Book-tax Conformity and Compensation Contracts

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Abstract

This paper investigates how does a degree of book-tax conformity affect manager's compensation contracts. The pros and cons of requiring book-tax conformity have been discussed in many countries for more than half a decade. However, there have been little studies which examine a relationship between the degree of book-tax conformity and manager's compensation contracts. Our study expands new aspects of book-tax conformity research by focusing on the relationship between tax regimes and manager's compensation contracts.

In this paper, we find that the book-tax conformity prevents the manager from engaging earnings management while it fails to provide an incentive to do tax planning. Therefore, whether the principal raises the bonus coefficient depends on the relative level of production and biasing costs and the tax rate. Our main findings are as follows. The bonus coefficient in the decoupling case is higher than that in the conformity case if the corporate tax rate is high, the biasing cost is relatively small compared to the production cost, and/or manager's degree of risk aversion or cash flow volatility is sufficiently high. Further, principal's utility in the decoupling case is higher than that in the conformity case if the biasing cost is relatively high compared to the production cost. If the production and basing costs are the same, the bonus coefficient and principal's utility in the decoupling case are always higher than those in the conformity case.

Key Words: Book-tax conformity; Compensation contracts; Agency theory

1 Introduction

This paper investigates how does a degree of book-tax conformity affect manager's compensation contracts. There are two prevailing tax regimes; the first regime requires book-tax conformity and the other allows taxable income to be different from reported accounting earnings. For example, book-tax conformity is essentially required in Japan whereas it is not required in the United States.

The pros and cons of requiring book-tax conformity have been discussed in many countries for more than half a decade. Proponents of book-tax conformity insist that increased conformity reduces aggressive financial reporting and excessive tax planning, and then, it improves earnings quality and strengthens tax compliance (Slemrod and Blumenthal, 1996; Yin, 2001; Desai, 2005; Whitaker, 2005). Desai (2005) argues that low book-tax conformity has contributed to the simultaneous degradation of profit reporting to capital markets and tax authorities because it allows managers to mischaracterize tax savings to capital markets and to mischaracterize profits to tax authorities. Therefore, Desai (2005) proposes the extreme reform that would be to collapse the dual reporting system into one system, where taxes would be based on accounting definitions of income: i.e., book-tax conformity. Book-tax conformity would provide for a considerably simpler corporate tax system where accounting income with select pre-specified deviations or modifications would serve as the tax base. Further, Slemrod and Blumenthal (1996) points that book-tax conformity would sharply reduce compliance costs that are estimated to be fairly high, particularly for major corporations.

On the other hand, opponents of book-tax conformity insist that it impairs earnings quality, and accordingly leads to less informative earnings information (Hanlon and Shevlin, 2005; Hanlon et al., 2005, 2008). They argue that the information required by tax authorities is different from those required by other constituents. Because a tax system is designed to meet the government objectives such as increasing governmental revenue, providing economic incentives or disincentives for tax payers to engage in particular activities, rewarding

particular constituencies among others. In contrast, a financial accounting system typically provides managers with some discretion to convey more information, because it is designed to mitigate information asymmetry between the managers and other constituents. Thus, the opponents insist that book-tax conformity impairs the informativeness of earnings information, and therefore it is detrimental to the investors' decision.

In order to answer this controversy, our study focuses on new aspects of book-tax conformity research, that is, compensation contracts. Although empirical studies about effects of book-tax conformity on informativeness of accounting earnings have been accumulated, there have been little studies which examine a relationship between the degree of book-tax conformity and manager's compensation contracts. Recent empirical studies link tax planning with top executive incentive compensation and find that incentive contracts of saving tax expense make managers more tax aggressive (Desai and Dharmapala, 2006; Armstrong et al., 2012; Rego and Wilson, 2012). However, if the compensation contracts affect manager's behavior, shareholders make compensation contracts by considering the manager's behavior change. Further, the compensation contracts can be different depending on the degree of book-tax conformity because this difference in tax regimes affects the manager's behavior. The main purposes of this paper are to find which regime (book-tax conformity or decoupling) has more incentive for the principal to raise a bonus coefficient and which regime is more effective in compensation contracts.

The analysis shows as follows. First, in the book-tax conformity case, the bonus coefficient is increasing in the corporate tax rate if the biasing cost is sufficiently large compared to the production cost and vice versa. If the production cost is the same with the biasing cost, the bonus coefficient is decreasing in the corporate tax rate. Further, when the production and biasing costs are given, if the tax rate is low, then the bonus coefficient is decreasing in the corporate tax rate. Second, in the book-tax decoupling case, the bonus coefficient is increasing or decreasing in the corporate tax rate. If the corporate tax rate is high or the production cost is the same with the basing cost, the bonus coefficient is increasing in the corporate tax rate. Third, comparing the bonus coefficient between both regimes, we find that the bonus coefficient in the decoupling case is higher than that in the conformity case if

the corporate tax rate is high, the biasing cost is relatively small compared to the production cost, and/or manager's degree of risk aversion or cash flow volatility is sufficiently high. Finally, comparing principal's utility between both regimes, we find that principal's utility in the decoupling case is higher than that in the conformity case if the biasing cost is relatively high compared to the production cost. If the production and basing costs are the same, the principal's utility in the decoupling case is always higher than that in the conformity case.

This paper proceeds as follows. Section 2 describes and analyzes the conformity case, while Section 3 repeats the same procedure for the decoupling case. Section 4 conducts a comparative institute analysis. Section 5 concludes.

2 The conformity case

2.1 Model description

We develop a multi-task principal agent model in which the principal owns a firm. The firm is operated by a manager who reports the firm's earnings. The manager chooses an unobservable production effort a_p that produces actual cash flow or unmanaged earnings $x = a_p + \tilde{\varepsilon}$ where $\tilde{\varepsilon}$ is an uncertainty regarding the cash flow which is normally distributed with mean zero and variance σ^2. This unmanaged earnings are not available as a performance measure.

Besides the production activity, the manager can take actions which increase or decrease unmanaged earnings. These actions include an earnings management activity, a_b, and a tax planning activity, a_d. The earnings management activity is an upward bias and the tax planning activity is a downward bias in unmanaged earnings. In a conformity case, taxable income must be equal to reported earnings, hence, $r = x + a_b - a_d$, where r denotes firm's reported earnings. These manager's actions entail convex psychological costs $c(a_p, a_b, a_d) = (c_p a_p^2 + c_b a_b^2 + c_b a_d^2)/2$ for the manager where c_p and c_b are coefficients of the

marginal costs (part of marginal cost) in each action. Hereafter, we call c_p a "*production cost*" and c_b a "*biasing cost*" for simplicity. In other words, these coefficients represent how difficult or costly taking each action is. We assume that the cost of taking productive action is different from that of biasing the reporting earnings.[1]

The manager is risk- and effort-averse and the manager's utility function consists of a compensation w and activity costs, that is, $U_M = -\exp[-\rho(w - c)]$ where $\rho > 0$ represents a constant coefficient of absolute risk aversion. We assume that the compensation contract is linear in manager's performance and is based on the after-tax earnings. Therefore, in the conformity case, the manager's compensation is of the form:

$$w_C = \alpha_C + \beta_C(1 - t)r, \tag{1}$$

where α_C is a fixed compensation, β_C is a bonus coefficient, and t is a corporate tax rate which satisfies $0 \leq t \leq 1$. More recently, empirical studies suggest that the incentive compensation of the tax director exhibits a strong negative relationship with the GAAP effective tax rate (ETR) which is the common measure of tax planning effectiveness (Armstrong et al., 2012).[2] According to these studies, it is natural to assume that the principal cares about the tax burden and contracts on the after-tax earnings.

2.2 First-best case

First of all, we begin by considering a first-best contract in which the principal and agent can contract on the actions directly or manager's efforts are observable. In this case, it is optimal for the risk-neutral principal to protect the risk-averse agent from risk so that the agent only receives a fixed compensation, i.e., the bonus coefficient, β_C, is zero. The

[1] Although we can separate the cost of engaging earnings management and tax planning activities, this change of the setting makes the results in equilibrium and conditions more complicated and can not provide additional meaningful implications.

[2] Halperin and Sansing (2005) examine the properties of ETR as a measure of managerial tax planning effectiveness using a principal-agent model.

remaining contract problem for the assignment of the manager is

$$\max_{a_p,a_b,a_d,w} \quad E[v - w_C - t(r - w_C)] \tag{2}$$

$$s.t. \quad E[w_C] - c \geq \underline{U} \tag{PC}$$

where $\underline{U}$ denotes manager's reservation utility. Without loss of generality, we normalize it to zero. The principal's utility is equal to cash flow which is determined by unmanaged earnings minus manager's compensation minus tax expense which is based on the reported earnings. In other words, although manager's earnings management and tax planning activities do not affect the unmanaged earnings, they affect real cash flow via tax payment. (PC) is a manager's participation constraint. The left-hand side of (PC) is a manager's certainty equivalent of compensation w and effort costs.

In the optimum, PC is binding and the manager receives a fixed compensation which is equivalent to $E[w_C] = c$. This leads to the following optimization problem for the principal:

$$\max_{a_p,a_b,a_d} \quad E[(1 - t)(v - c) - t(a_b - a_d)] \tag{3}$$

Differentiating equation (3) with respect to each action, we can derive the optimal level of actions as follows:

$$a_p = \frac{1}{c_p}, \quad a_b = 0, \quad a_d = \frac{t}{c_b(1 - t)}. \tag{4}$$

First, the optimal level of productive action is independent of the corporate tax rate. This is because both a marginal benefit and a marginal cost by increasing the production action are affected by the tax rate and they are canceled out.[3] In other words, the tax rate decreases not only the marginal benefit but also the marginal cost because the manager's compensation can be included in deductible expense. Second, the optimal level of earnings management is zero because the principal gets no benefit from this activity. Engaging in the earnings management activity does not increase the firm's cash flow, however, it increases manager's compensation and tax payment. Third, the optimal level of tax planning action is affected by the tax rate. The marginal benefit of engaging in the tax planning activity is t, that is,

[3]The marginal benefit is $(1 - t)$ and the marginal cost is $(1 - t)c_p$.

the higher the tax rate is, the more the marginal benefit for the principal is. The marginal cost of the tax planning activity is $(1-t)c_b$, that is, the higher the tax rate is, the lower the marginal cost is. Putting it all together, the tax planning activity is increasing in the corporate tax rate.

Substituting equation (4) into binded (PC), we derive the fixed compensation, w_C^{FB}, and expected utility of the principal, EU_C^{FB}, in conformity case as follows:

$$w_C^{FB} = \frac{1}{2}\left(\frac{1}{c_p} + \frac{t^2}{c_b(1-t)^2}\right), \tag{5}$$

$$EU_C^{FB} = \frac{(1-2t)c_b + t^2(c_p + c_b)}{2c_p c_b(1-t)}. \tag{6}$$

This result leads to the following lemma.

Lemma 1. *1. The manager's compensation in the first-best case is increasing in the corporate tax rate.*

2. The principal's expected utility in the first-best case is increasing in the corporate tax rate if the production cost is high compared to the biasing cost and vice versa.

Proof. Differentiating equations (5) and (6) with respect to t, one has

$$\frac{\partial w_C^{FB}}{\partial t} = \frac{t}{c_b(1-t)^3} > 0, \quad \frac{\partial EU_C^{FB}}{\partial t} = \frac{t(2-t)c_p - (1-t)^2 c_b}{2c_p c_b(1-t)^2}. \tag{7}$$

The relationship between the principal's expected utility and the tax rate is ambiguous and the sign depends on the largeness of each cost. *Q.E.D.*

The intuition of Lemma 1 is as follows. Regarding the manager's compensation, a rise in a tax rate makes the tax planning activity more attractive to the manager. This increases the manager's psychological cost, which leads to a rise in the compensation. There are two effects of the rise in the tax rate on the principal's utility. One is that raising the tax rate reduces an after-tax output and the other is that it enhances the tax planning efficiency. When the production cost is high, the reduction of output is small, thus, the principal's utility in increasing in the tax rate. On the other hand, when the biasing cost is high, the

compensation which guarantees the participation constraint is high, thus, the principal's utility is decreasing in the tax rate.

2.3 Optimal contracts

For unobservable managerial activities the principal can offer performance-based compensation contracts to motivate the manager to provide the desired activity levels. In this case, the optimal contract solves the following problem.

$$\max_{\alpha,\beta} \; E[v - tr - (1-t)w_C] \tag{8}$$

$$s.t. \quad E[w_C] - c - \frac{\rho}{2}(1-t)^2\beta_C^2\sigma^2 \geq 0 \tag{PC}$$

$$a_i = \underset{a_i}{\operatorname{argmax}}\, E[w_C] - c - \frac{\rho}{2}(1-t)^2\beta_C^2\sigma^2, \quad i \in \{p, b, d\} \tag{IC}$$

The optimal activity choices of the managers are

$$a_p = \frac{\beta(1-t)}{c_p}, \quad a_b = \frac{\beta(1-t)}{c_b}, \quad a_d = 0. \tag{9}$$

Equation (9) shows that the manager has no incentive to take the tax planning activity because it decreases the manager's compensation.[4] In the optimum, again, (PC) is binding so that the expected compensation can be written as $E[w_C] = c + \rho(1-t)^2\beta_C^2\sigma^2/2$. Substituting this condition and (IC) into the principal's utility function and differentiating it with respect to β_C, the first order conditions derive the following optimal bonus coefficient and level of activities.

$$\alpha_C^* = \frac{((1-t)c_b - tc_p)^2(c_b c_p \rho\sigma^2 - c_b - c_p)}{2c_p c_b(1-t)^2(c_p + c_b + c_p c_b \rho\sigma^2)}, \tag{10}$$

$$\beta_C^* = \frac{(1-t)c_b - tc_p}{(1-t)^2(c_p + c_b + c_p c_b \rho\sigma^2)}, \tag{11}$$

$$a_p^* = \frac{(1-t)c_b - tc_p}{(1-t)c_p(c_p + c_b + c_p c_b \rho\sigma^2)}, \tag{12}$$

$$a_b^* = \frac{(1-t)c_b - tc_p}{(1-t)c_b(c_p + c_b + c_p c_b \rho\sigma^2)}, \tag{13}$$

$$a_d^* = 0. \tag{14}$$

[4]The manager prefers negative tax planning in this case. However, we define the upward bias as earnings management. Therefore, we implicitly impose the condition, $a_d \geq 0$.

We assume $(1-t)c_b - tc_p > 0$ so that the bonus coefficient and activity levels are positive.[5] A comparison of the optimal contract with the first-best solution shows that a_p^* and a_d^* are lower than those in the first-best. On the other hand, a_b^* is higher than that in the first-best because the principal has no incentive to engage in earnings management.

Differentiating equation (11) with respect to the tax rate, one has

$$\frac{\partial \beta_C^*}{\partial t} = \frac{(1-t)c_b - (1+t)c_p}{(1-t)^3(c_p + c_b + c_p c_b \rho \sigma^2)}. \tag{15}$$

This result derives the following proposition.

Proposition 1 (The conformity case)**.** *In the conformity case, the bonus coefficient is increasing in the corporate tax rate if* $c_b/c_p > (1+t)/(1-t)$ *and decreasing if* $c_b/c_p < (1+t)/(1-t)$*. If the production cost is the same with the basing cost, the bonus coefficient is decreasing in the corporate tax rate. Further, when the production and biasing costs are given, if the tax rate is low, then the bonus coefficient is decreasing in the corporate tax rate.*

Proposition 1 states if the cost of earnings management activity is sufficiently higher than that of the production activity, the bonus coefficient is increasing in the tax rate, and vice versa. Specifically, in the case of $c_p = c_b$, the bonus coefficient is decreasing in the tax rate. The intuition of Proposition 1 is as follows. An increase in the tax rate has several effects on the principal's utility. There are possibilities that give more or less incentives to the manager. First, according to equation (9), the rise in the tax rate decreases the levels of production and earnings management activities. The former makes the principal set the lower incentive because the marginal impact of increasing β decreases due to the tax rate. On the other hand, the latter gives more incentives for the principal to set the high bonus coefficient because in the conformity case, the tax prevents the manager from taking earnings management activity which is harmful for the principal. Second, these reductions of activities decrease the manager's psychological cost, which makes the principal pay less

[5] In the special case of $c_b = c_p$, that is, the production cost is equal to the biasing cost, $t < 1/2$ guarantees positive solutions. This tax rate range is quite natural in reality.

compensation due to the participation constraint. This effect increases the bonus coefficient. Third, the rise in the tax rate purely increases tax expense via production and earnings management activities. This effect decreases the bonus coefficient. Forth, the rise in the tax rate increases tax shield for paying compensation, which enhances the principal's incentive of raising the bonus coefficient.[6] Fifth, the rise in the tax rate decreases the compensation volatility for the manager. This effect increases the bonus coefficient because the manager is risk-averse.

All things considered, the impact of the rise in the tax rate depends on the production cost, the biasing cost, and the tax rate. Given the tax rate, the sign of $d\beta_C/dt$ is likely to be positive if the biasing cost is relatively high compared to the production cost because the level of earnings management in this case is low and an additional tax payment is also low by the rise in the tax rate. On the other hand, given the production and biasing costs, the sign of $d\beta_C/dt$ is likely to be negative if the tax rate is high because the reduction of psychological costs and the benefit from a deductible expense of manager's compensation are low in this case.

This proposition can raise the following empirical hypothesis. In countries where its tax system is conformity, if the firm's production technology is high (production cost is low) and the firm's governance is good or accounting audit is strict (earnings management cost is high) and/or the corporate tax rate is low, the rise in the tax rate is likely to increase the bonus coefficient.

[6]This effect is based on the assumption that the compensation is a deductible expense for calculating taxable income.

3 The decoupling case

3.1 Model description

In a decoupling case, the manager releases the reported earnings, $r = x + a_b$, and the taxable income, $z = x - a_d$, separately. Except this point, all other things are kept the same with minor modifications. The principal's utility is slightly modified as $E[v - w_D - t(z - w_D)]$ and the compensation contract is $w_D = \alpha_D + \beta_D(r - tz)$. The difference between the conformity and the decoupling case is that the manager can choose the taxable income z that is different from the reported earnings r.

3.2 First-best case

As the same with the conformity case, we begin by considering the first-best contract in which the principal and agent can contract on the actions directly or manager's effort is observable. In this case, it is optimal for the risk-neutral principal to protect the risk-averse agent from risk so that the agent only receives a fixed compensation, i.e., the bonus coefficient β_D is zero. The remaining contract problem for the assignment of the manager is

$$\max_{a_p, a_b, a_d, w} \quad E[v - w_D - t(z - w_D)] \tag{16}$$

$$s.t. \quad E[w_D] - c \geq 0 \tag{PC}$$

The principal's utility is equal to cash flow v minus manager's compensation minus tax expense which is based on taxable income. In other words, although the manager's earnings management and tax planning activities do not affect the unmanaged earnings, they affect real cash flow via tax payment. The left-hand side of (PC) is the manager's certainty equivalent of her compensation, w_D, and effort costs.

In the optimum, (PC) is binding and the manager receives a fixed compensation which is

equivalent to $E[w_D] = c$. This leads to the following optimization problem for the principal:

$$\max_{a_p, a_b, a_d} \quad E[(1-t)(v-c) + ta_d)]. \tag{17}$$

Differentiating equation (17) with respect to each action, we can derive the optimal level of actions as follows:

$$a_p = \frac{1}{c_p}, \quad a_b = 0, \quad a_d = \frac{t}{c_b(1-t)}. \tag{18}$$

The first-best activity levels are the same with conformity case.

Substituting equation (18) into binded (PC), we derive the fixed compensation w_D^{FB} and expected utility of the principal EU_D^{FB} in decoupling case as follows:

$$w_D^{FB} = \frac{1}{2}\left(\frac{1}{c_p} + \frac{t^2}{c_b(1-t)^2}\right), \tag{19}$$

$$EU_D^{FB} = \frac{(1-2t)c_b + t^2(c_p + c_b)}{2c_p c_b(1-t)}. \tag{20}$$

According to these equations, the first-best solutions are the same in each case.

3.3 Optimal contracts

For unobservable managerial activities the principal can offer performance-based compensation contracts to motivate the manager to provide the desired activity levels. In this case, the optimal contract solves the following problem.

$$\max_{\alpha, \beta} \; E[v - tr - (1-t)(\alpha + \beta_D(r - tz)] \tag{21}$$

$$s.t. \;\; E[w_D] - c - \frac{\rho}{2}(1-t)^2\beta_D^2\sigma^2 \geq 0 \tag{PC}$$

$$a_i = \operatorname*{argmax}_{a_i} E[w_D] - c - \frac{\rho}{2}(1-t)^2\beta_D^2\sigma^2, \quad i \in \{p, b, d\} \tag{IC}$$

The optimal activity choices of the managers are

$$a_p = \frac{\beta(1-t)}{c_p}, \quad a_b = \frac{\beta}{c_b}, \quad a_d = \frac{\beta t}{c_b}. \tag{22}$$

Equation (22) is different from equation (9). First, the optimal earnings management activity for the manager is positive and is independent of the tax rate because the tax authority

does not impose corporate income tax based on reported earnings but on taxable income. Second, the optimal tax planning activity for the manager is positive because the manager is rewarded by the after-tax earnings. Further, in the decoupling case, the manager can save tax expense without decreasing reported earnings.

In the optimum, again, (PC) is binding so that the expected compensation can be written as $E[w_D] = c + \rho(1-t)^2\beta_D^2\sigma^2/2$. Substituting this condition and (IC) into the principal's utility function and differentiating it with respect to β_D, the first order conditions derive the following optimal bonus coefficient and level of activities.

$$\alpha_D^* = \frac{[(1-t)c_b - tc_p]^2\{(2t-1)[c_p(1+t^2) + c_b(1-t)^2] + c_pc_b(1-t)^2\rho\sigma^2\}}{2c_pc_b(1-t)^2[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]^2}, \tag{23}$$

$$\beta_D^* = \frac{c_b(1-t)^2 + c_pt^2}{(1-t)[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]}, \tag{24}$$

$$a_p^* = \frac{c_b(1-t)^2 + c_pt^2}{c_p[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]}, \tag{25}$$

$$a_b^* = \frac{c_b(1-t)^2 + c_pt^2}{c_b(1-t)[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]}, \tag{26}$$

$$a_d^* = \frac{t[c_b(1-t)^2 + c_pt^2]}{(1-t)[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]}. \tag{27}$$

A comparison of the optimal contract with the first-best solution shows that a_p^* and a_d^* are lower than those in the first-best. On the other hand, a_b^* is higher than that in the first-best because the principal has no incentive to engage in the earnings management.

Differentiating equation (24) with respect to the tax rate, one has

$$\frac{\partial\beta_D^*}{\partial t} = \frac{c_p^2t[2-t(1-t^2)] + c_b(1-t)^2\{c_b(1-t)^2(1+c_p\rho\sigma^2) + c_p[2t^2 - 1 + c_pt(2+t)\rho\sigma^2]\}}{(1-t)^2[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]^2}. \tag{28}$$

According to equation (28), the sign is ambiguous. However, if the corporate tax rate is high, the sign is likely to be positive. In the special case that the production and basing costs are the same, that is, $c_p = c_b = c$, this equation reduces to

$$\left.\frac{\partial\beta_D^*}{\partial t}\right|_{c_p=c_b=c} = \frac{2t^2[3-2t(2-t)] + c(1-t)^2(1+2t^2)\rho\sigma^2}{(1-t)^2\{2[1-t(1-t)] + c(1-t)^2\rho\sigma^2\}^2} > 0. \tag{29}$$

This comparative statics derives the following proposition.

Proposition 2 (The decoupling case)**.** *In the decoupling case, the bonus coefficient is increasing or decreasing in the corporate tax rate. If the corporate tax rate is high or the production cost is the same with the basing cost, the bonus coefficient is increasing in the corporate tax rate.*

Proposition 2 shows that the impact of a rise in the corporate tax rate on the bonus coefficient is ambiguous in the decoupling case. However, if the corporate tax rate is high or the production and biasing costs are the same, the rise in the tax rate has a positive impact on the bonus coefficient. This result is opposite to the conformity case because the manager in the decoupling case has more incentive of engaging in the tax planning activity when the tax rate is higher as in equation (22) and this tax planning activity also generates the firm's cash flow. Therefore, it is more likely that the principal has an incentive to let the manager engage in the tax planning activity by raising the bonus coefficient compared to the conformity case where the manager has no incentive to engage in the tax planning. If the tax rate is high, the benefit from the tax planning activity is high in the decoupling case, which leads to Proposition 2.

With respect to the production and biasing costs, the cost and benefit of raising the bonus coefficient depend on the relative largeness between both activities. If the biasing cost is high, the principal is reluctant to raise the bonus coefficient because the manager has an incentive to increase reported earnings. This earnings management activity of the manager increases the manager's compensation without increasing firm's cash flow. Further, especially in the decoupling case, the corporate tax fails to prevent the manager from engaging in the earnings management because tax expense is determined by taxable income.

This proposition can provide the following empirical hypothesis. In countries where its tax system is decoupling, if the firm's production technology is high (production cost is low) and the firm's governance is good or accounting audit is strict (earnings management cost is high) and/or the corporate tax rate is high, the rise in the tax rate raises the bonus coefficient.

4 Comparative institutional analysis

4.1 Comparison in bonus coefficient

This section compares the bonus coefficients and principal's utility in both tax regimes: the conformity and the decoupling case. Taking the difference between equations (11) and (24), one has

$$\beta_D^* - \beta_C^* = \frac{c_p t[c_p(1+t) - c_b(1-t)(1-c_p\rho\sigma^2)]}{(1-t)^2(c_p + c_b + c_p c_b \rho\sigma^2)[c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]}. \tag{30}$$

According to equation (30), we derive the following proposition.

Proposition 3. *The bonus coefficient in the decoupling case is higher than that in the conformity case if the corporate tax rate is high, the biasing cost is relatively small compared to the production cost, and/or manager's degree of risk aversion or cash flow volatility is sufficiently high.*

The intuition of this proposition is as follows. First, If the corporate tax rate is high, the principal in the decoupling case has a more incentive to raise the bonus coefficient in order to let the manager engage in the tax planning. Second, if the biasing cost is high, giving more incentives for working to the manager is costly in the decoupling case because the rise in the bonus coefficient increases manager's earnings management activity. Although there is also an incentive to engage in earnings management in the conformity case, the corporate tax prevents the manager from engaging earnings management. Third, if the degree of risk aversion or cash flow volatility is sufficiently high, the bonus coefficient in the decoupling case is likely to be high. This is because the bonus coefficient in the decoupling case is more resistant to the risk terms than that in the conformity case. The marginal cost of raising β consists of an effort cost of production, an effort cost of biasing, and a cost of increasing compensation volatility. The cost of production effort and the cost of increasing compensation volatility are the same in both cases, however, the effort cost of biasing is different in the decoupling case and it is higher than that in the conformity case. In this case, a marginal increase in the degree of risk aversion or cash flow volatility decreases the

bonus coefficient more in the conformity case. In other words, the effort cost of biasing dilutes the impact of risk terms in the decoupling case.

This result is consistent with real world. In general, managers in Japanese firms are considered to be more risk averse than those in U.S. firms and the degree of book-tax conformity in Japan is thought to be higher than that in the U.S.[7] Proposition 3 indicates that the bonus coefficient tends to be low if the degree of book-tax conformity is high, the manager is risk-averse, and/or cash flow volatility is high. Actually, the bonus coefficient in Japanese firms is much lower than that in U.S. firms. Therefore this proposition provides one of reasons why compensation contracts are different among countries.

4.2 Comparison in principal's utility

Next we compare the principal's expected utility in both cases which represents the efficiency of compensation contracts because in this framework, the manager's utility is zero owing to the participation constraint. Substituting equations (10)–(14) and equations (23)–(27) into principal's expected utility functions respectively and taking the difference between them, one has

$$EU_D^* - EU_C^* = \frac{c_p t\{c_b(2-t) - c_p t - c_b[c_p t(1-2t) - 2c_b(1-t)^2]\rho\sigma^2\}}{2c_b(1-t)[c_p + c_b + c_p c_b \rho\sigma^2][c_p(1+t^2) + c_b(1-t)^2(1+c_p\rho\sigma^2)]}. \quad (31)$$

where EU_D^* and EU_C^* are equilibrium utility levels of the principal in decoupling and conformity case. In the special case that the production and basing costs are the same, that is, $c_p = c_b = c$, this equation reduces to

$$EU_D^* - EU_C^*\Big|_{c_p=c_b=c} = \frac{t\{2(1-t) + c[2 - t(5-4t)]\rho\sigma^2\}}{2c(1-t)(2+c\rho\sigma^2)(1+t^2+c(1-t)^2(1+\sigma^2)} > 0. \quad (32)$$

Equations (31) and (32) derive the following proposition.

Proposition 4. *The principal's expected utility in the decoupling case is higher than that in the conformity case if the biasing cost is relatively high compared to the production cost. If*

[7] See Atwood et al. (2008).

the production and basing costs are the same, the principal's utility in the decoupling case is always higher than that in the conformity case.

Proposition 4 shows that the comparison in the principal's utility depends on the magnitude relationship between the production and biasing costs. According to Proposition 3, if the biasing cost is small compared to the production cost, the bonus coefficient in the decoupling case is higher than that in the conformity case. However, in this case, the principal has to pay much compensation to the manager because she engages more in earnings management and tax planning. Therefore, there is a possibility that the compensation contracts in the conformity case are more effective than that in the decoupling case.

This proposition provides the following empirical hypothesis. If the firm's production technology is low (production cost is high) and the firm's governance is bad or accounting audit is not strict (earnings management cost is low), the compensation contracts in the conformity case is more effective than that in the decoupling case.

5 Concluding remarks

This paper has investigated how does a degree of book-tax conformity affect manager's compensation contracts. The pros and cons of requiring book-tax conformity have been discussed in many countries for more than half a decade. However, there have been little studies which examine a relationship between the degree of book-tax conformity and manager's compensation contracts. Our study expands new aspects of book-tax conformity research by focusing on the relationship between tax regimes and manager's compensation contracts. In this paper, we have found that book-tax conformity prevents the manager from engaging earnings management while it fails to provide an incentive to do tax planning. Therefore, whether the principal raises the bonus coefficient depends on the relative level of production and biasing costs and the tax rate. Our main findings are as follows. The bonus coefficient in the decoupling case is higher than that in the conformity case if the corporate tax rate is high, the biasing cost is relatively small compared to the production

cost, and/or manager's degree of risk aversion or cash flow volatility is sufficiently high. Further, principal's utility in the decoupling case is higher than that in the conformity case if the biasing cost is relatively high compared to the production cost. If the production and basing costs are the same, the principal's utility in the decoupling case is always higher than that in the conformity case. Some of these results are consistent with a real world. For example, managers in Japanese firms are considered to be more risk averse than those in U.S. firms and the degree of book-tax conformity in Japan is thought to be higher than that in the U.S. One of our results indicates that the bonus coefficient tends to be low if the degree of book-tax conformity is high, the manager is risk-averse, and/or cash flow volatility is high. Actually, the bonus coefficient in Japanese firms is much lower than that in U.S. firms. Therefore, this result provides one of reasons why compensation contracts are different among countries.

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