The Determinants and Effect of the Incentive Intensity: Empirical Evidence from Japan

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Abstract

This study examines various determinants of incentive intensity and the moderating effect of risk aversion on the relationship between incentive intensity and organisational performance. Prior studies have reported mixed results concerning the determinants of incentive intensity, and few studies have examined the moderation effect. We analysed empirical data from a cross-sectional survey of 600 Japanese organisations that manage foreign subsidiaries. The principal and agency structure can be seen in both participants (HQ and a foreign subsidiary) with the agency problem. The first determinant is environmental uncertainty, which is investigated in two types of uncertainties: market and general business environmental uncertainties. The findings suggest that general business environmental uncertainty is negatively associated with incentive intensity, but the negative effect of market environmental uncertainty on it depends on the prospect of incremental profits. The rest of the determinants are derived from the incentive intensity principle, including some features of management accounting systems. In this study, the effects of the determinants are supported as expected in principle. In particular, the incentive intensity is influenced by the prospect of incremental profits, an agent's risk preference, and their responsiveness to incentives. As for the moderation effect, the positive effect of the incentive intensity on the performance is decreased by an agent's risk aversion. Our empirical results explain mixed evidence in previous studies and are consistent with the agency theory.

Keywords: Incentive intensity, Environmental uncertainty, Risk preference, Foreign subsidiary management, Survey

JEL: M40, M41, J33   **SDG:** SDG8, Target 8.2

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1. Introduction

Agency theory presents a principal-agent structure as a principal delegates works and responsibilities to an agent (Eisenhardt, 1989; Jensen & Meckling, 1976; Milgrom & Roberts, 1992). At the same time, the principal will suffer from an agency problem associated with the characteristics of the participants (principal and agent). First, the agency problem often arises from incongruence or conflict in the participants' goals. The goal conflict is based on the economic assumption that the principal and agent tend to pursue their interests to maximise their utilities (Jensen & Meckling, 1976). Second, this structure makes the principal facing difficulty in monitoring or verifying the agent's effort, which allows the agent to take a covert action (Arrow, 1985; Hölmstrom, 1979). Third, the agent, taking covert actions, is likely to have information that the principal never knows directly, called information asymmetry (Arrow, 1985; Hölmstrom, 1979; Gomez-Mejia & Balkin, 1992).

The design of an incentive system in the principal and agency structure has been considered important for effectively overcoming the agency problem (Jensen & Meckling, 1976). The fundamental objective of incentive schemes, such as incentive-based compensations and pay for performance, is to ensure that agents direct their efforts to pursue the organisational goals. The theory in the economics of information (or contract theory) has been devoted to understanding incentives analytically, focusing on tasks, performance measures, periods, and contracts (Lambert, 2007). Some analytical studies (e.g., Budde, 2007: Dater & Gupta, 1994; Dater et al., 2001) have examined the features of advanced management accounting systems (MASs) such as balanced scorecard and activity-based costing because they can provide less noise or rich information (Cooper & Kaplan, 1988, 1998: Kaplan & Norton, 1996, 2000). These studies suggest that appropriate systems designs are expected to help a principal align the prescribed goal with the agent's to reduce the agency problem.

An incentive intensity, the extent to which pay is offered per unit of measured performance, is the most influential factor in payment systems (Milgrom & Roberts, 1992). The prior literature has investigated the factors that determine the intensity. In particular, the research focus has been on environmental uncertainty and the prosperities of performance measures.

The causal relationship between the agent's effort and the outcomes becomes increasingly ambiguous or complex with increased environmental uncertainty. Based on the agency theory (e.g., Milgrom & Roberts, 1992; Prendergast, 2002), when the environmental uncertainty is low, a principal is more likely to know what the agent would do for achieving desired performance. In this case, the principal's monitoring of the agent's effort would lead to the desired outcomes. On the other hand, when the uncertainty is high, the principal has little knowledge about the agent's best practices, decreasing the systems' informativeness. In this case, the principal has difficulty observing or verifying the agent's activities. Therefore, under high uncertainty, principals are more likely to rely on output-based control to motivate the agents to contribute to the organisational objectives (than on their monitoring).

At the same time, such an incentive scheme forces an agent to take a high risk because the outcome of the agent's effort is largely affected by the environmental uncertainty that is out of his/her control. As agents' risk level increases, the principals have to increase the required risk premium (Milgrom & Roberts, 1992). Therefore, when the additive payment for agents' incremental efforts exceeds the marginal profits, the principals should provide the agents with more stable compensation by moderating the incentive intensity to reduce the risk premium paid for them. Thus, the standard agency theory suggests a negative relationship between incentive intensity and environmental uncertainty.

However, according to a comprehensive literature survey by Prendergast (2002), the empirical evidence on executive compensations is remarkably mixed. From the theoretical point of view, the incentive-intensity principle states the optimal incentive intensity depends on the following four factors; (1) the incremental profits created by additional effort, (2) the precision with which the desired activities are assessed, (3) the agent's risk tolerance, and (4) the agent's responsiveness to incentives (Milgrom & Roberts, 1992). The mixed results can be attributed to these factors. Prendergast (2002) indicated that when a principal delegates responsibility to an agent in an uncertain environment, the principal is compelled to base compensation on output to constrain discretion. His argument refers to the potential of the positive relationship between uncertainty and incentive. The delegation increases the responsiveness to incentives because the delegated agent is authorised to autonomously perform what should be done to deal with the uncertain environment. Besides, some management accounting studies have paid attention to precision and responsiveness and investigated the prosperities of performance measures used for determining compensation pay (Bouwens & Lent, 2007; Gibbs et al., 2009). For example, Gibbs et al. (2009) examined the effect of measuring prosperities (noise, controllable risk, distortion, and manipulability) on incentive intensity. The prosperities are as follows. First, risk should be divided into two different concepts on whether it is controllable or not. The controllable risk refers to an environmental uncertainty that agent can respond to using their private information. On the other hand, the uncontrollable risk refers to noise for which agents cannot use their private information. Second, distortion occurs when an agent misallocates a part of his/her effort to tasks that are not supposed to be allocated. Third, the manipulation takes place through gaming by an agent to increase the payment without increasing a firm value. They found that the incentive intensity for explicit incentives decreases in noise, distortion, and manipulation of the measure, in contrast, but increases in controllable risk.

The prosperities of measures are deeply concerned with factors described in the incentive-intensity principle. For example, less noisy performance measures are precise, indicating that any uncontrollable factors for agents do not affect the measured results. However, the prosperities of actions are not the only factors affecting the incentive intensity. For example, the upper limit of investment that the subordinates are allowed to make without prior approval of their superiors determines the range of the subordinates' discretions (Simons, 1995). The more tasks the subordinates are delegated, the more their responsiveness increases. This implies that wider attention to the design and use of Management Accounting Systems (MASs) is needed to improve our understanding of the relationship between the intensity and MASs. Furthermore, the principal will likely determine the intensity level carefully considering the environmental uncertainty and the abovementioned factors. However, there is little empirical evidence on the examination of the effects of these factors at the same time.

As another issue, it is important to clarify the relationship between incentive intensity and performance. While the theory in the economics of information has already proven its effectiveness, the analytical knowledge remains unclear empirically (Ashton, 1990; Bonner et al., 2000; Chong & Eggleton, 2007; Eisenhardt, 1988; Sprinkle, 2000). These indecisive results indicate that more attention needs to be paid to the variables moderating the linkage of incentives with performance. For instance, Bonner et al. (2002) provide a framework for understanding the effects of monetary incentives on individual effort and task performance and indicate the importance of a personal variable (e.g., skill, cognitive style, intrinsic motivation, and risk preferences) as a moderator. This study focuses on agents' risk attitudes, which have been considered in agency theory-based analytical studies but have rarely been a focus of empirical research. Although an organisation determines the optimal incentive intensity based

on the above four factors, it is hard to observe the risk attitudes accurately. Besides, adjusting the incentive intensity individually is highly costly, depending on the difference between agent's tolerance levels (or aversion). Hence, the incentive intensity may not be fully matched by the agent's risk attitude, and this gap will likely produce the moderating effect of risk preferences. However, there is relatively little empirical evidence on the moderating effects of risk attitudes on the relationship between incentive intensity and the outcomes (i.e., the goals and performance desired by principals).

This study aims to examine the factors that determine incentive intensity and the moderating effect of risk aversion on the relationship between incentive intensity and organisational performance. To approach this issue, we collected data from a cross-sectional survey of 659 Japanese organisations that manage foreign subsidiaries. We focused on the incentive intensity for executives of foreign subsidiaries. Thus, we examined the principal-agent structure in the relationship between the HQ (principal) and foreign subsidiary (agent). The main reasons for this selection are as follows. First, the agency problem, which arises from goal incongruence and information asymmetries, is easily facilitated by the distance between the HQ and a foreign subsidiary. The design of incentive systems and the incentive intensity are often critical issues for the HQ's managers (Dossi & Patelli, 2008; Gong, 2003; Roth & O'Donnel, 1996). Second, focusing on the local CEO's nationality can overcome the difficulty in measuring the agent's risk preference. We use one of Hofstede's national culture dimensions, uncertainty avoidance, as a proxy for risk preference. The last comes from a practical issue; as globalisation grows, managing foreign subsidiaries becomes an increasingly important management accounting practice. Recent studies focus on global organisations to understand the characteristics and effects of MASs in organisations that critically suffer from the agency problem (e.g., Busco et al., 2008; Cruz et al., 2011).

The remainder of the paper is organised as follows. Section 2 develops the hypotheses. Section 3 presents the research method, including the sample selection and variable measurement. Section 4 presents results from analyses. Section 5 discusses the results and implications and outlines this study's limitations.

2. Hypothesis development

Agency theory analytically reflects situations that include a principal and agent structure (Eisenhardt, 1989; Jensen & Meckling, 1976; Milgrom & Roberts, 1992). Such a structure can also be found in the HQ-foreign subsidiary relationship, as the HQ (principal) delegates some work and responsibilities to foreign subsidiaries (agents) (Roth & O'Donnell, 1996). In the HQ-foreign subsidiary relationship, the design of an incentive system between the participants (HQ and foreign subsidiary) is also considered necessary as the global context satisfies conditions for the agency problem (Jensen & Meckling, 1976; Roth & O'Donnell, 1996).

First, the agency problem often arises from incongruence or conflict in the participants' goals. The goal conflict is based on the economic assumption that the participants (principal and agent) tend to pursue their interests to maximise utility (Jensen & Meckling, 1976). In particular, the global context would facilitate the agency problem. According to Roth & O'Donnell (1996), the more a foreign subsidiary is delegated and localised with specialised knowledge, the more likely the subsidiary is to deviate from the global rationalisation desired by the HQ. Second, this situation often makes the HQ have difficulty in monitoring or verifying the agent's effort, which allows the agent to have hidden action (Arrow, 1985; Hölmstrom, 1979). Third, as the difficulty grows, the agent is likely to have information that the principal

never accessed and knows directly, called information asymmetry (Gomez-Mejia & Balkin, 1992). Because of the information asymmetry, the principal is forced to be inferior in the information about the agent's effort and behaviour. Roth & O'Donnell (1996) argue that the information asymmetries between the HQ and the foreign subsidiary are more facilitated by the subsidiary characteristics such as cultural distance and the degree of localisation (roles in the local market). Because of goal incongruence and information asymmetry, foreign subsidiaries tend to be incentivised to deviate from the HQ's goal. In contract theory or economics-based organisational studies, appropriate compensation strategies have been investigated for supporting the principals to reduce moral hazard (Grossman & Hart, 1983; Hölmstrom, 1979, 1982; Roth & O'Donnell, 1996). Hölmstrom (1979, 1982) prove that performance-based incentives for CEOs reduce the agency problem that arises from the information asymmetry between stockholders and the CEOs. Thus, the principals (the HQs) prefer output-based control for managing foreign subsidiaries.

The agency theory emphasises a trade-off between imposing a risk on an agent and the pay-performance intensity (Hölmstrom, 1979; Milgrom & Roberts, 1992). When the agent bears the high cost of putting effort into the task, or whether the effect of his/her effort leads to the desired outcome is uncertain, the principal widens the compensation gap between success and failure to encourage the agent. Hence, given that the agent is risk averse, the principal provides grater expected payments to the agent. The increased payments should be equivalent to be as much as the reward that the agent receives for risk-bearing under uncertainty.

As environmental uncertainty levels grow, the relationship between an agent's effort and the outcomes is more unclear. In turn, the principal has to increase the required risk premium as the risk level increases. Therefore, because the additive payment becomes too high under the highly uncertain environment, it is better for the principal to provide the agent with more stable compensation by moderating the incentive to reduce the risk premium paid. Some researchers provide empirical evidence to indicate the trade-off between incentive intensity and uncertainty. For instance, Evans III et al. (2006) found a negative relationship between the extent of uncertainty and the level of risk imposed on agents in managed care organisations. In the context of foreign subsidiary management, Gong (2003) argues that output control is undesirable for distant foreign subsidiaries, which operate under high uncertainty since this type of control shifts risks completely to the risk-averse agents. Furthermore, Roth & O'Donnel (1996) did not find evidence to support the hypothesis of the positive relationship between the cultural distance of a foreign subsidiary from corporate headquarters and the proportion of compensation through incentives at the level of senior subsidiary management. Considering the above arguments, the following hypothesis was formed:

H_1: As environmental uncertainty increases, the incentive intensity for the foreign subsidiary's executive becomes weaker.

Although we have developed the hypothesis (H_1) to predict the negative relationship between environmental uncertainty and incentives, the empirical evidence concerning executive compensation is mixed. Prendergast (2002) indicates the two reasons why the evidence linking observed measures of risk and incentive pay is scared. One is the measurement error problem in the statistical analysis, which means empirical estimates do not reflect the actual environment. The other is the undeveloped explanation of the effect of agents' efforts under the riskiness of the domain. Addressing the latter, Prendergast (2002) argues that the marginal returns to a principal's delegation to agents are likely to be larger as the uncertain level of environment increases when the principal has little choice but to offer pay for performance.

Although Prendergast (2000, 2002) suggests the positive effect of uncertainty on incentives, his explanation is not inconsistent with our hypothesis, indicating a negative impact. This is because his explanation refers to the relationship, including other constructs such as an authority delegation, a distortion in information communication, and an investigation of endogenous events and malfeasances. Also, agency theory does not disregard the potential of the increase in performance pay. The incentive intensity principle states that the optimal incentive intensity depends on the four factors mentioned above.

First, the incentive intensity is decreased (increased) by agents' inability (ability) to control the performance or profitability via their additional efforts (Lal & Srinivasan, 1993). Agents never incur any costs of exerting extra effort unless the return is profitable. Instead, when agents cannot control their performance with their actions, a highly-intensified incentive will impose much risk on them under uncertain results. Thus, the principal will provide a modest performance-based incentive in this case. The optimal intensity level should be proportional to the profitability of agents' additional efforts, given other factors remain unchanged.

Second, a factor refers to the degree of precision of performance measures or the linkage between true and measured performance. Low precision of performance measures provides noise in the measured performance or a high value of the measure variance. Strong incentives will harm the agents' efforts when performance measures are not precise. If the principal highly insists on performance-based incentives despite the low precision, the agents tend to neglect unmeasured performance dimensions, decreasing the true performance (Zenger & Marshall, 2000). In practice, a variety of management accounting systems, such as activity-based costing/management and balanced scorecard, have been advanced so that these systems can provide financial and non-financial information with less noise (Baines & Langfield-Smith, 2003; Kaplan & Cooper, 1988, 1998; Kaplan & Norton, 1996, 2000; Libby & Waterhous, 1996; Wiliams & Seaman, 2001).

Third, the risk aversion of an agent can impede incentive intensity. The more risk-averse an agent is, the higher he/she risks from bearing the risk accompanied by intense incentives. Thus, if an agent is risk-averse, the principal should use weak or modest incentives for the agent. Accordingly, a high level of risk aversion will diminish the incentive intensity and vice versa.

Finally, the incentive intensity also depends on the responsiveness of agents' efforts to incentives. The responsiveness derives from how much the agents are delegated for their autonomous decision-making. The principle suggests that highly intense incentives should be used when agents are allowed to respond to problems autonomously. An agent with wide discretion facing strong incentives is motivated to find innovative ways to increase his/her performance.

Based on the above arguments, we formed the following set of individual hypotheses for each factor facilitating the incentive intensity:

H2a: The more prospect of the incremental profits from an agent's additional effort, the more the HQ's managers enhance the incentive intensity for the foreign subsidiary's executive.

H2b: The more precise the assessment, the more the HQ's managers enhance the incentive intensity for the foreign subsidiary's executive.

H2c: The higher the risk-averse level of an agent, the more the HQ's managers diminish the incentive intensity for the foreign subsidiary's executive.

H2d: The higher an agent's responsiveness to incentives is, the more the HQ's managers enhance the incentive intensity for the foreign subsidiary's executive.

From the principal-agency structure, the relationship between the HQ and foreign subsidiary is essentially characterised by information asymmetries arising from a distance in the participants (Dikova, 2009; Gong, 2003; Roth & O'Donnell, 1996). The asymmetries make the HQ have difficulty in observation and a disadvantage in what the subsidiary should do for the desired outcomes. Under such a condition, what the HQ largely rely on for effective foreign subsidiary management is an output-based control system with compensations, allowing the HQ to overcome the agency problem (Prendergast, 2002).

The proper design and use of the control systems of the HQ would solve the agency problem. For instance, incentive systems with less noise would encourage the agents to take the actions predicted by the principal, leading to the desired outcomes. The optimal level of the incentive intensity, based on the incentive-intensity principle will more likely to yields appreciable results.

Besides, the context of global organisations can enhance the effectiveness of the intensity. The HQ gives incentives strong enough to exert much effort from the foreign subsidiary as they require the subsidiary to deal with many uncontrollable events. The pay is so high; thus, it costs a lot for the HQ to keep the incentives highly intense. However, global organisations are recently increasing their reliance on the foreign sector, and foreign sales and profits account for a large proportion of the total. Therefore, the HQ is sure that the high pay can be offset by developing a foreign market. Considering the above views, we formed the following hypothesis:

H3: The more the HQ's managers enhance the incentive intensity for managing a foreign subsidiary, the more the subsidiary's performance is improved.

Although many empirical studies have examined the outcome of the output-based control system, including linking with compensation, the evidence is not always conclusive (Hoque, 2004). This is partly because agency theory tends to emphasise agents' self-interest behaviours without consideration of moderators in the relationship between incentives and performance (Shields, 1997). Luft (1997) suggests that some moderating factors, such as ethical and fairness considerations, should be integrated into the agency theory-based model to more appropriately examine the effect of incentives. Franco-Santos et al. (2012) suggested that internal and external factors mediate or moderate the relationship between output-based control, such as PMS and performance.

We focused on an agent's risk aversion as the above moderator. The three factors affecting the incentive intensity (the incremental profits, the precision, and the responsiveness) are not exogenously given. However, there remains room for a principal partly determined through the design and use of management accounting systems. For example, the capability of management accounting systems to reduce noise in measurement largely depends on the amount of investment for these systems. Also, giving agents discretionary funds earmarked for some specific proposes increases the level of their responsiveness to incentives. Besides, the principal induces the agents to realise sufficient room for incremental profits through their additional efforts by rearranging strategy or work processes or by relaxing limitations for their behaviours with aggregation of measures. Unlike these three factors, the principals have difficulty directly observing agents' risk tolerance (or aversion) because it mainly comes from the agents' private information or hidden characteristics. Such an unobservability makes it more difficult for the principals to arrange the design and use of the incentive systems depending on each agent. Even if the arrangement is available, the cost will be so high because sufficient fairness perceived among evaluatees (agents) is not gained. As a result, a principal cannot tune the incentive intensity fully because of the unobservable factor, the risk attitude of agents. Hence, there is still room for the moderating effect of the agent's risk preference on the

relationship between incentive intensity and performance. As mentioned above, the high incentive intensity poses an excessive risk to a risk-averse agent, which leads to his/her self-defensive action inconsistent with the action desired by the principal. Thus, we established the following hypothesis concerning the moderation effect of an agent's risk aversion:

H4: Risk aversion decreases the positive effect of incentive intensity on performance.

3.   Research Method

Survey and respondents

To test our hypotheses, we use the survey data from Japanese global companies and scores on Hofstede's dimensions of National Culture. The survey data is a part of the data collected through a postal questionnaire survey in our original research project. The survey's objective was to explore the current state of Japanese companies' overseas operations, namely, their foreign subsidiary management. The survey's target sample included 5,410 managers in 4,233 Japanese companies. We mailed the questionnaire to the companies selected from the Kaigai Shinshutsu Kigyo Data database, which contains demographic information for Japanese companies with overseas operations. The name and addresses of the managers responsible for listed companies' overseas businesses were selected from the D-VISION database.[4] The questionnaires sent included cover letters and self-addressed envelopes. Of the 5,410 questionnaires distributed, 659 were returned, representing 604 unique firms, or a response rate of 12.18%. Some cases were excluded if they were missing data for any variable included in the analysis, leaving 600 complete responses (562 different firms).

The targeted respondents are HQ's managers who govern overseas departments. The questionnaire asked respondents to choose one subsidiary with core business and sales operations. The sample subsidiaries are profiled as follows: they average 17.6 years of age (median = 16.0), the mean number of employees per unit is 448.9 (median =100), and the average ratio of Japanese staff to the total is 8.81% (median = 3.75%). Our sample has 393 wholly-owned subsidiaries (65.50%), and the average equity ratio is 87.81%. The industry category is noted in Appendix A.

Table 1 shows the locations of the respondents' foreign subsidiaries for answering the questionnaire and the local CEOs' nationality types. The nationality types are categorised into the following three groups: parent-country national (PCN), host-country national (HCH), and third-country national (TCN). The data in Table 1 indicates that a high percentage of subsidiaries are located in East Asia, Southeast Asia, North America, China, Thailand, and the United States. The Table also indicates that most Japanese MNCs tend to apply the personnel policy called Parent Country National (PCN) rather than Home Country national (HCN) or Third Country National (TCN) regardless of the subsidiary's location. The finding is congruent with the prior studies (e.g., Harzing, 1999; Kopp, 1994; Negandhi & Baliga, 1979; Tung, 1984; Tungli & Peiperl, 2009) demonstrating that the degree of personal localisation in Japanese MNCs is much lower than in other developed countries.

We examined the possibility of a non-response bias by comparing early and late respondents for all variables used in the analysis.[5] The *t*-test results indicate the absence of a significant non-response bias at a 0.05 significance level.

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4 We were not able to identify the personal information of the managers in unlisted companies; hence, the questionnaire's destination consisted of a company name and managerial position.
[5] Late respondents were identified by counting responses received after the deadline.

Variable measurement

We developed survey instruments to capture the constructs of this study of interest through the following procedure: First, we interviewed several managers in two highly successful firms to explore how they manage their foreign subsidiaries. We referenced these interviews in preparing a questionnaire draft, which was pre-tested on six academic scholars and two accounting managers. The feedback received from these testing was then used to clarify the question items further. Questions were refined until a consensus was reached that each item was fit to measure the theoretical constructs of our interest. Thus, the content validity of the measures was enhanced.

Table 1. The country where the subsidiary is located and the nationality of the CEO

The country and continent where the foreign subsidiary is located						The Nationality of the CEO in the foreign subsidiary		
Continent	N	Percentage	Country	N	Percentage	PCN	HCN	TCN
Oceania	7	1.2%	Australia	7	1.2%	6	1	0
Europe	47	7.8%	England	12	2.0%	5	7	0
			France	5	0.8%	3	2	0
			Italy	1	0.2%	1	0	0
			Netherlands	3	0.5%	2	1	0
			Switzerland	1	0.2%	1	0	0
			Spain	1	0.2%	1	0	0
			Slovenia	1	0.2%	0	1	0
			Deutschland	16	2.7%	12	3	1
			Hungary	1	0.2%	1	0	0
			Belgium	2	0.3%	1	1	0
			Poland	3	0.5%	2	1	0
Western Asia	3	0.5%	UAE	1	0.2%	1	0	0
			Saudi Arabia	1	0.2%	1	0	0
			Turkey	1	0.2%	0	1	0
East Asia	232	38.7%	South Korea	8	1.3%	3	5	0
			Hong Kong	24	4.0%	20	3	1
			Taiwan	18	3.0%	13	5	0
			China	182	30.3%	149	31	2
Southeast Asia	172	28.7%	Indonesia	24	4.0%	23	1	0
			Singapore	31	5.2%	26	4	1
			Thailand	80	13.3%	75	5	0
			Philippines	4	0.7%	4	0	0
			Vietnam	21	3.5%	18	2	1
			Malaysia	13	2.2%	11	2	0
South Asia	9	1.5%	India	8	1.3%	7	1	0
			Bangladesh	1	0.2%	1	0	0
North America	125	20.0%	America	121	20.2%	82	36	3
			Canada	1	0.2%	1	0	0
			Mexico	3	0.5%	3	0	0
South America	5	0.8%	Brazil	5	0.8%	3	1	1
Sum	600					476	114	10

Note. PCN = parent country national, HCN = home country national, and TCN = third country national.

The variables used in our analyses are as follows: the incentive intensity, the environmental uncertainty, the prospect of incremental profits, the precision in assessment, an agent's risk aversion, an agent's responsiveness to incentives, and organisational performance. The measurements of these are described below:

Incentive intensity

The incentive intensity for a foreign subsidiary's executives is operationalised in a single question item indicating how the executive payments link to the financial performance. The respondents were asked to rate this item on a 7-point Likert scale anchored by (1) not at all (unclearly): and (7): exactly true (clearly). We used the default reply values for the analysis.

Environmental uncertainty

To measure environmental uncertainty, we used seven question items regarding the extent to which the HQ can predict environmental situations surrounding the foreign subsidiary: customer needs, demand trends, price trends, requested functions, labour market trends, political and social environment, and the financial environment. The respondents were asked to rate the predictability concerning each of the four items on a 7-point Likert scale anchored by (1): precisely predictable and (7): not predictable at all. Although we initially predicted one environmental uncertainty variable, the exploratory factor analysis (See Table 2) found that the items loaded on two factors with eigenvalues greater than one. Factor 1 comprises the four items of customer needs, demand trends, price trends, and request functions, which are associated with the local market in which a foreign subsidiary operates. Factor 2 comprises the three items of the political and social environment, the financial environment, and labour market trends, which are associated with the general business in which the subsidiary operates. Factor 1 in this study is called the market environmental uncertainty, and Factor 2 is the general business environmental uncertainty. The Cronbach's alpha coefficients were 0.819 and 0.855, respectively. They are acceptable to good internal reliability. We calculated subscale scores by averaging the scores for the items on each scale and using them for the analysis.

Table 2. The results of factor analyses

Variable	Items	Factor1	Factor2	Variable	Items	Factor1
Market environmental uncertainty	Demand trends	0.864	-0.024	*Organisational performance*	Implementation of plans	0.839
	Requested functions	0.743	-0.006		Adaptation to change	0.809
	Customer needs	0.708	-0.025		Achievement of the performance target	0.781
	Price trends	0.584	0.126		Performance compared to the competitors	0.772
General business environmental uncertainty	Political and social situations	-0.047	0.918		Capability to find problems	0.768
	Financial environment	0.003	0.867		Performance compared to other subsidiaries within your group company	0.758
	Labor market	0.085	0.649		Autonomous learning	0.738
	KMO		0.793			0.877
	Bartlett's test		*p* < 0.000			*p* < 0.000
	Eigenvalue	3.148	1.078			4.27
	Cumulative variance	44.97%	60.37%			61.06%
	Correlation		0.473			-
	Cronbach's α	0.819	0.855			0.915

Note. N = 600.

Table 2 reports the descriptive statistics for all variables used in the analyses. Table 3 shows the correlation matrix among them. Although even significant correlations are entirely weak, the signs of the relationships are as expected by our hypotheses.

Table 3. The correlation matrix

Variable	Actual range Min	Max	Mean	SD	Skew	Kurt	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) *Market environmental uncertainty*	1	5.5	2.55	0.75	0.55	0.54	1							
(2) *General business environmental uncertainty*	1	7	3.01	1.08	0.55	0.30	0.426***	1						
(3) *Prospect of incremental profits*	1	7	5.32	1.15	-0.69	0.46	-0.124***	0.005	1					
(4) *Precision in assessment*	1	7	5.37	1.31	-0.83	0.29	-.0213***	-0.123***	0.135***	1				
(5) *Responsiveness to incentives*	1	7	3.69	1.35	-0.01	-0.32	-0.148***	-0.068	0.181***	0.078*	1			
(6) *Risk aversion*	8	94	82.61	20.46	-1.93	2.18	0.012	0.102**	0.012	-0.032	0.069*	1		
(7) *Incentive intensity*	1	7	3.84	1.81	-0.13	-1.06	-0.121***	-0.163***	0.113***	0.082**	0.119***	-0.275***	1	
(8) *Organisational performance*	1	7	4.52	1.12	-0.41	-0.18	-0.271***	-0.175***	0.139***	0.217***	0.342***	-0.010	0.212***	1

Note: N=600. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Prospect of Incremental profits

We focus on the potential to increase profits because it is hard for researchers to measure directly how much effort the agent demonstrates. Specifically, we asked about the degree to expect the growth of the local market the foreign subsidiary is facing. The high expectation of local market growth encourages a foreign subsidiary as an agent to recognise the possibility of increasing profits. The respondents were asked to rate this item on a 7-point Likert scale anchored by (1): not likely and (7): extremely likely. We used the default reply values for the analysis.

Precision in assessment

The variance of the error term captures the noise in performance measures—a measure is more precise when the variance is lower (Feltham & Xie, 1994). A principal can enhance the precision by devoting resources to monitoring (Milgrom & Roberts, 1992). Thus, collecting additional information about the agents' activities will improve the precision of the measurement criteria used in the incentive system. Many global organisations adopt integrated information systems, including accounting functions, such as Enterprise Resource Planning systems, which incorporate and draw data based on a common global criterion. Even if the HQ locates geographically, economically, politically, and culturally far from the foreign subsidiaries, the HQ can collect the operational process data of the subsidiaries in detail. Thus, we used the degree to collect operational data as a proxy variable of precision in assessment. We asked the respondents to rate how much in detail the HQ collects the operational process data of a foreign subsidiary on a 7-point Likert scale anchored by (1): not at all (outlined) and (7): exactly true (in detail). We used the default reply values for the analysis.

Risk aversion

Given the feasibility of measuring risk aversion, we focused on the local CEO's nationality. Recognising nationality enables us to use the uncertainty avoidance score in Hofstede's national culture dimensions. Using this score as a proxy variable in the context of foreign subsidiary management is reasonable, although this measure has a limitation to brush the individual difference off. We downloaded the data from the web page regarding Hofstede's national culture (http://geerthofstede.com/) on December 26, 2016.

Responsiveness to incentives

Generally speaking, the agent's responsiveness to incentives is accompanied by authority delegation. With sufficient delegation linking to incentives, agents are more likely to be motivated to show their additional efforts for finding innovative ways. In this study, we focus on the development of a contingency found as a facilitator of the additional efforts. Under uncertainty, such a fund can support the agents taking autonomous or innovative decisions and actions financially. In other words, the contingency fund can be a safety net for filling emergency needs and adapting the environmental uncertainty. The

respondents were asked to rate the degree of developing enough contingency funds in a foreign subsidiary on a 7-point Likert scale anchored by (1): not at all (poor) and (7): exactly true (well-developed). We used the default reply values for the analysis.

Organisational performance

The delegated foreign subsidiaries in global organisations have incentives to maximise their profits or interests by focusing their strategic resources on local contingencies. Simultaneously, the HQ requires the local managers' consistency with globalisation or organisational (company-wide) direction. We measure the foreign subsidiary's performance by using the HQ's total ratings instead of objective data. We measured the subsidiary's organisational performance based on previous studies (Abernethy & Brownell, 1999; Abernethy & Stoelwinder, 1991; Govindarajan, 1984). The instruments include seven indicators: (1) the achievement of performance targets; (2) the adaptation to change; (3) performance compared to competitors; and (4) performance compared to other subsidiaries within a group company; (5) the capability to find problems; (6) the autonomous learning; and (7) the implementation of plans. Respondents were asked to rate their subjective evaluation for each item on a 7-point Likert scale, anchored by (1): not at all satisfied and (7): extremely satisfied. The exploratory factor analysis extracted one factor as expected. The internal reliability was very high (alpha coefficients = 0.915). We calculated a subscale score by averaging the items scores for the items on each scale and used it for the analysis.

4. Results

Our hypotheses were tested in two procedures. First, we applied multiple regression models to examine the effects of the factors affecting incentive intensity. This analysis tested H_1, H_{2a}, H_{2b}, H_{2c}, and H_{2d}. Second, we performed the multiple regression analysis with one dependent variable (organisational performance), a predictor (the incentive intensity), and five control variables for testing H3 and then examined the significance of the product term between risk aversion and the incentive intensity and the regions of significance for testing H4.

Table 4 shows the result of the multiple regression model to statistically investigate the associations between the incentive intensity and five variables predicted by H_1 and $H_{2a/b/c/d}$. The coefficients for *market environmental uncertainty* (B = -0.093, $p > 0.05$) and *general business environmental uncertainty* (B = -0.182, $p < 0.05$) variables are negative; however, a significant variable was not market but general business relevant uncertainty. Overall, H_1 is partly supported.

Table 4. The effects on incentive intensity

Dependent variable = *Incentive intensity*

Independent Variables	Coeff	SE[#]	*p*-value	CI(Low)	CI(High)
Constant	5.106	0.685	0.000	3.761	6.540
Market environmental uncertainty	-0.093	0.116	0.425	-0.320	0.135
General business environmental uncertainty	-0.182	0.081	0.025	-0.340	-0.023
Prospect of incremental profits	0.139	0.067	0.039	0.007	0.271
Precision in assessment	0.044	0.060	0.460	-0.073	0.162
Responsiveness to incentives	0.143	0.056	0.011	0.032	0.253
Risk aversion	-0.024	0.004	0.000	-0.031	-0.017

N = 600, F = 14.29 (p = 0.000), R^2 = 0.122.

Note. A level of confidence for confidence intervals (CI) is 95%.
[#] Heteroscedasticity consistent (HC3) standard errors were used.

Next, we will confirm the results to test the hypotheses regarding four factors that influence optimal incentive intensity. Table 4 shows that the coefficients for *prospect of incremental profits* (B = 0.139, $p < 0.05$) and *responsiveness to incentives* (B = 0.143, $p < 0.01$) were positive and significant, providing support for H_{2a} and H_{2d}. The coefficient for *risk aversion* (B = -0.024, $p < 0.01$) was negative and significant, supporting H_{2c}. The coefficient for *precision in assessment* (B = 0.044, $p > 0.05$) is positive but insignificant. H2b is not supported. This insignificant result is likely due to the lack of assumption for measuring that tightening a monitor leads to increased precision with which the desired activities are assessed.

Table 5. The effects of incentive intensity on organisational performance

Panel A. Dependent variable = *Organisational performance*

Independent Variables	Coeff	SE[#]	*p*-value	CI(Low)	CI(High)
Constant	3.602	0.338	0.000	2.938	4.265
Market environmental uncertainty	-0.234	0.064	0.000	-0.359	-0.110
General business environmental uncertainty	-0.053	0.041	0.201	-0.134	0.028
Prospect of incremental profits	0.033	0.041	0.427	-0.048	0.113
Precision in assessment	0.120	0.031	0.000	0.059	0.181
Responsiveness to incentives	0.233	0.033	0.000	0.169	0.298
Risk aversion	0.001	0.002	0.598	-0.031	0.005
Incentive intensity	0.088	0.025	0.001	0.038	0.137

N = 600, F = 23.71 (p = 0.000), R^2 = 0.212.

Panel B. Dependent variable = *Organisational performance*

Independent Variables	Coeff	SE[#]	p-value	CI(Low)	CI(High)
Constant	3.585	0.336	0.000	2.926	4.245
Market environmental uncertainty	-0.234	0.064	0.000	-0.360	-0.108
General business environmental uncertainty	-0.053	0.042	0.207	-0.134	0.029
Prospect of incremental profits	0.031	0.040	0.439	-0.048	0.110
Precision in assessment	0.123	0.031	0.001	0.061	0.184
Responsiveness to incentives	0.227	0.033	0.000	0.163	0.292
Risk aversion (RA)	0.003	0.002	0.186	-0.016	0.008
Incentive intensity (II)	0.087	0.025	0.001	0.037	0.136
RA * II[##]	-0.003	0.001	0.032	-0.005	-0.002

N = 600, F = 21.35 (p = 0.000), R^2 = 0.220.

Panel C. Conditional Effect of *incentive intensity* at values of *risk aversion* (Johnson-Neyman technique[###])

Values of *risk aversion*	Coeff	p-value	CI(Low)	CI(High)
-74.61	0.281	0.0033	0.094	0.469
-70.31	0.270	0.0029	0.093	0.448
-66.01	0.259	0.0025	0.091	0.428
-61.71	0.248	0.0022	0.090	0.406
-57.41	0.237	0.0018	0.088	0.385
-53.11	0.225	0.0015	0.087	0.364
-48.81	0.214	0.0012	0.085	0.343
-44.51	0.210	0.0009	0.083	0.322
-40.21	0.192	0.0007	0.081	0.302
-35.91	0.180	0.0005	0.079	0.282
-31.61	0.166	0.0004	0.077	0.262
-27.31	0.158	0.0002	0.074	0.242
-23.01	0.147	0.0002	0.071	0.223
-18.71	0.136	0.0001	0.067	0.204
-14.41	0.124	0.0001	0.063	0.186
-10.11	0.113	0.0001	0.057	0.169
-5.81	0.102	0.0001	0.050	0.154
-1.51	0.091	0.0004	0.041	0.140
2.79	0.079	0.0016	0.030	0.129
7.09	0.068	0.0091	0.017	0.119
11.39	0.057	0.0419	0.002	0.112

Note. A level of confidence for confidence intervals (CI) is 95%.

[#] Heteroscedasticity consistent (HC3) standard errors were used.

[##] R^2 increase due to the interaction is 0.0072 (F = 4.609, p = 0.032).

[###] Johnson-Neyman regions of significance are nonsimultaneous ones.

Table 5 shows the analysis results that organisational performance is regarded as a dependent variable. Panel A in Table 5 displays the result of the multiple regression model to examine the effect of incentive intensity on organisational performance. We included two environmental uncertainty variables and three factors used in the analysis to test H_1 and H_{2a}, H_{2b}, and H_{2d} as control variables because they predicted that they are associated with performance. The coefficient for incentive intensity (B = 0.088, p < 0.01) is positive and significant, supporting H_3.

Panel B in Table 5 shows the result to introduce the hypothesised interaction term (*RA * II*). The interaction term significantly increased the variance explained in organisational performance ($R^2 = 0.0072$, $p < 0.05$) and has a negative association with the performance (B = -0.003), providing support for H_4.

To further evaluate the form of the interactive effect, we used the Johnson-Neyman (J-N) technique. Although the simple slopes method has been popular in management accounting research, it has an important limitation of the arbitrary choice of condition values[6] of the moderator (Preacher et al., 2006). On the contrary, the J-N technique can estimate the moderator values where the predictor's effect transits significantly and insignificantly if a such value exists in the data. Thus, these values define the limits of the regions of significance for the predictor variable along the moderator variable continuum (Hayes & Matthes, 2009). We used Hayes's MODPROBE macro (2009) to conduct this analysis. As a result, we did not find the regions of significance (i.e transition points lie above the maximum or below the minimum possible measurement on the moderator variable). Panel C in Table 5 shows the effect of the incentive intensity is statistically significant across the entire observed range of the moderator. Also, Figure 1 shows the confidence bands (Preacher et al., 2006) that the 95% confidence intervals around simple slopes for all uncertainty avoidance values are continuously plotted. Due to the sample size, the confidence intervals are larger when the uncertainty avoidance is very low; however, the confidence bands do not contain zero. Also, the plotted graph is decreasing continuously, suggesting the increase in agents' uncertainty avoidance decreases the incentive system's positive effect on performance, as the agency theory predicted.

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[6] Simple slopes are the partial derivative of regression equations containing interaction terms. As shown in representative texts in Aiken & West (1991) and Cohen et al. (2002), most of the studies select values at the three level (i.e., mean, one standard deviation above and below the mean) of the moderator variable.
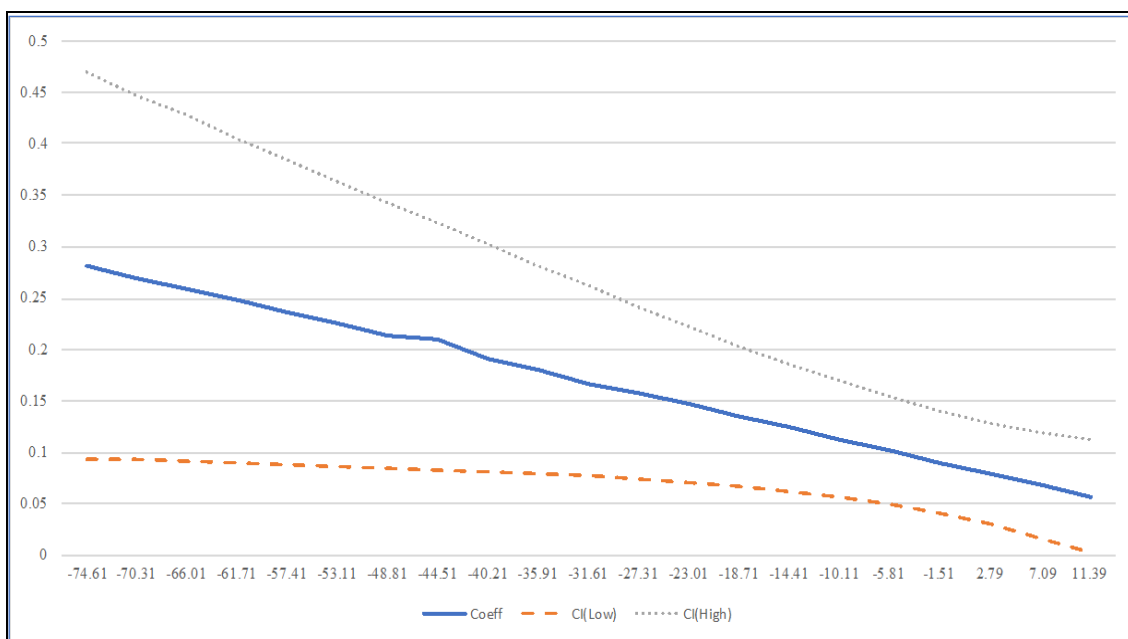
Figure 1. The confidence bands

We also conducted an additional analysis to consider the effect of market environmental uncertainty in detail. In the test of H1, the result did not significantly support the negative effect of the market environmental uncertainty, whereas the negative effect of the general business environmental uncertainty was supported.

The difference in the results may be concerned with the controllability principle. Accordingly, managers' performances should be measured using indicators they can control (Horngren, Foster, & Datar, 1994). Based on this, volatilities in the general business environments, such as labour and financial market, politics, and society, are beyond the CEO's controllability. In contrast, the HQ gives foreign subsidiaries a responsibility to adapt to the market environments as their central tasks. However, the environmental changes are not entirely under their scope of control. Gibbs et al. (2009) classify risk into two types; one is controllable, and the other is uncontrollable. According to this, the market environmental uncertainty can be characterised by controllable risk, whereas the general business environmental uncertainty is characterised by uncontrollable risk.

However, the HQ is not always sure if the foreign subsidiary should bear the risk that arises from the market environmental change. The HQ changes their understanding of the market environmental uncertainty from controllable to uncontrollable risk, and vice versa depending on the prospect of incremental profits. Then, based on the understanding, the HQ might increase (or decrease) the incentive intensity in high market environmental uncertainty when the prospect of incremental profits is high (or low). To examine this prediction, we examined the moderation effect of the prospect of incremental profits on the relationship between the market environmental uncertainty and the incentive intensity.

Panel A in Table 6 shows the result to introduce the interaction terms (*MEU * PIP*). The interaction term significantly increased the variance explained in organizational performance ($R^2 = 0.0061$, $p < 0.10$) and has a positive association with the performance (B = 0.160). Besides, Panel B in Table 6 indicates a negative effect of the environmental uncertainty on the incentive intensity is statistically significant at the level of 0.05 below the value (-1.42) of the prospect of incremental profits. Thus, when the market growth is perceived to be low, the HQ decreases the incentive intensity.

Table 6. The moderation effects of prospect of incremental profits

Panel A. Dependent variable = *Incentive intensity*

Independent Variables	Coeff	SE[#]	*p*-value	CI(Low)	CI(High)
Constant	5.621	0.5280	0.0000	4.584	6.658
General business environmental uncertainty	-0.191	0.0800	0.0174	-0.348	-0.034
Precision in assessment	0.050	0.0599	0.4035	-0.068	0.168
Responsiveness to incentives	0.148	0.0561	0.0086	0.038	0.258
Risk aversion	-0.024	0.0036	0.0000	-0.031	-0.017
Market environmental uncertainty (MEU)	-0.073	0.1163	0.5309	-0.301	0.156
Prospect of incremental profits (PIP)	0.130	0.0680	0.0567	-0.004	0.263
*MEU * PIP*	0.160	0.0818	0.0508	-0.001	0.321

N = 600, F = 13.26 ($p = 0.000$), $R^2 = 0.128$.

Panel B. Conditional Effect of *MEU* at values of *PIP* (Johnson-Neyman technique[###])

Values of PIP	Coeff	*p*-value	CI(Low)	CI(High)
-4.32	-0.764	0.033	-1.464	-0.064
-4.02	-0.716	0.032	-1.371	-0.061
-3.72	-0.668	0.032	-1.278	-0.058
-3.42	-0.620	0.032	-1.185	-0.055
-3.12	-0.572	0.032	-1.093	-0.051
-2.82	-0.524	0.032	-1.002	-0.046
-2.52	-0.476	0.033	-0.912	-0.039
-2.22	-0.428	0.034	-0.824	-0.032
-1.92	-0.380	0.037	-0.737	-0.022
-1.62	-0.332	0.043	-0.654	-0.010
-1.42	-0.300	0.050	-0.600	0.000
-1.32	-0.284	0.055	-0.573	0.006
-1.02	-0.236	0.078	-0.498	0.027
-0.72	-0.188	0.127	-0.429	0.054
-0.42	-0.140	0.232	-0.369	0.090
-0.12	-0.092	0.428	-0.318	0.135
0.18	-0.044	0.715	-0.278	0.191
0.48	0.004	0.972	-0.247	0.256
0.78	0.053	0.709	-0.223	0.328
1.08	0.101	0.519	-0.205	0.406
1.38	0.149	0.391	-0.191	0.488
1.68	0.197	0.306	-0.181	0.574

Note. A level of confidence for confidence intervals is 95%.

[#] Heteroscedasticity consistent (HC3) standard errors were used.
[##] R^2 increase due to the interaction is 0.0061 (F = 3.83, p = 0.051).
[###] Johnson-Neyman regions of significance are nonsimultaneous ones.

5. Discussion and Conclusion

To enhance our understanding of how various factors, including MASs, affecting incentive intensity and its effectiveness, this study examined the determinants of incentive intensity and the moderation effect of one of the determinants, risk aversion, on the path from the incentive intensity to the performance. Theory predicts that environmental uncertainty and risk aversion have a negative effect on the intensity, while the prospect of incremental profits, the precision in assessment, and the responsiveness to incentives have positive effects on the intensity. Besides, risk aversion decreases the positive effect of the intensity on performance. Our empirical evidence substantially supports these predictions. More specifically, the findings are as follows.

First, although we find a significant negative effect of the general business environmental uncertainty, the market environmental uncertainty is not a significant factor. This result is due to controllability for foreign subsidiaries. The HQ perceives that the foreign subsidiaries' executives cannot control the general business environment, which is beyond their responsibility. On the other hand, they should bear the responsibility for dealing with the market environment if it does not have an effect to enhance the intensity. The difference reflects two types of risk: controllable and uncontrollable (Gibbs et al., 2009). Unlike general business environmental uncertainty, we argue that market environmental uncertainty is associated with controllable risk.

Second, as the incentive-intensity principle states, we find the significant effect of the prospect of incremental profits, risk aversion, and responsiveness. Given our measures of these constructs, the results indicate several implications. Firstly, we find the significant moderation effect of the prospect of incremental profits, which suggests that the market environmental uncertainty is regarded as an uncontrollable risk when there is a small room for incremental profits by the foreign subsidiary's additional effort. Secondly, although the type of an agent's risk aversion is inherently his/her private information, the type is significantly associated with the level of incentive intensity. We argue that the principal guesses the agent's risk preference with some information source, such as the nationality of an agent. Thirdly, the principal can coordinate the intensity using the budget (i.e., contingency funds) and performance measures' prosperities.

Third, we find that the incentive intensity directly enhances organisational performance. Some studies argue that posing excessive risk decreases the dependence on pay for performance (Gong, 2003). Hence, our findings indicate that in the context of foreign subsidiary management, the outcome from the high intensity meets a high-risk premium for a high-risk bearing. Besides, we find a significant negative association between the market environmental uncertainty and performance. In contrast, the general business environmental uncertainty coefficient is negative but insignificant. Interestingly, the effects of the uncertainties are different in the relationship between the intensity and the performance. Hence, the HQ's managers decrease the incentive intensity as the level of

the general business environment increases; however, the nonsignificant relationship to performance raises doubt about the necessity to coordinate the intensity.

Fourth, we find the moderating effect of risk aversion on the relationship between incentive intensity and performance. This suggests that it is hard for the principal to alter the incentive intensity following risk aversion. Poor coordination due to unobservability is bad enough not to affect performance negatively. However, the consistent decreasing effect shown in Figure 1 is noteworthy. However, it is worth noting that the level of risk aversion is not determined only by the national culture. In conclusion, our finding indicates uncertainty avoidance index (i.e., Hofstede's national culture dimension) is beneficial to measure an agent's risk aversion.

This study makes several contributions to the accounting literature. First, it makes important implications for the extant literature on the relationship between risk and intensive. Our findings emphasise the importance of focusing on the difference in environmental uncertainty (controllable or uncontrollable risk) and the effect of the prospect of incremental profits that is concerned with recognising controllability. Second, our findings shed light on the factors influencing incentive intensity, including various features of MASs. In particular, this study supports the effect of the features of MASs other than performance measures, which expands a research opportunity for further studying features of MASs that are relevant to the incentive intensity. Third, the study responds to calls to investigate foreign subsidiary management (Busco et al., 2008; Cruz et al., 2011) by providing empirical evidence on the effect of incentive intensity on performance. In this study, the effectiveness of incentives is positively supported in the context of foreign subsidiary management. We argue that the performance-based incentive systems can be effective even though there is an argument that the agency problem enhanced by the distance between the HQ and foreign subsidiaries makes it difficult to control the subsidiaries' behaviours and outputs. Lastly, our findings suggest that the uncertainty avoidance index of Hofstede's national culture is available for measuring an agent's risk aversion level. The wide diversity of the members' nationalities cannot be seen only in global firms. Thus, we believe that the way of measurement in this study can also be used in other contexts.

The study is subject to several limitations. First, the sample was collected only from Japanese firms. Our findings can be subject to the fact that Japanese managers, including local CEOs and HQ managers, are characterised by low uncertainty avoidance. We believe increasing the generalizability of our findings to non-Japanese firms is vital in future research. Second, we also acknowledge that this study did not consider the specific features of performance measures linked to compensation. Understanding whether the effectiveness of incentive systems depends on the indicators (e.g., return on equity or economic earnings) is important theoretically and practically. Third, this study focused on one of the management controls, performance-based incentive systems, although the management accounting researchers suggest that a control package usually works with various types of controls and is mutually interrelated (Busco et al., 2008; Malmi & Brown, 2008). Thus, future research needs to consider incentive systems from the perspective of a control package. Despite these limitations, the findings in this study provide valuable empirical evidence on the application of incentive intensity in Japanese organisations.

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Appendix A. Classification of firms in the sample by industry

Industry	N	Percentage
Mining	4	0.67%
Construction	32	5.33%
Glass and Ceramics products	11	1.83%
Rubber products	8	1.33%
Pulp and Paper	8	1.33%
Textiles and Apparels	16	2.67%
Pharmaceuticals	12	2.00%
Chemicals	42	7.00%
Oil and Coal products	1	0.17%
Metal products	27	4.50%
Nonferrous Metals	14	2.33%
Machinery	69	11.50%
Electric appliances	64	10.67%
Transportation equipment	52	8.67%
Precision instruments	14	2.33%
Foods	25	4.17%
Iron and Steel	8	1.33%
Other products	23	3.83%
Land Transportation	10	1.67%
Warehousing and Harbor Transportation	9	1.50%
Marine Transportation	3	0.50%
Air Transportation	2	0.33%
Transportation and communications	16	2.67%
Commerce	14	2.33%
Wholesale Trade	67	11.17%
Banks	5	0.83%
Securities and Commodities Futures	1	0.17%
Insurance	9	1.50%
Other Financing Business	4	0.67%
Real estate	3	0.50%
Services	27	4.50%
Sum	600	100.00%

Appendix B. Basic statistics of items used in factor analyses

Variable	Item in questionnaire	Actual range		Mean	SD	Skew	Kurt
		Min	Max				
Market environmental uncertainty	Customer needs	1	6	2.50	0.94	0.75	0.91
	Demand trends	1	6	2.63	0.89	0.80	1.06
	Price trends	1	6	2.62	0.97	0.86	1.07
	Requested functions	1	6	2.44	0.92	0.68	0.71
General business environmental uncertainty	labor market	1	7	2.85	1.09	0.69	0.71
	political and social situations	1	7	3.10	1.34	0.71	0.08
	financial environment	1	7	3.07	1.23	0.50	-0.08
Organisational performance	Achievement of the performance target	1	7	4.60	1.48	-0.62	-0.16
	Adaption for the change	1	7	4.49	1.30	-0.36	-0.39
	Performance compared to the competitors	1	7	4.36	1.46	-0.23	-0.67
	Performance compared to other subsidiaries within your group company	1	7	4.71	1.47	-0.65	-0.23
	Capability to find problems	1	7	4.39	1.32	-0.24	-0.32
	Autonomous learning	1	7	4.34	1.30	-0.22	-0.19
	Implementation of plans	1	7	4.75	1.29	-0.50	-0.26

Note: n=600. All items are measured using 7-point Likert-scale which min is 1 and max is 7.