + \delta}} = -\frac{f/\delta}{1+f/\delta} \frac{1 - \frac{\delta^2}{(z_J^* + \delta)^2}}{1 + \left(\frac{\partial n_\phi^*}{\partial z_A^*} + \frac{n_\phi^*}{z_A^*}\right) \frac{z_A^* f}{z_J^* + \delta}} \\
&= -\frac{f/\delta}{1+f/\delta} \frac{1 - \left(n_\phi^* + n_A^*\right)^2}{1 + n_\phi^{*2} f/\delta} < 0
\end{aligned}$$

Proposition 1 *In steady state, when the country J 's share of human capital, H_J/\bar{H} rises, total human capital devoted to research in the world, $z^* \equiv z_A^* + z_J^*$ decreases.*

Next we will investigate how changes in human capital share affect the real wages of each resource. A straightforward result is obtained concerning w_J^* .

Proposition 2 *A steady state equilibrium wage of the country J 's human capital w_J^* is monotone decreasing in H_J/\bar{H} .*

Regarding to w_A^* , the effect of the changes in H_J/\bar{H} is ambiguous. There are two opposite effects. With a rise of H_J/\bar{H} , accompanied with the corresponding fall of H_A/\bar{H} , the equilibrium n_A^* declines. From Proposition 1, however, the number of not yet invented varieties increases. This is because as the country J becomes relatively larger, quite a few number of human capital is devoted to operational fixed inputs in equilibrium. Concerning the relative wage of human capital w_J^*/w_A^* , we have the following results.

Proposition 3 *When $H_J/\bar{H} \rightarrow 0$, $w_J^* > w_A^*$ and when $H_J/\bar{H} \rightarrow 1$, then $w_J^* < w_A^*$.*

When the share of J firms is small, J firms seldom meet each other while always drive out A firms from business. When the share becomes large, A firms have an advantage of being free from unprofitable competition.

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