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Large shareholder portfolios, monitoring and legal
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Gros actionnaires, monitoring et protection légale des
actionnaires : une note

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Abstract

We consider an optimal portfolio diversification model in which a large shareholder can influence shares return by monitoring efficiently managers. Less diversification decreases insurance but increases the stake in the ownership and then enhances efficiency of management monitoring. We analyze the effect of legal shareholders protection on portfolio diversification.

Keywords: Corporate governance, optimal portfolio choice, large shareholders.

Résumé

Nous considérons un modèle de diversification optimale de portefeuille dans lequel un gros actionnaire peut influencer le rendement d'un actif en contrôlant efficacement les managers. Un portefeuille moins diversifié réduit l'assurance mais améliore l'efficacité du contrôle sur la direction. Nous analysons l'impact de la protection juridique des actionnaires et de la dilution de la propriété sur la diversification du portefeuille.

Mots-cles: gouvernement d'entreprise, choix de portefeuille, gros actionnaire.

JEL classification: G11, G34

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1 Introduction

Recent literature on corporate governance displays the central role of shareholders monitoring on managers decisions [Admati and al.(1994), Burkart and al. (1997), Maug (1998)]. Development of institutional investors (e.g. mutual funds, investments funds...) stresses this activity of monitoring. Indeed, their significant weight in the structure of property allows them to exert efficient control and thus reduces managers free riding.

This article establishes a link between portfolio choice and corporate governance. We consider a portfolio choice model in which investors can influence the shares return by making an effort of monitoring. They internalize their shareholder's role in corporate governance in their choice of portfolio diversification. Hence, optimal portfolio is different from the standard insurance criteria and results from a trade-off between diversification (insurance) and efficiency of corporate governance. Besides, the control efficiency of the shareholder does not only depend on its weight in the shareholding, but is also a function of both intrinsic firms parameters, e.g. the composition of the shareholding, and extrinsic parameters, e.g. legal protection of shareholders.

Few papers focus on monitoring in a portfolio setting. The closest related paper is the Admati, Pfleiderer and Zechner (1994) one. They analyze the impact of shareholder activism on portfolio allocations. They show that despite the free rider problem associated with monitoring, risk sharing considerations lead to equilibria in which monitoring takes place.

The paper is organized as follows. Section 2 presents the model. We consider a portfolio choice between a risk free asset and a risky asset. We specify technology of monitoring. Section 3 derives the optimal portfolio diversification. Sections 4 and 5 analyze respectively the effects of change in legal shareholders protection and dilution of ownership structure on portfolio diversification.

2 The model

A risk averse investor can invest his initial wealth w_0 in the risk-free asset B and in the risky asset X . This risky asset is an equity with one share-one vote structure. The rate of return on the risk free asset is i . The rate of return on the risky asset is a random variable \widetilde{X} with $\mu = E(\widetilde{X}) > 1 + i$. Prices per unit of assets X and B are exogenous and are respectively P_X and P_B . The terms α_X and α_B (assumed non negative) represent respectively the number of risky and risk free assets held by the investor. Thus, the investor faces the following budget constraint:

$$\alpha_x P_x + \alpha_B P_B = w_0 \quad (1)$$

Without loss of generality, we normalize $P_x = P_B = w_0 = 1$, which gives:

$$\alpha_x + \alpha_B = 1 \quad (2)$$

From now, we notice $\alpha_x = \alpha$.

The investor as a shareholder can monitor the managers behavior. We consider that a shareholder does not choose projects of investment. The decision is delegated to the manager. Hence, the riskiness of the payoffs are not affected. By exerting a monitoring effort (e), he improves the expected return of the shares (e.g. the shareholder can induce the manager to give up some of his private benefits).

The impact of the monitoring effort increases as the investor's stake in the corporate capital increases. This stake is represented by $\frac{\alpha}{N}$ where N denotes the number of shares X issued by the firm. The function $f(\frac{\alpha}{N}, e)$ displays the efficiency of the shareholder's monitoring on the equities return.

Assumption 1: *The function $f(\frac{\alpha}{N}, e)$ satisfies $f(., 0) = f(0, .) = 0$ and⁴ $f_\alpha > 0$, $f_e > 0$, $f_{ee} < 0$, $f_{e\alpha} > 0$.*

⁴The notation f_m represents the derivative of function $f(m)$ with respect to m .

We introduce a specific term to the firm $\beta \geq 0$ which can be interpreted as a measure of legal shareholders protection or more generally as a measure of the corporate governance efficiency.

Assumption 2: *The function $\Phi(\alpha, e) = \alpha\beta f\left(\frac{\alpha}{N}, e\right)$ represents the global corporate governance effect. It is strictly concave, i.e. $\Phi_{\alpha\alpha} < 0$, $\Phi_{ee} < 0$ and $\Phi_{\alpha\alpha}\Phi_{ee} - (\Phi_{\alpha e})^2 > 0$.*

Any effort level e brings a disutility to the investor of $\Psi(e)$ expressed in monetary terms, $\Psi(0) = 0$, $\Psi' > 0$ and $\Psi'' > 0$. The portfolio return is:

$$\tilde{R} = (1+i)(1-\alpha) + \alpha \left[\tilde{X} + \beta f\left(\frac{\alpha}{N}, e\right) \right] \quad (3)$$

The investor exhibits a Von Neuman Morgenstern utility function. We consider $U' > 0$ and $U'' < 0$. Moreover, we assume that this utility function displays non increasing absolute risk aversion.

3 Optimal portfolio diversification

To characterize the optimal portfolio diversification, we have to solve maximization program of the investor:

$$\max_{\alpha, e} E \left[U(\tilde{R}) \right] - \Psi(e) = E \left\{ U \left[(1+i)(1-\alpha) + \alpha \left[\tilde{X} + \beta f\left(\frac{\alpha}{N}, e\right) \right] \right] \right\} - \Psi(e) \quad (4)$$

From assumption 2, $U(\cdot)$ is concave and increasing, $\Psi(\cdot)$ is convex, hence first order conditions are necessary and sufficient conditions for global maximum points.

The first order condition with respect to α gives $\alpha^*(e)$ and writes

$$E \left[U'(\tilde{R}) \cdot \frac{\partial \tilde{R}}{\partial \alpha} \right] = E \left\{ U'(\tilde{R}) \left[-(1+i) + \tilde{X} + \phi(\alpha^*, e) \right] \right\} = 0 \quad (5)$$

where $\phi(\alpha^*, e) = \beta f\left(\frac{\alpha^*}{N}, e\right) + \frac{\alpha^*}{N} \beta f_{\alpha}\left(\frac{\alpha^*}{N}, e\right)$ can be interpreted as the marginal effect of corporate governance with respect to α .

The first order condition with respect to e gives $e^*(\alpha)$ and writes

$$E \left[U'(\tilde{R}) \right] \cdot \frac{\partial \tilde{R}}{\partial e} = E \left[U'(\tilde{R}) \right] \alpha \beta f_e \left(\frac{\alpha}{N}, e^* \right) - \Psi'(e^*) = 0 \quad (6)$$

We may derive first results on interaction between risky asset demand and effort.

Lemma 1 *The risky asset optimal demand is a non decreasing function of effort, i.e. $\frac{d\alpha^*(e)}{de} > 0$ and the optimal effort increases as the demand increases: $\frac{de^*(\alpha)}{d\alpha} > 0$.*

Proof. See appendix ■

We derive the following proposition for the optimal portfolio.

Proposition 2 *There exists an optimal portfolio fully concentrated in the risky asset iff the optimal effort is high enough.*

Proof. See appendix ■

Two types of solution can emerge: $\alpha^* \in (0, 1)$ or $\alpha^* = 1$. The first one involves a diversified portfolio and the second one a fully concentrated portfolio. It depends on assets returns and investor's effort which affects the expected return of the risky asset. If the optimal effort is high enough, monitoring is very efficient and the large shareholder's optimal portfolio is fully concentrated in the risky asset.

4 Optimal portfolio and legal protection of shareholders

We now analyze the effect of a change in legal protection of shareholders, i.e. β . We derive the following proposition.

Proposition 3 *As the shareholders legal protection increases, the concentration in risky asset is higher or lower.*

Proof. By using the function z , we have:

$$\frac{dz(\alpha, e^*(\alpha, \beta), \beta)}{d\beta} = \underbrace{\frac{\partial z(\alpha, e^*(\alpha, \beta), \beta)}{\partial \beta}}_{>0} + \underbrace{\frac{\partial z(\alpha, e^*(\alpha, \beta), \beta)}{\partial e}}_{>0} \underbrace{\frac{\partial e^*(\alpha, \beta)}{\partial \beta}}_{<0}$$

From lemma 5, we deduce that:

$$\frac{\partial z(\alpha, e^*(\alpha, \beta), \beta)}{\partial \beta} = \frac{\partial^2 E[U(\tilde{R})]}{\partial \alpha \partial \beta} = E\left[U''(\tilde{R}) \frac{\partial \tilde{R}}{\partial \alpha}\right] \frac{\partial \tilde{R}}{\partial \beta} + E[U'(\tilde{R})] \frac{\partial^2 \tilde{R}}{\partial \alpha \partial \beta} > 0$$

The second term is negative:

$$\frac{\partial z(\alpha, e^*(\alpha, \beta), \beta)}{\partial e} \frac{\partial e^*(\alpha, \beta)}{\partial \beta} = - \frac{\partial^2 E[U(\tilde{R})]}{\partial \alpha \partial e} \frac{E[U''(\tilde{R})]}{\frac{\partial^2 E[U(\tilde{R})]}{\partial e^2}} \frac{\partial \tilde{R}}{\partial e} \frac{\partial \tilde{R}}{\partial \beta} < 0$$

■

We isolate two opposite effects. On the one hand, as β increases, the expected risky asset return increases and then the investor substitutes risky for riskless assets in its portfolio. This concentration effect is enhanced by an increase in wealth which decreases the absolute risk aversion. On the other hand, as β increases, the investor makes less effort which reduces the concentration in risky asset. It is a diversification effect.

LaPorta, Lopez-de-Silanes, Shleifer and Vishny (1998) examine laws governing investor protection, the quality of enforcement of these laws, and ownership concentration in 49 countries around the world. Their analysis suggest

that countries with poor investor protection have more concentrated ownership of their shares. Large shareholders who monitor the managers might need to own more capital, *ceteris paribus*, to exercise their control rights and thus to avoid being expropriated by the managers. In other words, with poor investor protection, ownership concentration becomes a substitute for legal protection, because only large shareholders can hope to receive a return on their investment. Thus the diversification effect seems to predominate.

5 Optimal portfolio and dilution of ownership structure

The effect of dilution of ownership structure may be caught by an increase in N . We derive the following proposition.

Proposition 4 *A dilution of ownership structure induces a higher or a lower concentration in risky asset.*

This dilution induces two opposite effects which are sum-up in the following expression:

$$\frac{dz(\alpha, e^*(\alpha))}{dN} = \underbrace{\frac{\partial z(\alpha, e^*(\alpha))}{\partial N}}_{<0} + \underbrace{\frac{\partial z(\alpha, e^*(\alpha))}{\partial e}}_{>0} \underbrace{\frac{de^*(\alpha)}{dN}}_{>0}$$

A dilution of ownership structure decreases the efficiency of corporate governance, which is captured by $\frac{d}{dN}\beta f\left(\frac{a}{N}, e\right) = -\beta\frac{\alpha}{N^2}f_\alpha\left(\frac{a}{N}, e\right) < 0$. Indeed, it decreases the weight of the investor in the ownership structure and then reduces the impact of its effort to monitor the manager's behavior. This direct effect shall decrease the optimal demand of risky asset. However, the investor will try to compensate this loss in efficiency of corporate governance by increasing its monitoring effort. This indirect effect will tend to increase the optimal demand of risky asset.

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6 Appendix

We need the following result:

Lemma 5 $E \left[U''(\tilde{R}) \frac{\partial \tilde{R}}{\partial \alpha} \right] \geq 0$

Proof. We can write the portfolio return as $\tilde{R} = (1+i) + \alpha \left[\tilde{X} + \beta f\left(\frac{a}{N}, e\right) - (1+i) \right]$.

Under non increasing absolute risk aversion, in the event that $\tilde{X} + \phi(\alpha, e) \geq (1+i)$ we have $\tilde{R} \geq (1+i)$ since the amount invested in the risky asset is positive and $\tilde{X} + \phi(\alpha, e) \geq (1+i)$ is equivalent to $\alpha \left[\tilde{X} + \beta f\left(\frac{a}{N}, e\right) - (1+i) \right] \geq 0$ by integrating the two terms of this inequality over $[0, \alpha]$. Thus:

$$A(\tilde{R}) \leq A(1+i) \quad (7)$$

where $A(-)$ denotes the measure of absolute risk aversion..

Similarly, in the event that $\tilde{X} + \phi(\alpha, e) < (1+i)$, we have $\tilde{R} < (1+i)$ and thus:

$$A(\tilde{R}) > A(1+i) \quad (8)$$

Multiplying both sides of (7) and (8) by $-U'(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right]$ gives:

$$U''(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right] \geq -A(1+i) U'(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right]$$

in the event that $\tilde{X} + \phi(\alpha, e) \geq (1+i)$ and

$$U''(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right] > -A(1+i) U'(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right]$$

in the event that $\tilde{X} + \phi(\alpha, e) < (1+i)$. These two latter relations imply:

$$E \left[U''(\tilde{R}) \frac{\partial \tilde{R}}{\partial \alpha} \right] \geq -A(1+i) E \left\{ U'(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right] \right\}$$

After substituting the first order condition $E \left\{ U'(\tilde{R}) \left[\tilde{X} + \phi(\alpha, e) - (1+i) \right] \right\} = 0$, we have the desired result. ■

6.1 Proof of lemma 1

Those results come from the complementary between α and e . From the differentiation of (5), we obtain:

$$\frac{d\alpha^*(e)}{de} = -\frac{\frac{\partial^2 E[U(\tilde{R})]}{\partial e \partial \alpha}}{\frac{\partial^2 E[U(\tilde{R})]}{\partial \alpha^2}}$$

The SOC in α gives: $\frac{\partial^2 E[U(\tilde{R})]}{\partial \alpha^2} < 0$. Because $f_{\alpha e} > 0$ (assumption 1) and $E\left[U''(\tilde{R})\frac{\partial \tilde{R}}{\partial \alpha}\right] \geq 0$ (lemma 5), we have $\frac{d\alpha^*(e)}{de} > 0$.

It is the same to show that $\frac{de^*(\alpha)}{d\alpha} > 0$. ■

6.2 Proof of lemma 2

Let us define $z(\alpha, e) = E\left[U'(\tilde{R}) \cdot \frac{\partial \tilde{R}}{\partial \alpha}\right]$ which is strictly decreasing with respect to α since $\partial z(\alpha, e)/\partial \alpha = \partial^2 E\left[U(\tilde{R})\right]/\partial \alpha^2 < 0$ and increasing with respect to e since $\partial z(\alpha, e)/\partial e = \partial^2 E\left[U(\tilde{R})\right]/\partial \alpha \partial e > 0$.

$$\begin{aligned} z(0, e) &= E\left[U'(1+i)\left(-(1+i) + \tilde{X} + \phi(0, e)\right)\right] \\ &= U'(1+i)E\left(- (1+i) + \tilde{X}\right) \\ &= U'(1+i)\left[\mu - (1+i)\right] > 0. \end{aligned} \tag{9}$$

since $\mu - (1+i) > 0$ by assumption.

We now study $z(\alpha, e^*(\alpha))$.

$$\begin{aligned} \frac{dz(\alpha, e^*(\alpha))}{d\alpha} &= \underbrace{\frac{\partial z(\alpha, e^*(\alpha))}{\partial \alpha}}_{<0} + \underbrace{\frac{\partial z(\alpha, e^*(\alpha))}{\partial e}}_{>0} \underbrace{\frac{de^*(\alpha)}{d\alpha}}_{>0} \\ \text{sgn} \frac{dz(\alpha, e^*(\alpha))}{d\alpha} &= \text{sgn} \left\{ \frac{\partial^2 E\left[U(\tilde{R})\right]}{\partial \alpha^2} - \frac{\partial^2 E\left[U(\tilde{R})\right]}{\partial e \partial \alpha} \frac{\frac{\partial^2 E[U(\tilde{R})]}{\partial e \partial \alpha}}{\frac{\partial^2 E[U(\tilde{R})]}{\partial e^2}} \right\} \end{aligned}$$

$$= -\operatorname{sgn} \left\{ \frac{\partial^2 E [U(\tilde{R})]}{\partial \alpha^2} \frac{\partial^2 E [U(\tilde{R})]}{\partial e^2} - \left[\frac{\partial^2 E [U(\tilde{R})]}{\partial e \partial \alpha} \right]^2 \right\} < 0$$

from concavity of the problem.

From (6), it is straightforward that $e^*(0) = 0$. Then $z(0, e^*(0)) = z(0, 0) > 0$ from (9).

As $z(\alpha, e^*(\alpha))$ is strictly decreasing with respect to α and $z(0, e^*(0)) > 0$, we derive that there exists a unique α^* such that

$$\begin{aligned} 0 < \alpha^* < 1 &\Leftrightarrow z(1, e^*(1)) < 0 \\ \alpha^* = 1 &\Leftrightarrow z(1, e^*(1)) \geq 0 \end{aligned}$$

As $z(\alpha, e)$ is increasing with respect to e , $z(1, e^*(1)) < 0 \Leftrightarrow e^*(1) < \bar{e}(1)$. with $z(1, \bar{e}(1)) = 0$.

$\bar{e}(\alpha)$ is the highest effort level inducing a diversified portfolio at optimum. ■