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DIVERSIFICATION AND OWNERSHIP CONCENTRATION

BRUNO PARIGI
Università di Padova

LORIANA PELLIZZON
Università di Venezia e SSAV

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Diversification and ownership concentration*

Bruno Parigi
Department of Economics
University of Padova, Italy
brunomaria.parigi@unipd.it

Loriana Pelizzon
Department of Economics
University of Venice and SSAV, Italy
loriana.pelizzon@unive.it

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ABSTRACT

We consider a mean-variance general equilibrium economy where the expected returns for controlling and non-controlling shareholders are different because the former are able to divert a fraction of the profits. We find that when investor protection is poor, asset return correlation affects ownership structure in a positive way. Higher return correlation lowers the benefits of diversification which causes a higher investment by the controlling shareholder in his asset and a lower investment by the non-controlling shareholders. The empirical analysis supports the predictions of the model. In particular, controlling for measures of the quality of the investor protection, the legal origin of the countries, and other structural variables as in a previous study by La Porta et al. (1998) we find that equity ownership is significantly more concentrated in countries where stock return correlation is higher, and that the magnitude of this effect is larger in countries where investor protection is poorer.

Key words: Corporate governance, Investor protection, Private benefits, Diversification opportunities.

JEL classification: D8, G2, G3

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Recent research reveals a number of important differences among countries in terms of ownership structure, portfolio allocation, and stock market participation. One strand of literature argues that these differences are shaped by the extent of legal protection for outside shareholders (La Porta et al. 1997, Kumar et al. 1999, La Porta et al. 1999, Nenova 1999, among others). Ownership concentration in particular is related to poor governance: for example, in Jensen and Meckling (1976) ownership aligns the interests of controlling and non-controlling shareholders; in Zingales (1994) and La Porta et al. (1998) ownership concentration is seen as a response to poor investor protection. A number of empirical studies show that ownership is more concentrated in countries with poorer investor protection (see for example La Porta et al. 1998). The presence of control benefits is the most common explanation for ownership concentration and the resulting loss of diversification benefits (Zingales 1994, Demsetz and Lehn 1985). Theoretical work in this area is only starting to develop. Most existing models, though, are constructed in a partial equilibrium framework with risk-neutral agents (La Porta et al. 1998, 1999, Zingales 1995, Bennedsen and Wolfenzon 2000).[1]

The objective of this paper is to further the understanding of the above mentioned differences by showing that, when investor protection is poor, ownership concentration is affected by diversification opportunities. More specifically, we show that diversification opportunities, which we measure as the stock returns correlation in a given economy - the "local market correlation" - matter in explaining portfolio allocation and therefore ownership structure.

To address these issues theoretically we consider a mean-variance general equilibrium economy with one risk-free asset and a large number of risky assets, that can be interpreted as "firms". Some investors, the "savers", have no control of any firm whereas others, the "entrepreneurs", each have control of their firm. Controlling shareholders obtain higher expected returns than non-controlling shareholders because they are able to divert a fraction of the profits of the firm they control. Since the returns on the risky assets are imperfectly correlated there are benefits from portfolio diversification. The portfolio decisions of all individuals generate a demand for the shares. The model determines the fraction of the endowment wealth invested in the risk-free asset and in the risky assets and, as a result, both the total amount invested in each firm and the ownership structure of the firms.

The theoretical model yields several insights. First, we find that profit diversion induces controlling shareholders to hold less diversified portfolios. A higher level of profit diversion makes controlling shareholders retain both (i) a larger share of the assets they control, and (ii) a smaller share of the other assets than would be required only without private benefits. The first part of this result is well known in the literature. For example, Zingales (1994) observes that there is little reason to hold a large controlling block of shares unless there are benefits of control. However, low portfolio diversification may also arise as a result of a second effect: the presence of control rights enjoyed by other

[1] An exception is the general equilibrium study by Shleifer and Wolfenzon (2002) that in a risk-neutral environment examines the impact of the endogenously determined level of investor protection on the ownership structure of firms that go public.

controlling shareholders induces an even lower investment in the risky assets controlled by other entrepreneurs. This theoretical result is consistent with the stylized fact noted by La Porta et al. (1999) that in general there is no other large shareholder to monitor the controlling shareholder.

Second, lower portfolio diversification in turn leads to ownership concentration, defined as the fraction of the shares of a firm held by the controlling shareholder with respect to the shares of the same firm held by the other entrepreneurs. Ownership concentration increases when diversification opportunities decline. When diversification opportunities decline, other things being equal, each controlling shareholder invests a larger share of his wealth in the assets he controls. This result arises because the cost of poor diversification is low when correlation is high and thus each controlling shareholder can divert a larger amount of profits sacrificing less portfolio diversification. Similarly, when diversification opportunities decline, non-controlling investors allocate a *lower* fraction of their wealth to the assets that they do not control.

Third, the impact of local market correlation on ownership concentration is amplified by poor investor protection. The reason is that the poorer the investor protection, the lower the cost of sacrificing diversification and thus poor investor protection reinforces local market correlation in making it more attractive for controlling shareholders to invest in the assets they control.

Fourth, because the controlling shareholders can appropriate more profits than non-controlling shareholders, the classical two-funds separation theorem does not hold here, and investors' portfolios composition of risky assets are different. This result is related to Merton's (1987) study of capital market equilibria with incomplete information, to Admati et al. (1994) who show that the large shareholder does not hold the market portfolio, and to Easley and O'Hara (2004) who show that uninformed investors demand a higher return for holding stocks with less available public information.

The basic trade-off between risk-sharing and the (private) benefits of concentrated ownership that drives our results is closely related to Admati et al. (1994). They study the trade-off between achieving a high degree of monitoring, which is promoted by concentrated ownership, and realizing risk-sharing gains, which requires more diffuse ownership. Share holding acts as a commitment device to monitor: to extract the surplus generated by increased monitoring, the large shareholder increases his holdings which leads him to overinvest in the risky security. Similarly Bolton and vonThadden (1998) study the liquidity benefits associated with dispersed ownership and the benefits from efficient management arising from ownership concentration. In our model, however, ownership concentration does not increase efficiency but arises only as a result of the controlling shareholder's ability to divert profits which makes it more attractive for him to invest in his own firm.

Notice that although in the financial agency literature the ultimate source of profit diversion is moral hazard (Jensen and Meckling 1976), in our paper we do not focus on moral hazard *per se*. We consider instead a reduced form problem where the primitive is the level of legal investor protection that determines the level of profits that insiders

divert. This allows us to have a manageable framework to trace the feedbacks of the wedge between the expected returns of controlling and non-controlling shareholders.

Then we analyze if our theoretical prediction is empirically relevant. More specifically, we take the model to the data and investigate whether local market correlation matters in explaining ownership structure after controlling for variables considered in previous studies. As measure of ownership concentration we take the percentage of the shares owned by the top three shareholders in the ten largest companies in a group of countries from La Porta et al. (1998). The main measure of local market correlation that we use is the weighted average of pair-wise correlations between industry stock indexes in 38 countries for the period 1998-2000. Recent studies (see Morck et al. 2000, and Jin and Myers 2004) show that measures of stock price synchronicity differ sharply across countries. Similarly, in our sample local market correlation ranges from 0.23 in Australia to 0.80 in Malaysia and Turkey, with a mean of 0.52 (see Table IV and Table V). It is beyond the scope of this paper to investigate the many causes of the variability of local market correlation that might be related for example to comparative advantage in certain industries, availability of natural resources, and historical reasons leading to different patterns of financial development. What matters for us is that different stock price synchronicity may lead to different diversification opportunities for domestic investors.

Our main empirical finding is the novel result that ownership is more concentrated in countries where local market correlation is higher consistently with the model prediction. Furthermore, when a measure of the negative of investor protection (i.e. poor governance) is interacted with local market correlation, the estimated coefficient is significant and has a positive sign consistently with the model prediction that poor governance amplifies the impact of local market correlation on ownership concentration. These results are robust with respect to different measures of correlations and different model specifications aiming at capturing the effect of omitted variables that could affect both ownership concentration and local market correlation.

The rest of the paper is organized as follows. Section I presents the basic model set-up. Section II presents the optimal portfolio, the optimal ownership structure and the comparative static results w.r.t. local market correlation. Section III tests the empirical relevance of our results and presents our findings on the relation between ownership structure and diversification opportunities. Section IV discusses some possible extensions and concludes.

I Model set-up

A Investments and individuals

Consider a two-period closed economy with $n+1$ assets. The investment in asset $i = 1, .., n+1$ at time 0 is I_i. The gross return from asset i at time 1 is $\tilde{R}_i(I_i)$. Investments

in assets $1, ..., n$ are risky; for $i = 1, ..., n$ we have $\tilde{R}_i(I_i) = (m_i + \epsilon_i) I_i$, where m_i is the gross expected return per unit of investment in asset i, ϵ_i is a random variable with $E(\epsilon_i) = 0, E(\epsilon_i \epsilon_j) = \sigma_{ij} > 0, i \neq j$ and $E(\epsilon_i^2) = \sigma_i^2$. Thus, the correlation coefficient $\rho_{ij} \equiv \sigma_{ij} / (\sigma_i \sigma_j)$ is larger than zero so that risk cannot be completely eliminated from any portfolio. We also assume that $\rho_{ij} < 1$, i.e. there are diversification opportunities. Asset $n+1$ is the risk-free asset with rate of return normalized to zero; that is $\tilde{R}_{n+1}(I_{n+1}) = I_{n+1}$. The functions $\tilde{R}_i(I_i), i = 1, ..., n+1$, can be interpreted as production functions whose inputs are the investments I_i. Asset returns arise from linear technologies and thus are not affected by the size of the investment.

There are $n+1$ individuals. Individuals $1, ..., n$ are "entrepreneurs". Individual $n+1$ represents the household sector of the economy that we will consider as a unique representative agent the "saver". Each individual $j = 1, ..., n+1$ is endowed with $W_j > 0$ units of the risk-free asset that he can store investing in the risk-free asset itself; for the whole economy the total endowment of wealth is $W = \sum_{j=1}^{n+1} W_j$ units of the risk-free asset.

Entrepreneur i, "controls" risky asset i, $i = 1, ..., n$. Who is an entrepreneur and who is a saver and which asset an entrepreneur controls is exogenously determined. We have assumed that the number of entrepreneurs match the number of risky assets thus ruling out the possibility that one entrepreneur controls several assets, and that the same asset can be controlled by more than one entrepreneur. Control allows each entrepreneur to divert part of the realized profits of the assets he controls. Following La Porta et al. (1998) we assume that the amount of profit diversion is determined both by the rules that protect outside investors and by the quality of the enforcement of these rules. These rules and their enforcement depend also on the jurisdiction in which the assets are invested and cover, for example, voting power and legal protection against expropriation by management. We are considering a closed economy because investor protection is specific to a given jurisdiction and individuals have difficulty investing abroad to exploit diversification opportunities, better investor protection, and higher returns.

Profit diversion takes the form of monetary benefits $B(I_i)$ that entrepreneur i receives from the asset $i = 1, ..., n$ that he controls. The saver is not able to extract benefits. For the risk-free asset all return is paid to outsiders since there is no profit diversion: $B(I_{n+1}) = 0$.

Our assumption that the limited investor protection introduces a wedge between the returns of the controlling and non-controlling shareholders can be seen as a reduced form of a more general incentive problem where one party can obtain rents e.g. because of an information advantage. Following Holmström and Tirole (1997), suppose for example that an entrepreneur can work hard or shirk; shirking allows him to obtain private benefits but lowers the probability of success; this introduces an incentive constraint to induce the entrepreneur to work hard; to satisfy this constraint the entrepreneur must be given a rent proportional to the foregone benefits. This rent can be seen as the source of the wedge between the income generated by the assets and the income payable to outsiders.

B Cash flow rights

Cash flow rights from asset i, $i = 1, ..., n$, defined as gross return net of the diverted profits, are

$$\widetilde{Y}_i(I_i) = \tilde{R}_i(I_i) - B(I_i) \tag{1}$$

with the rate of return $\widetilde{y}_i = \frac{\widetilde{Y}_i(I_i) - I_i}{I_i}$ and expectation $E(\widetilde{y}_i) = y_i$.

For the sake of simplicity we consider the case in which profit diversion is proportional to the size of the investment and thus can be interpreted as a deterministic salary or a management fee to the controlling shareholder, paid out of stochastic income. In particular, we define $B(I_i) = b_i I_i$, where $b_i \geq 0$ for $i = 1, ..., n$. The parameter b_i measures the amount of profit diversion as a fraction of the initial investment. For simplicity we assume that b_i is the same for each risky asset ($b_i = b, i = 1, ..., n$).[2] This way of modelling profit diversion is consistent with the ample empirical evidence showing that the scope for profit diversion grows with firm size.

To focus on the impact of local market correlation on portfolio decisions, we assume that all the risky assets have the same expected returns and standard deviations ($m_i = m, \sigma_i = \sigma, i = 1, ..., n$), and that the correlation coefficients between the returns on the risky assets are identical to ρ. An entrepreneur investing in the asset he controls is entitled to receive both the expected cash flow rights like any other shareholder, and the control benefits. The expected rate of return on the risky assets, $m - 1$, which is fixed given the linearity of the return function, can be split in two parts: $y = m - 1 - b$ are the expected cash-flow rights accruing pro rata to all shareholders; b are the profits diverted by the controlling shareholder.

We make a number of assumptions about the parameters. First, we assume that $\widetilde{y} \in \left[\underline{y}, \overline{y}\right]$, with $\underline{y} \geq -1$, that is, for all i, $m + \epsilon_i > b$ for all realization of ϵ_i, so that profit diversion can happen also when income is low. This captures the idea that insiders can divert profits even if the company performs poorly: the recent corporate scandals in the U.S. and in Europe provide ample evidence that insiders could obtain large payoffs even when companies fail. Second, the expected rate of return on the risky asset y must be positive (i.e. $m - 1 > b$) otherwise storage dominates and the optimal investment of the saver in the risky assets is zero, that is, limited market participation is directly linked to a high level of profit diversion.[3] Finally, to avoid the modelling shortfall that all wealth is invested in the risky assets, we assume that $m - 1 - b$ is not "too" large.

[2] Shleifer and Wolfenzon (2002) observe that legal protection could vary across industries (higher in regulated industries), and could depend on the ownership structure of firms, e.g. the monitoring of a second large shareholder could result in a higher effective level of investor protection (Bennedsen and Wolfenzon 2000, La Porta et al. 1999, Pagano and Röell 1998). However, to keep the model simple, we assume that the level of investor protection is the same for all industries in a given economy and does not depend on the ownership structure.

[3] There is ample empirical evidence (see e.g. Guiso et al. 2002) indicating that in countries where the potential for profit diversion is high household market participation is low.

II Ownership structure

A The portfolio problem

We concentrate on a portfolio problem where individuals allocate their initial wealth to maximize their expected utility. We have simplified the problem of maximizing firms' profit by assuming a linear technology that yields a perfectly elastic demand for funds. Thus we have taken the return process of securities and therefore their prices as given, an approach often followed in portfolio problems (Cochrane 2001). In this way we lose the effect of size on the marginal return on the investment and therefore on the cost of capital. However, we gain a much simplified framework that allows us to determine the optimal investment size, an aspect usually neglected. Indeed, in most cases the opposite is true: the demand for funds is given (i.e. investment size) by the observed market portfolio (in line with the classical CAPM model) or normalized to one (see for example Admati et al. 1994) and the equilibrium cost of capital is endogenously determined.

We assume that the entrepreneur maintains control after the initial share offering (Zingales 1995) and that control does not depend on the shares owned. This captures the idea that shares with multiple votes, voting trusts, cross-ownership arrangements, etc. can shield the controlling shareholder from the market from corporate control and allow him to maintain control also with a small fraction of the shares.

To determine the amount of investment in the various assets we consider the problem of individual $j = 1, ..., n+1$ that must choose how to allocate his wealth by purchasing claims on the cash flow rights of $n+1$ assets. We assume that each individual's preferences are represented by a utility function V_j defined over the mean and the variance of the portfolio's return, the initial wealth and the level of profit diversion. We assume that all individuals have the same relative risk aversion coefficient, λ. We envision a situation where each entrepreneur behaves as a price taker and approaches potential investors proposing to raise whatever capital they are willing to provide, by offering shares in his start-up firm.

In the text we present the case with three assets, two risky and one safe, and three individuals, two entrepreneurs and one saver, leaving the general case to the appendix. All the qualitative results and the comparative statics are the same. Let x_{ji} be the proportion of the wealth of individual j, $j = 1, 2, 3$, invested in assets $i = 1, 2, 3$, with the budget constraint

$$\sum_{i=1}^{3} x_{ji} = 1. \tag{2}$$

The accounting identity linking the individual portfolio shares and the total investment in the risky assets is

$$I_i = x_{1i}W_1 +, ..., +x_{3i}W_3, \qquad i = 1, 2. \tag{3}$$

Denote with

$$\mu_j = x_{j1}y_1 + x_{j2}y_2 \tag{4}$$

and

$$\sigma_j^2 = x_{j1}^2\sigma^2 + x_{j2}^2\sigma^2 + 2x_{j1}x_{j2}\rho\sigma^2 \tag{5}$$

the portfolio's expected rate of return and variance per unit of wealth, respectively.

Each individual $j, j = 1, 2, 3$, chooses his portfolio weights to maximize the objective function

$$V_j = \left[1 + \mu_j - \frac{\lambda_j}{2}\sigma_j^2\right] W_j + B\left(I_j\right) \tag{6}$$

with $B\left(I_i\right) = bI_i$ for $i = 1, 2$, $B\left(I_3\right) = 0$ s.t. his budget constraint (2) and (3). We assume that $W_1 = W_2 = 1, W_3 > 0$.

The solution to the above problem yields the following optimal portfolio weights

$$x_{ii}^* = \frac{m-1}{\lambda\sigma^2\left(\rho+1\right)} + \frac{b\rho}{\lambda\sigma^2\left(1-\rho^2\right)} \text{ for } i = 1, 2, \tag{7}$$

$$x_{ji}^* = \frac{m-1}{\lambda\sigma^2\left(\rho+1\right)} - \frac{b}{\lambda\sigma^2\left(1-\rho^2\right)} \text{ for } j \neq i \text{ and } i, j = 1, 2, \tag{8}$$

$$x_{3i}^* = \frac{m-1}{\lambda\sigma^2\left(\rho+1\right)} - \frac{b}{\lambda\sigma^2\left(1+\rho\right)} \text{ for } i = 1, 2. \tag{9}$$

The proof for the general case is presented in the appendix. The portfolio weights in all three equations (7), 8) and (9) have two components. The first is the solution of the classical Tobin-Markowitz mean-variance analysis which depends on the expected cash-flow rights and is common to all the investors. The second term characterizes the differences among the portfolio weights of investors. In equation (7) , which describes the proportion of the wealth of entrepreneur i in the assets he controls, the second term is the incentive stemming from profit diversion: the incentive for an entrepreneur to invest in his company is related to the level of profit diversion and it is amplified by the level of ρ that increases the numerator and decreases the denominator of the second term. In equation (8) , that represents the proportion of wealth that the entrepreneur invests in the other firm, the second term is decreasing in the amount of profit diversion and the effect is amplified by the level of correlation: the incentive of the entrepreneur to invest in the other firm is related to the amount of profit diversion extracted by the controlling shareholder and the opportunities of diversification offered by such asset. Therefore, profit diversion "double counts" on the amount of wealth the entrepreneur invests in his firm. Indeed, this amount is high not only because of profit diversion but also because each entrepreneur will see his returns reduced by the extraction of profits by another entrepreneur if he invests in somebody else's firm. This effect is amplified by the level of diversification opportunities. In equation (9), that shows the portfolio weights of the saver, the second term is decreasing in the amount of profit diversion.

Notice that investors do not hold the same portfolios. Profit diversion introduces a wedge between the expected return for controlling and non-controlling shareholders that perceive a different risk-return trade-off. Hence it is optimal to hold different portfolios

and the standard two-fund separation theorem does not hold here. A similar result is found in Easley and O'Hara (2004) where uninformed investors demand a higher return to hold stocks with less public information available. In that paper, private information introduces a wedge that cannot be arbitraged away either by holding more stocks or by holding more money but which requires a higher return by the uninformed thus increasing the cost of capital.

Despite the presence of profit diversion, as in a classical portfolio problem, the proportion of the saver's wealth invested in the cash flow rights of the risky assets is positive under the maintained assumption that profit diversion is not so large as to expropriate the saver completely; i.e. $b < m-1$. Notice that non-controlling shareholders will invest in assets with known bad governance, although a smaller amount than absent profit diversion; in fact $\frac{\partial x^*_{ji}}{\partial b} < 0, j \neq i = 1,2$ and $\frac{\partial x^*_{3i}}{\partial b} < 0, i = 1,2$.

Moreover, each controlling shareholder invests a fraction of his wealth in the asset that he controls higher than that of the other entrepreneur, $\frac{x^*_{ii}}{x^*_{ij}} > 1$, $i, j = 1,2$, which makes entrepreneurs' portfolios concentrated. The loss of diversification is compensated by the higher expected return in the investment in the assets he controls and by the lower total amount of profit diversion recognized to the other entrepreneur. This effect is stronger when local market correlation is higher as summarized in the following Proposition.

Proposition 1 *When local market correlation increases, each entrepreneur invests a higher fraction of his wealth in the asset he controls and a lower fraction in the other risky asset. This applies only after some threshold level of correlation is achieved.*

Proof. See the appendix. ■

Several comments are in order. First, if local market correlation is sufficiently high, when local market correlation increases (diversification opportunities decline) each controlling shareholder's loss of diversification opportunities becomes less important w.r.t. the additional profits that can be diverted. Thus each controlling shareholder increases his investment in the assets he controls and invests less in the other risky assets.

Second, it must be stressed that the relationship between portfolio concentration and local market correlation becomes relevant only when investor protection is imperfect. In fact a necessary condition for the result in Proposition (1) is positive profit diversion; it is easy to see that when $b = 0$ the portfolio weights of the risky assets are the same for all the individuals and when local market correlation increases they all invest a lower, not higher, fraction of their wealth in both risky assets. Thus the loss in portfolio diversification stems from the joint effect of profit diversion and local market correlation, not just local market correlation.

B Equilibrium ownership structure

From the optimal portfolio weights, x^*_{ij}, of each individual the equilibrium ownership structure of the assets follows immediately. In equilibrium, the supply of funds is equal to the demand for funds and the total amount invested in each risky asset can be obtained using the market clearing conditions

$$I^*_i = x^*_{1i}W_1 +, ..., +x^*_{3i}W_3, \quad i = 1, 2, \tag{10}$$

i.e.

$$I^*_i = \frac{2(m-1) - b + W_3\,(m-1-b)}{\lambda\sigma^2\,(\rho+1)} \quad i = 1, 2, \tag{11}$$

and the resource constraint

$$I_3 = W - I^*_1 - I^*_2. \tag{12}$$

From (11) we observe that the investments in the risky assets decline when the protection of non-controlling shareholders declines, $\frac{\partial I^*_i}{\partial b} < 0, i = 1, 2$, as verified empirically by La Porta et al. (1998) and Castro, Clementi, MacDonald (2004). Similarly, quite intuitively from (11) it follows that the investment in risky assets declines with the diversification opportunities; $\frac{\partial I^*_i}{\partial \rho} < 0$.

From the optimal portfolio weights and the amount invested in the risky assets, I^*_i, with $i = 1, 2$, we determine the fraction α^*_{ji} of the cash flow rights of asset i owned by individual $j = 1, 2, 3$. An individual j, that invests a fraction x^*_{ji} of his wealth W_j in asset i spends $x^*_{ji}W_j$. Since the total value of individual $j's$ holding of asset i, $\alpha^*_{ji}I^*_i$ must equal the amount individual j spends in asset i, then the relation between the proportion of wealth invested by each individual j in assets i, and the shares owned by individual j of the cash flow rights of asset i, is

$$\alpha^*_{ji} = \frac{W_j}{I^*_i}x^*_{ji} = \frac{x^*_{ii}W_1}{x^*_{1i}W_1 + x^*_{2i}W_2 + x^*_{3i}W_3},\ i = 1, 2,\ j = 1, 2, 3. \tag{13}$$

Thus we have

$$\alpha^*_{ii} = \frac{(m-1)}{2\,(m-1) - b + W_3\,(m-1-b)} + \frac{b\rho}{(2\,(m-1) - b + W_3\,(m-1-b))\,(1-\rho)} \text{ for } i = 1, 2, \tag{14}$$

$$\alpha^*_{ji} = \frac{m-1}{2\,(m-1) - b + W_3\,(m-1-b)} - \frac{b}{(2\,(m-1) - b + W_3\,(m-1-b))\,(1-\rho)} \text{ for } i \neq j = 1, 2, \tag{15}$$

and

$$\alpha_{31}^{*} = \alpha_{32}^{*} = \frac{(m-1-b)\,W_3}{2\,(m-1)-b+W_3\,(m-1-b)}. \tag{16}$$

Equations (14), (15), and (16) allow us to analyze the ownership structure of the assets and yield the most important insights of the paper.

We define *concentrated* an ownership structure in which the two entrepreneurs do not hold the same fraction of shares. Our first result shows that the optimal ownership structure is concentrated because the relative share of the cash flow rights of the controlling entrepreneur is larger than that of the other entrepreneur; $\alpha_{ii}^{*} > \alpha_{ji}^{*}\ j \neq i = 1, 2$. The saver has a different level of wealth and his shares cannot be directly compared with those of the entrepreneurs. Notice however, that in the case of identical wealth the saver holds a level of shares intermediate between the two entrepreneurs; i.e. when $W_3 = 1$, $\alpha_{ii}^{*} > \alpha_{3i}^{*} > \alpha_{ji}^{*}$.[4]

Second, from (14), (15), and (16) it follows that ownership concentration grows with profit diversion: $\frac{\partial a_{ii}^{*}}{\partial b} > 0$, $\frac{\partial a_{ji}^{*}}{\partial b} < 0$ and $\frac{\partial a_{31}^{*}}{\partial b} < 0$. This result is strictly related to the effect of profit diversion on portfolio weights. As equation (13) shows, ownership concentration arises not only because the controlling shareholder invests a higher fraction of his wealth in his firm (x_{ii} increases), as stressed by Zingales (1994), but also because the non-controlling shareholders invest less in that firm.

Third, the impact of local market correlation on ownership concentration is shown in the following Proposition that provides our main testable implications.

Proposition 2 *When investor protection is limited, ownership becomes more concentrated as local market correlation increases: in fact in the presence of profit diversion (i.e. $b > 0$), when local market correlation increases, the shares of the controlling shareholder increase ($\frac{\partial a_{ii}^{*}}{\partial \rho} > 0$), those of the other entrepreneur decline ($\frac{\partial a_{ji}^{*}}{\partial \rho} < 0$), and those of the saver remain unchanged ($\frac{\partial a_{31}^{*}}{\partial \rho} = 0$). Moreover, poor investor protection amplifies the effect of local market correlation on ownership concentration; in fact the derivative of $\frac{\partial a_{ii}^{*}}{\partial \rho}$ w.r.t. b is positive, and the derivative of $\frac{\partial a_{ji}^{*}}{\partial \rho}$ w.r.t. b is negative.*

Proof. See the appendix. ■

This Proposition illustrates the interaction between local market correlation, ownership concentration and investor protection. When local market correlation increases, the controlling shareholder faces a lower loss from foregone diversification opportunities arising from concentrated ownership (thus he invests more in his firm) and the non-controlling shareholders face less attractive risky securities (thus they invest less in that firm).

[4] We have assumed that control is not contestable. However, the result that $a_{ii}^{*} > a_{ji}^{*}$ has implications for the control of the assets. In particular, it implies that the only other individual in the economy capable of extracting private benefits (the other entrepreneur) finds it optimal to acquire only a minority stake in a firm controlled by somebody else, even if control is contestable.

Furthermore the impact of diversification opportunities on ownership concentration is amplified by profit diversion. The poorer the investor protection, the lower the cost of sacrificing diversification opportunities to pursue private benefits through concentrated ownership. In the limit, absent profit diversion as in a Tobin-Markowitz world for example ($b = 0$), diversification opportunities play no role in ownership concentration as can be seen from equations (14) and (15) . Similarly, even in the presence of profit diversion the share of the saver is not affected by local market correlation since he is not able to divert profits which is the channel through which correlation affects ownership. From $a_{3i}^* = \frac{W_3}{I_i^*} x_{3i}^*$ an increase in ρ causes a decrease in x_{3i}^* and a decrease in I_i^* of the same amount so that $\frac{\partial \alpha_{31}^*}{\partial \rho} = 0$ while $\frac{\partial x_{31}^*}{\partial \rho} < 0$. As shown in the appendix, Proposition (2) also applies to the general case with $n + 1$ assets.

Notice finally that in Admati et al. (1994) and Bolton and vonThadden (1998) ownership concentration has beneficial incentive effects that increase returns although at the cost of poorer diversification and lower liquidity, respectively. On the contrary, in our model, ownership concentration has no positive incentive effect but is just an instrument to obtain a higher overall level of profit diversion.

C A numerical example

The potential magnitude of the impact of local market correlation on ownership concentration can be illustrated by a simple numerical example. The specific value to attach to some of the model's parameters is surely debatable. As our focus is on the comparative static effects of changes induced by the correlation parameter, we adopt simple base levels for the model's structural parameters. Thus we set the expected return from the investment at $m = 1.1$, and the wealth of the savers at $W_3 = 1$. We then compute the optimal ownership structure $\left(a_{ii}^*, a_{ji}^*, a_{3i}^*\right)$ generated by changing the level of correlation, ρ, and the level of profit diversion, b.

[INSERT Table (I) about here]

Table (I) shows how changes in ρ and b affect the ownership structure. The example shows that the effect of correlation on ownership structure depends on the level of profit diversion. When there is no profit diversion ($b = 0$) , correlation has no effect on ownership structure. However, when profit diversion is positive, correlation matters. To show this result we consider a range of values for b and ρ. In particular, the range of b is from 0.006 (the minimum percentage of profit diversion observed per dollar invested in some empirical studies, e.g. Faccio and Lang 2002) to 0.020 (the maximum observed in the same study) and the range of local market correlation, ρ, is from 0.23 to 0.80 (respectively, the minimum and the maximum observed in our sample; see Table (IV)). An increase in b from the minimum to the maximum yields a change in the share of the controlling shareholder (respectively, other entrepreneur) from 35% to 41% (from 32% to 28%) for the lowest level of correlation. Ownership becomes even more concentrated

when correlation increases: from 41% to 67% for the controlling shareholder (from 28% to 2% for the other entrepreneur) for the maximum level of investor protection. Therefore, the joint effect of profit diversion and correlation changes the ownership structure from 35% to 67% for the controlling shareholder and from 32% to 2% for the other entrepreneur. Thus, the effect of correlation on ownership concentration is of a similar order of magnitude to profit diversion.

In the next section we move from the theoretical model to its testing on a group of countries.

III Empirical analysis

In this section we investigate empirically if local market correlation matters in explaining ownership concentration. It should be remembered that the model predicts that ownership is more concentrated in countries with higher local market correlation and that this relationship is amplified by poor investor protection. To test these hypotheses, we regress ownership concentration against local market correlation, several control variables, and other explanatory variables.

A Data Description

Our main measure of local market correlation is a weighted average of industry stock indexes. We estimate correlations between industry stock indexes in 38 countries (see Table IV) using monthly returns for the three-year sample 1998-2000 from Datastream stock prices.[5] We consider stock indexes rather than individual stocks on the ground that the returns on the industry indexes are better indicators of the primitive states of nature in the economy and thus are taken as proxies for the asset returns of the theoretical model. The 10 industries in the Datastream database are: Resources, Basic Industries, General Industrials, Cyclical Consumption Goods, Non-Cyclical Consumption Goods, Cyclical Services, Non-Cyclical Services, Utilities, Information Technology, Financial. We calculate the pair-wise correlation among the 10 industry returns and determine the average pair-wise industry correlation using as weights the market capitalizations of each industry index. This measure is able to capture the average correlation among the asset returns, the parameter ρ of our theoretical model.

A detailed description of this and the other variables used in the analysis and their sources can be found in Tables (II) and (III)).

[INSERT Table (II) about here]

[5] We have also considered the correlation based on the five-year sample 1996-2000 for which a smaller number of countries is available. The lower number of countries is the only reason why we preferred the three-year sample. Nevertheless the results of the five-year sample are qualitatively similar and we do not report them here.

[INSERT Table (III) about here]

The data on Ownership concentration are from La Porta et al. (1998) and indicate the percentage of the shares owned by the top three shareholders in the ten largest companies (see Table IV). We take the shares of the top three shareholders as a proxy for the shares of the controlling entrepreneur, under the assumption that all the largest shareholders have the potential to divert profits.

[INSERT Table (IV) about here]

To define our control variables we use the explanatory variables of La Porta et al. (1998). In particular we use: the logarithm of GNP per capita on the idea that richer countries may have different ownership patterns, the logarithm of total GDP on the idea that larger economies have larger firms which might have lower Ownership concentration, the Gini coefficient for a country's income as a proxy of the level of inequality in the society, and several measures of the legal system such as Legal origin dummies (French, English, German, the omitted dummy being Scandinavian). As additional control variables we consider the four measures of the quality of the legal system that La Porta et al. (1998) show to be statistically significant in their study, namely Antidirectors rights (a measure of shareholders protection), Accounting standards, Mandatory dividend (describes whether there are rules that force firms to pay dividends), Legal reserve required (the percentage of total share capital mandated by Corporate Law to avoid the dissolution of an existing firm). We consider all these four indexes proxies for (the inverse of) profit diversion b. We limit our analysis to these variables given the small dataset.

Table (V) displays the univariate statistics and Table (VI) the simple correlation coefficients for our main variable of stock returns correlation (Local market correlation) Ownership concentration and the structural variables listed above.

[INSERT Table (V) about here]

[INSERT Table (VI) about here]

The univariate statistics show that Local market correlation and Ownership concentration are different across countries. The sign of the correlation coefficients for our stock returns correlation and ownership concentration are largely as expected from our theoretical model. Moreover, Antidirectors rights and local market correlation are statistically unrelated; indeed, despite the negative correlation, the coefficient is not different from zero.[6] This result is consistent with the relation found by Morck et al. (2000).

[6]We have tested the correlation coefficient by regressing Local market correlation against Antidirectors rights. Even if we introduce control variables in the analysis the result does not change.

We stress that it is not an objective of this paper to explain why stock correlation differs across countries.[7] Rather, the key point of our research is that diversification opportunities matter in explaining ownership concentration and that poor investor protection alone is not able to capture all the variability of ownership concentration among countries. In particular, as our model and numerical example show, there are two sets of explanatory variables that have to be considered in analyzing ownership concentration: one is investor protection, which we measure with Antidirectors rights, and the other is diversification opportunities. As shown above, notice that Antidirectors rights and diversification opportunities, measured by Local market correlation, are unrelated.

Furthermore, Figure (1) shows that countries with different levels of Antidirectors rights might have the same diversification opportunities and countries with the different diversification opportunities may have the same level of Antidirectors rights. In particular, we observe almost all the levels of Local market correlation for each value of Antidirectors rights. This means that not only local market correlation differs among countries but that it differs among countries with the same level of minority shareholders protection. The implication is that ownership concentration could be different for countries with identical levels of Antidirectors rights. For instance, in our dataset there are countries (see for example Italy, Mexico,Venezuela) with the same level of Antidirectors rights as Germany and lower diversification opportunities but a higher ownership concentration. On the other side Singapore has a high level of Antidirectors rights but few diversification opportunities and again a high ownership concentration.

[INSERT Figure (1) about here]

B Ownership concentration and local market correlation

One of the model predictions is that Ownership concentration increases when diversification opportunities decline. To test this hypothesis, we regress Ownership concentration against Local market correlation, several control variables, and several explanatory variables. Table (VII) shows the results.

[INSERT Table (VII) about here]

The first column of Table (VII) shows the explanatory power of the control variables used by La Porta et al. (1998). The second column of Table (VII) reports the results from a baseline specification using both the control variables and the explanatory variables suggested by La Porta et al. (1998).[8]

[7]Note that the few studies on this issue, Morck et al (2000) and Jin and Myers (2004), have so far been unable to offer a convincing explanation.

[8]The results are in line with those reported by La Porta et al. (1998). Though some of the countries in our sample are different from those in their study the signs and values of the coefficients statistically different from zero are very similar to those in La Porta et al. (1998).

To document the extent to which diversification opportunities affect ownership concentration, we extend the empirical specification used by La Porta et al. (1998) by including the Local market correlation variable. The results are reported in the third column of Table (VII). An increase in Local market correlation, all else being equal, is associated with an increase in ownership concentration. In particular, Local market correlation matters in that its coefficient is significant at the 1% level, and has the expected positive sign. The impact of local market correlation on Ownership concentration is sizeable. The estimated coefficient suggests that an increase of one standard deviation of Local market correlation (approximately +13% of Local market correlation) is associated with an increase of slightly less than half standard deviation of Ownership concentration (approximately +6% of ownership concentration).

Furthermore, the inclusion of Local market correlation in the regression increases the explanatory power by 15% (the adjusted R^2 increases from 45.2% to 60.8%). This effect is larger than that of the inclusion of the four measures of the quality of the legal system described above. In fact, comparing the explanatory power of the regression in the first column - which excludes the four measures of the quality of the legal system - with that of the regression in the second column - which includes them - we see that the explanatory power increases by 10% (from 35.1% to 45.2%).

A potential critique of the interpretation that fewer diversification opportunities make ownership more concentrated is that both are affected by common factors. One such candidate is the protection that the legal system affords to investors. However, adding local market correlation to the explanatory variables of column 2 (that includes measures of investor protection) does not affect the significance of the coefficients of these variables. In particular, adding Local market correlation does not turn the coefficient of Antidirectors rights insignificant, the only significant measure of investor protection in the regression in column 2.

We then investigate an additional prediction of the model, namely that the *intensity* of the relationship between Local market correlation and Ownership concentration varies with some exogenous variables. In particular we test whether poor investor protection amplifies the impact of Local market correlation on Ownership concentration.

[INSERT Table (VIII) about here]

In Table (VIII) we consider a regression where a measure of investor protection is interacted with local market correlation. For this purpose we have constructed a new variable, Directors rights, the negative of Antidirectors rights, that takes value 0 when investor protection is maximum and 5 when investor protection is minimum. We select Antidirectors rights because it is the only significant measure of investor protection in the regression in column 1. The results show that the impact of Local market correlation on Ownership concentration is amplified by poor investor protection. This is consistent with the model explanation, namely that the poorer the investor protection, the lower the cost of sacrificing diversification opportunities to extract profits.

A caveat is necessary to interpret our results. We have assumed that the model represents a closed economy but in reality financial markets are open and investors could potentially invest in financial markets around the world. Although the possibility of investing abroad is real, there is ample empirical evidence that the home bias is relevant not only for retail investors but also for mutual fund managers and that the price of risk differs internationally (see for example Levine and Zervos 1998). As long as this is at least in part true there are diversification opportunities that are only domestic and therefore they matter for ownership concentration. The investigation of the impact of international capital mobility on diversification opportunities and ownership concentration needs further theoretical and empirical investigation which is beyond the scope of this paper.

C Robustness analysis

C.1 A parsimonious model specification and alternative measures of diversification opportunities

The first analysis of robustness of our result is a more parsimonious specification of the model given the limited dataset. From the theoretical standpoint the main variables to include are: the size of the country and the governance indicators.

[INSERT Table (IX) about here]

The regressions presented in Table (IX) show that even under a more parsimonious specification Local market correlation continues to be significant and to dramatically improve the explanatory power of the regressions.

As a further robustness check of our correlation variable, we use alternative measures of local market correlation. The detailed description of these variables is in Table (II) and the univariate statistics and correlations are presented in Tables (X) and (XI) respectively.

[INSERT Table (X) about here]

[INSERT Table (XI) about here]

The first measure of correlation is the Morck et al. (2000) measure of stock price synchronicity based on the standard CAPM/market factor linear regression. This is the average R^2 of firm-level regressions of bi-weekly stock returns in each country in 1995.

[INSERT Table (XII) about here]

Under this framework a high R^2 indicates a high degree of stock price synchronicity and therefore a high correlation among stocks. We use the R^2 data reported in Morck et al. (2000) (as indicated in Table (IV)), henceforth the Morck R^2, and perform the same analysis as before. The results (shown in the third column of Table (XII)) are qualitatively similar to our previous analysis. The estimated coefficient is statistically different from zero (with a p-value of 2.6%) and with the predicted sign. Thus an increase in Morck R^2, all else being equal, is associated with an increase in Ownership concentration. Adding Morck R^2 increases the explanatory power of the regression based on explanatory and control variables of La Porta et al. (1998) by almost 7% (see the second and third column of Table (XII)).

It should be remembered that our main measure of local market correlation is a weighted average of pair-wise correlations of 10 industry indexes of returns where the weights are the indexes of stock market capitalization. To cope with the potential problems arising with this weighing we consider an alternative measure of local market correlation based on the average correlation among industry indexes (Equally weighted pair-wise correlation).

A second potential problem for the correlation measure is that we do not find the same number of industries in all countries. Therefore, the second measure we consider is the equally weighted correlation measure based on the same number of industries for each country. Since for some countries there are only four industry indexes, we used the four largest common industries in each country as a measure of local market correlation (Correlation of 4 common industries). The third measure we consider as a proxy for diversification opportunities is the logarithm of the number of listed stocks. The idea is that for diversification opportunities to be available to portfolio investors, risks must be traded in organized exchanges. Hence, the number of stocks listed in a market offers an indication of the diversification opportunities available in the economy. Using these three measures of diversification opportunities we obtain results similar to those presented above (see Table (XIII)). In particular, ownership is less concentrated in countries with better diversification opportunities.[9]

[INSERT Table (XIII) about here]

C.2 Omitted variables

It may be argued that the positive relationship between Local market correlation and ownership concentration is due to the presence of some common observable and unobservable factors not controlled for in the above regressions that affect both variables.

Although this is a classical critique that could be applied to many cross-country analysis, to address this issue we need to identify the factors that could affect both variables. The first potential common factor is the variable Disclosure constructed by La Porta et

[9]We have considered alternative explanatory variables like stock market capitalization over GDP and average market capitalization of firms and the results of the regressions are qualitatively unchanged.

al. (2005). Disclosure is an index that considers six criteria: prohibition to sell securities to investors without a prospectus; disclosure requirements regarding the compensation of directors and key officers; disclosure requirements about ownership structure; disclosure requirements about insiders' ownership; disclosure requirements regarding outside contracts by the issuers of new shares, and disclosure regarding transactions between the issuers and related parties like its directors.

We regress Local market correlation against all previous control variables and the Disclosure variable.

[INSERT Table (XIV) about here]

The first column of Table (XIV) shows that the Disclosure variable does not significantly affect Local market correlation, similarly to the other variables that measure poor investor protection.

We then analyze if and how Disclosure affects Ownership concentration. The second column of Table (XIV) shows that its effect is not statistically significant. To complete the analysis we perform two additional regressions. The first, shown in the third column, considers the two explanatory variable Disclosure and Local market correlation. If Disclosure is the common factor that explains both Ownership concentration and Local market correlation we should observe a decline of the explanatory power of Local market correlation. However, the coefficient of Local market correlation remains highly statistically significant. The last analysis that we perform to disentangle the role of Disclosure is the creation of a variable for Local market correlation which is by construction independent from Disclosure. We create this variable by orthogonalizing our measure of Local market correlation with respect to all the control variables, the poor investor protection variable and the Disclosure variable by considering the residuals of the regression presented in the first column. By construction the residual variable is not affected by the Disclosure variable. If minority shareholders protection and Disclosure are common factors that capture all the effects of Local market correlation on ownership structure we should expect the residual variable to have no power to explain Ownership concentration. We perform the same regression as before considering the Local market correlation variable orthogonalized with respect to the previously mentioned variables. The results presented in the fourth column of Table (XIV) show that the residual variable is highly statistically significant (at the 1% level as in the regression without the Disclosure variable shown above). Therefore the results suggest that there are other relevant aspects of Local market correlation that affect Ownership concentration that are not captured by rule of law or disclosure.

We repeated the analysis with a more parsimonious model (in line with La Porta et al. 2005) and the results are shown in the Table (XV).[10]

[Insert Table (XV) about here]

[10]We have also repeated the analysis with the Morck R^2 variable with qualitatively similar results.

We used the same explanatory variables as La Porta et al. (2005). The first column of Table (XV) shows that the Disclosure variable is statistically significant at the 10% level. However, as shown in column two, it does not affect Local market correlation. In columns three and four we include in the regression of ownership concentration our measure of Local market correlation and the results are that both Local market correlation and the orthogonalized variable are highly statistically significant.

We consider a second potential factor that could affect both Ownership concentration and Local market correlation. This is the Opacity measure used by Jin and Myers (2004) and published by PriceWaterhouseCoopers (2001). In Jin and Myers (2004) the reason why lack of transparency (Opacity) about cash flow matters for stock price synchronicity is that it allows insiders to capture a higher fraction of the positive earning surprises which outsiders are not exposed to. This lowers the amount of firm-specific risk that outsiders absorb and thus leads to a higher price synchronicity. Thus poor investor protection alone does not affect stock price synchronicity if firms are completely transparent. Table (XVI) shows the results of regressions including Opacity.

[INSERT Table (XVI) about here]

In the first column of Table (XVI) we show the results of the simple regression of Local market correlation against opacity. The analysis shows that the Opacity variable is negatively related with our measure of Local market correlation. In the second column we perform the same analysis with some control variables and it emerges again that the role of Opacity in explaining Local market correlation is very limited. In the third column we investigate whether Opacity could be considered a relevant factor for Ownership concentration but the results do not suggest this. We then use both the Opacity variable and the Local market correlation as explanatory variables and we see that Local market correlation is still highly statistically significant and its relevance for Ownership concentration is not affected by the Opacity variable.[11]

We then put Opacity and Disclosure together and the results are shown in Table (XVII).

[Insert Table (XVII) about here]

The main result is again that Local market correlation is still relevant in explaining Ownership concentration even after controlling for a series of potential common factors like Opacity and Disclosure.[12]

Despite the remaining difficulty in accounting for unobservable factors that could affect both Ownership concentration and Local market correlation, we believe that our

[11] Jin and Myers (2004) used a logistic transformation of their R^2 variable. We have also performed our analysis considering as dependent variable the logistic transformation of local market correlation or Morck-R^2 and the results are qualitatively similar.

[12] We performed the same analysis shown above using the Morck R^2 variable, instead of Local market correlation, and the results are qualitatively similar.

theoretical and empirical results represent a promising step towards the construction of a more complete model of the relation between Ownership concentration and diversification opportunities.

C.3 Endogeneity

An additional potential critique is the possible presence of a reverse causality: namely, Ownership concentration might affect Local market correlation which therefore might be endogenous. To cope with this problem we need to identify an instrument that affects Local market correlation but it does not affect Ownership concentration. Our theoretical model suggests that this instrument could be the variance of the stock index returns. Notice that variance affects correlation by construction but, as shown in equations (14) , (15) , and (16) , it does not influence the ownership structure.

In order to investigate the potential evidence against the exogeneity of Local market correlation we perform a Hausman (1978) test. A detailed description of the procedure is provided in the appendix. The results of the Hausman test are shown in Table (XVIII). When the instrumental variable is included, the residuals u are uncorrelated with the error term of the Ownership concentration regression (column two) only if Local market correlation is exogenous.

[INSERT Table (XVIII) about here]

Table (XVIII) shows that the coefficient of the reduced form residuals u is not statistically significant at any standard level (p-value 0.18) and therefore the Hausman test rejects the hypothesis that Local market correlation is an endogenous variable. If we repeat the analysis with Morck R^2 the residual coefficient has a p-value of 0.88 (not shown in Table XVIII) and thus the Hausman test largely rejects the hypothesis of endogeneity.

Overall, our formal statistical tests fail to reject the null hypothesis of a zero correlation between Ownership concentration and the unobserved determinants of Local market correlation. Therefore, the Hausman test fails to reject the hypothesis that the results obtained with OLS estimation shown in Tables (VII) and (XII) yield unbiased and consistent results. The result of the test supports the conjecture that our measure of Local market correlation is exogenous in Ownership concentration regressions. Nevertheless, this evidence is tentative because we use only one instrumental variable and the dataset is limited. We argue that future progress will require a more structural approach to the model.

IV Extensions and Conclusions

This paper has developed a framework to analyze the interactions between diversification opportunities and Ownership concentration in an environment with control benefits arising from limited legal investor protection.

We have considered a mean-variance economy where the expected returns for controlling and non-controlling shareholders are different because the first can divert part of the profits. This offers a convenient simplified framework to study the general theme of the tension between the need to diversify the portfolio of the controlling shareholder and the small amount of external finance that can be raised when the possibility to expropriate outsiders is ample.

We have obtained a number of results. First, we show that, when local market correlation increases, each controlling shareholder invests a larger share of his wealth in the asset he controls and a lower share in the assets he does not control.

Moreover, as a result of the previous finding, ownership becomes more concentrated when diversification opportunities decline. This is because an increase in correlation affects both the loss from foregone diversification opportunities from concentrated portfolios and the overall level of control benefits that non-controlling investors are willing to tolerate to achieve the excess returns on the risky investments.

Our objective in attempting to integrate the analysis of firms' governance and ownership structure into a general equilibrium stock market economy with different levels of Local market correlation has been to show that correlation is an important variable to explain ownership structure. This theoretical result is confirmed by the empirical analysis. We extend the La Porta et al. (1998) study and show that Local market correlation has a relevant role in explaining Ownership concentration across countries. In particular, ownership is more concentrated in countries where Local market correlation is higher and this effect is amplified by poor investor protection.

Our work can be extended in several directions, theoretical, institutional and empirical. At the theoretical level an economy where entrepreneurs compete in the level of profit diversion to attract outside funds can be investigated. We can also generalize our analysis to an economy with asymmetric parameters of asset returns, risk aversion and market correlation. The more general issue of harmonization vs. competition in the corporate governance law across countries can be tackled using our framework. At the empirical level our analysis can also be conducted for a cross section of firms within the same country. However, a deeper understanding of the problems at hand requires better measures of profit diversion and control benefits.

Appendix

Proof of Proposition 1

First we want to prove that there is a sufficiently high level of $\rho < 1$ such that when $b > 0$ and the diversification opportunities decline each entrepreneur invests more in his company. Observe from (7) that

$$\frac{\partial x_{ii}^*}{\partial \rho} = -\frac{(m-b-1)\left(\rho^2+1\right) - 2\rho\,(m-1)}{\lambda\sigma^2\left(-1+\rho^2\right)^2}. \tag{17}$$

Thus $\frac{\partial x_{ii}^*}{\partial \rho} \mid_{\rho=0} = 0$, and $\lim_{\rho\to 1} \frac{\partial x_{ii}^*}{\partial \rho} > 0$. Thus by continuity there exists a ρ, such that $0 < \rho < 1$, above which the result holds.

Second, from (8) it is easy to see that $\frac{\partial x_{ji}^*}{\partial \rho} < 0$. ■

Proof of Proposition 2

From (14) the derivative of α_{ii} w.r.t. ρ is

$$\frac{\partial \alpha_{ii}^*}{\partial \rho} = \frac{b}{(-1+\rho)^2\left((m-1-b)\left(W_3+2\right)+b\right)} > 0. \tag{18}$$

From (15) the derivative of α_{ji}^* w.r.t. ρ is:

$$\frac{\partial \alpha_{ji}^*}{\partial \rho} = -\frac{b}{(-1+\rho)^2\left((m-1-b)\left(W_3+2\right)\right)} < 0. \tag{19}$$

Similarly for (16) . Taking the derivative of (18) w.r.t. b we obtain

$$\frac{\partial\left(\frac{\partial \alpha_{ii}^*}{\partial \rho}\right)}{\partial b} = \frac{\left(W_3+2\right)(m-1)}{(\rho-1)^2\left[W_3\,(1-m)+2\,(1-m)+b\,(W_3+1)\right]^2} > 0.$$

Taking the derivative of (19) w.r.t. b we obtain

$$\frac{\partial\left(\frac{\partial \alpha_{ji}^*}{\partial \rho}\right)}{\partial b} = -\frac{(m-1)\,(W+2)}{(2m-2-b+Wm-W-Wb)^2\,(-1+\rho)^2} < 0.$$

■

The model with $n+1$ assets and $n+1$ individuals

Let $\mathbf{x}_j' = (x_{j1}, ..., x_{jn})$ be the row vector of the proportion of the wealth of individual $j, j = 1, ..., n+1$, invested in assets $1, ..., n$. Using the accounting identity linking the individual portfolio shares and the total investment in the risky assets

$$I_i = x_{1i}W_1 +, ..., +x_{n+1i}W_{n+1}, \quad i = 1, ..., n, \tag{20}$$

the portfolio problem becomes:

for each entrepreneur

$$\max_{\mathbf{x}_j} \quad V_j = \left[1 + \mathbf{x}_j'\mathbf{y} - \frac{\lambda\sigma^2}{2}\mathbf{x}_j'\Omega\mathbf{x}_j\right] W_j + b\sum_{k=1}^{n+1} W_k\mathbf{x}_k'\mathbf{e}_j, \ j = 1, \ldots, n \tag{21}$$

and for the saver

$$\max_{\mathbf{x}_{n+1}} \quad V_{n+1} = \left[1 + \mathbf{x}_{n+1}'\mathbf{y} - \frac{\lambda\sigma^2}{2}\mathbf{x}_{n+1}'\Omega\mathbf{x}_{n+1}\right] W_{n+1} \tag{22}$$

where $\mathbf{y}' = ((m-1-b), ..., (m-1-b))$ denotes the row vector of the expected rates of return on the risky assets, $\mathbf{e}_j$ represents the $j-th$ column vector of the canonical base in $\Re^n$,[13] and Ω is the $n \times n$ matrix of the correlation coefficients between the returns on the risky assets.[14]

The terms in the square bracket of (21) and (22) represent the risk-adjusted rate of portfolio return per unit of wealth, the last term of (21) represents the profit diverted by entrepreneur j as a result of the investment decisions of all the individuals. If the conditions for the invertibility of the matrix Ω are satisfied, i.e. if

$$|\Omega| \neq 0 \text{ which implies } \rho \neq 1, \quad \rho \neq -\frac{1}{n-1}, \tag{23}$$

then

$$\Omega^{-1} = \begin{pmatrix} \frac{(n-2)\rho+1}{A} & \cdots & -\frac{\rho}{A} \\ & & \cdot \\ \cdot & & \cdot \\ -\frac{\rho}{A} & \cdots & \frac{(n-2)\rho+1}{A} \end{pmatrix} \tag{24}$$

with $A \equiv (1-\rho)(1+(n-1)\rho)$.

[13] That is the transpose of $\mathbf{e}_j$, is $\mathbf{e}_j' = (0, ..., 1, ..., 0)$.

[14] Formally $\Omega = \begin{pmatrix} 1 & \rho & ... & \rho \\ \rho & 1 & ... & ... \\ ... & ... & ... & \rho \\ \rho & ... & \rho & 1 \end{pmatrix}$.

The first order conditions of the optimization of (21) and (22) s.t. (20) and the resource constraint $I_{n+1} = W - \sum_{i=1}^{n} I_i$ are:

$$\mathbf{y} - \lambda\sigma^2 x_j \Omega + b e_j = 0, \quad j = 1, \ldots, n; \qquad \mathbf{y} - \lambda\sigma^2 x_{n+1}\Omega = 0. \tag{25}$$

The vector of the optimal shares of risky assets in the portfolios of the $n+1$ individuals are

$$\text{for the entrepreneurs} \qquad \mathbf{x}_j^* = \frac{1}{\lambda\sigma^2}\Omega^{-1}(\mathbf{y} + b\mathbf{e}_j), \ j = 1, \ldots, n; \tag{26}$$

$$\text{for the saver} \qquad \mathbf{x}_{n+1}^* = \frac{1}{\lambda\sigma^2}\Omega^{-1}\mathbf{y}. \tag{27}$$

Solving for $\mathbf{x}_j^*$ and $\mathbf{x}_{n+1}^*$ we obtain the optimal portfolio shares:

$$x_{ii}^* = \frac{m-1}{\lambda\sigma^2}\left[\frac{(1-\rho)}{A}\right] + \frac{(n-1)\rho b}{\lambda\sigma^2 A} \tag{28}$$

$$x_{ji}^* = \frac{m-1}{\lambda\sigma^2}\left[\frac{(1-\rho)}{A}\right] - \frac{b}{\lambda\sigma^2 A} \tag{29}$$

$i, j = 1, ..., n$ with $i \neq j$

$$x_{n+1i}^* = \frac{m-1}{\lambda\sigma^2}\left[\frac{(1-\rho)}{A}\right] - \frac{b(1-\rho)}{\lambda\sigma^2 A}. \tag{30}$$

Using equations (20), (28), (29) and (30) we obtain the level of investment in the risky assets:

$$\begin{aligned} I_i^* &= x_{ii}^* + x_{ji}^*(n-1) + x_{n+1i}^* W_{n+1} \\ &= \frac{m-1}{\lambda\sigma^2}\left[\frac{(1-\rho)}{A}\right] + \frac{(n-1)\,\rho b}{\lambda\sigma^2 A} + (n-1)\left[\frac{m-1}{\lambda\sigma^2}\frac{(1-\rho)}{A} - \frac{\rho b}{\lambda\sigma^2 A}\right] \\ &= \frac{m-1}{\lambda\sigma^2}\frac{(1-\rho)}{A}(1+n-1+W_{n+1}) - \frac{(n-1)\,(1-\rho)\,b}{\lambda\sigma^2 A} + W_{n+1}\frac{(1-\rho)\,b}{\lambda\sigma^2 A}. \end{aligned} \tag{31}$$

Using the accounting identities

$$\alpha_{ji}^* = \frac{W_{n+1}}{I_i^*} x_{j,i}^*, \ j = 1, ...n, i = 1, ...n \tag{32}$$

$$\alpha_{n+1,i}^* = \frac{W_{n+1}}{I_i^*} x_{n+1,i}^* \tag{33}$$

we obtain the ownership structure.

For example entrepreneur i owns α_{ii}^* of the asset he controls with

$$\alpha_{ii}^* = \frac{(m-1)(1-\rho)+(n-1)\rho b}{(m-1)(1-\rho)(n+W_{n+1})+(n-1)\rho b-(n-1)b-W_{n+1}b(1-\rho)}. \tag{34}$$

From (34) taking derivatives, and recalling that $m-1-b>0$, by assumption we obtain

$$\frac{\partial \alpha_{ii}^*}{\partial \rho} = \frac{(n-1)b}{(-1+\rho)^2((m-1-b)(W_{n+1}+n)+b)} > 0. \tag{35}$$

Taking the derivative of (35) w.r.t. b we obtain

$$\frac{\partial\left(\frac{\partial \alpha_{ii}^*}{\partial \rho}\right)}{\partial b} = \frac{(n-1)(m-1)(W_{n+1}+n)}{(\rho-1)^2[-(m-1-b)(W_{n+1}+n)-b]^2} > 0.$$

Hausman test

Let's estimate the equation

$$\widehat{\rho}_i = c + d_1 X_i + d_2 \sigma_i^2 \tag{36}$$

where $\widehat{\rho}_i$ is the fitted value of ρ_i, local market correlation, X_i is the vector of common explanatory variables of ρ_i, and ownership structure, α_{ii}. σ_i^2 is the instrumental variable, i.e. the returns variance. To perform the Hausman test we calculate the residual

$$u_i = \rho_i - \widehat{\rho}_i \tag{37}$$

and decompose the local market correlation ρ_i into two components

$$\rho_i = \widehat{\rho}_i + u_i. \tag{38}$$

The first element on the RHS of (38) is uncorrelated with the error terms of the equation (36) by construction. The second component is uncorrelated with the error term only if ρ_i is exogenous. If ρ_i is exogenous, then changes in $\widehat{\rho}_i$ or u_i should have exactly the same impact on α_{ii} in the ownership structure equation, i.e.

$$\alpha_{ii} = c + \gamma X_i + \beta_1 \widehat{\rho}_i + \beta_1 u_i + \varepsilon_i. \tag{39}$$

If ρ_i is endogenous then the coefficient on u_i will be different, reflecting the distorting impact of the correlation between the residual u_i and the errors in equation (39); i.e.:

$$\alpha_{ii} = c + \gamma X_i + \beta_1 \widehat{\rho}_i + \beta_2 u_i + \varepsilon_i. \tag{40}$$

where $\beta_1 \neq \beta_2$. Rather than testing for the difference between β_1 and β_2 it is common to use a t-test after replacing $\widehat{\rho}_i$ with $\rho_i - u_i$ in (40) ; thus we have:

$$\alpha_{ii} = c + \gamma X_i + \beta_1 \rho_i + (\beta_2 - \beta_1)\, u_i + \varepsilon_i. \tag{41}$$

The results of our analysis are shown in Table (XVIII). The Hausman test fails to reject the null hypothesis that the coefficient $(\beta_2 - \beta_1)$ is equal to zero.

References

[1] Admati A. R., P. Pfleiderer and J. Zechner (1994) "Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium" Journal of Political Economy 102, 1097-1130.

[2] Bennedsen M. and D. Wolfenzon (2000) "The Balance of Power in Closely Held Corporations" Journal of Financial Economics, 58, 113-139.

[3] Bolton P. and E-L. vonThadden (1998) "Blocks, Liquidity, and Corporate Control" The Journal of Finance, 53, 1, 1-25.

[4] Castro R., G. L. Clementi and G. MacDonald (2004) "Investor Protection, Optimal Incentives, and Economic Growth" Quarterly Journal of Economics, August, 1131-1175.

[5] Cochrane J. H. (2001) Asset Pricing, Princeton University Press, Princeton, New Jersey.

[6] Demsetz H. and K. Lehn (1985) "The Structure of Corporate Ownership: Causes and Consequences" Journal of Political Economy 93, 1155-77.

[7] Easley D. and M. O'Hara (2004) "Information and the Cost of Capital" Journal of Finance, 59, 4, 1553-1583.

[8] Faccio M. and H. P. Lang (2002) "The ultimate ownership of Western European corporations" Journal of Financial Economics, 65, 3 365-395.

[9] Guiso L., M. Haliassos and T. Jappelli (2002) Households Portfolios, MIT Press, Cambridge Mass.

[10] Hausman J., 1978. "Specification tests in econometrics". Econometrica 46, 1251-1271.

[11] Holmström B. and J. Tirole (1997) "Financial Intermediation, Loanable Funds, and the Real Sector" Quarterly Journal of Economics, 112, 663-692.

[12] Jensen M. and W. Meckling (1976) "Theory of the firm: managerial behavior, agency costs and ownership structure" Journal of Financial Economics 3, 305-360.

[13] Jin L. and S. Myers (2004) "R-Squared around the world: new theory and new tests", NBER WP 10453.

[14] Kumar K., R. Rajan and L. Zingales (1999) "What Determines Firm Size?" NBER Working Paper 7208.

[15] La Porta R., I. Lopez-de-Silanes and A. Shleifer, (1999) "Corporate ownership around the world", Journal of Finance, 54, 471-517.

[16] La Porta R., I. Lopez-de-Silanes and A. Shleifer, (2005) "What Works in Securities Laws", Journal of Finance, forthcoming.

[17] La Porta R., I. Lopez-de-Silanes, A. Shleifer and R. Vishny (1997) "Legal Determinants of External Finance" Journal of Finance 52, 1131-1130.

[18] La Porta R., I. Lopez-de-Silanes, A. Shleifer and R. Vishny (1998) "Law and Finance" Journal of Political Economy", 106, 1113-1155.

[19] Levine R. and S. Zervos, (1998) "Stock Markets, Banks, and Economic Growth" American Economic Review, 3, 537-558.

[20] Merton R. (1987) "A Simple Model of Capital Market Equilibrium with Incomplete Information", Journal of Finance 42, 483-510.

[21] Morck R., B. Yeung and W. Yu (2000) "The Information Content of Stock Markets: Why do Emerging Markets have Synchronous Stock Price Movements?" Journal of Financial Economics, 58, 215-260.

[22] Nenova T. (2003) "The Value of Corporate Voting Rights and Control: A Cross-Country Analysis" Journal of Financial Economics, 68, 325-351.

[23] Pagano M. and A. Röell (1998) "The Choice of Stock Ownership Structure: Agency Costs, Monitoring, and the Decision to Go Public", Quarterly Journal of Economics, 113, 187-226.

[24] PriceWaterhouseCooper (2001) "The Opacity Index" http://www.opacity-index.com/.

[25] Shleifer A. and D. Wolfenzon (2002) "Investor Protection and Equity Markets" Journal of Financial Economics, 66, 3-27.

[26] Zingales L. (1994) "The Value of the Voting Right: a Study of the Milan Stock Exchange Experience" Review of Financial Studies, 7, 125-148.

[27] Zingales L. (1995) "Inside ownership and the decision to go public" Review of Economic Studies, 62, 425-448.

Table I: **Numerical Example: The Effect of Correlations on Ownership Structure**

Profit diversion	Ownership shares	$\rho = 0.23$	$\rho = 0.50$	$\rho = 0.80$
$b = 0.000$	a_{11}^*	0.33	0.33	0.33
	a_{21}^*	0.33	0.33	0.33
	a_{31}^*	0.33	0.33	0.33
$b = 0.006$	a_{11}^*	0.35	0.37	0.43
	a_{21}^*	0.32	0.31	0.25
	a_{31}^*	0.33	0.33	0.33
$b = 0.010$	a_{11}^*	0.37	0.39	0.49
	a_{21}^*	0.31	0.29	0.19
	a_{31}^*	0.32	0.32	0.32
$b = 0.015$	a_{11}^*	0.39	0.43	0.58
	a_{21}^*	0.30	0.26	0.11
	a_{31}^*	0.31	0.31	0.31
$b = 0.020$	a_{11}^*	0.41	0.46	0.67
	a_{21}^*	0.28	0.23	0.02
	a_{31}^*	0.31	0.31	0.31

The parameters used are: $m = 1.1$, $W_3 = 1$.
Ownership shares are from equations (14) , (15) (16) .

Table II: **Variables description**

Variables	Variables description
Ownership concentration	The average percentage of common shares owned by the three largest shareholders in the ten largest non-financial, privately owned domestic firms in a given country constructed by La Porta et al. (1998).
Antidirectors rights	Antidirectors rights index constructed by La Porta et al. (1998)
Mandatory dividend	Mandatory Dividend index constructed by La Porta et al. (1998). Equals the percentage of net income that the Company Law or Commercial Code requires to distribute as dividends among ordinary stockholders.
Legal reserve required	Legal Reserve required index constructed by La Porta et al. (1998). It is the percentage of total share capital mandated by Corporate Law to avoid the dissolution of an existing firm.
Accounting	Accounting standards index constructed by La Porta et al. (1998). Index created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items.
Ln(GDP)	Natural logarithm of GDP. Source: World Bank and IMF.
Ln(GNP per capita)	Natural logarithm of GNP per capita. Source: World Bank and IMF
French Origin	Dummy for the French Origin of the legal system
German Origin	Dummy for the German Origin of the legal system
English Origin	Dummy for the English Origin of the legal system
Scandinavian Origin	Dummy for the Scandinavian Origin of the legal system
Gini Coefficient	Gini coefficient for income inequality in each country. When the 1995 coefficient is not available we use the previous available year. Source: World Bank.
Local market correlation	Country correlations. Determined calculating the weighted average of correlations among industry indexes in the different single countries for the years 1998-2000. The weights are the market capitalization of different indexes. Source: Datastream

Table III: **Variables description cont.**

Variables	Variables description
Variance	Country variance. Determined calculating the weighted average of variances of industry indexes in the different countries for the years 1998-2000. The weights are the market capitalization of different indexes. Source: Datastream
Equally weighted correlation	Country correlations. Determined calculating the simple average of correlations between industry indexes in the different countries for the years 1998-2000. Source: Datastream.
Correlation of 4 common industries	Country correlations. Determined calculating the simple average of correlations among the four largest common industry indexes in the different countries for the years 1998-2000. Source: Datastream.
Ln(Number of listed stocks)	Natural logarithm of the number of listed stocks, year 2000. Source: Datastream.
Disclosure	Disclosure index constructed by La Porta et al. (2003). Disclosure is an index that considers six criteria: prohibition to sell securities to investors without a prospectus; disclosure requirements regarding the compensation of directors and key officers; disclosure requirements about ownership structure; disclosure requirements about insiders' ownership; disclosure requirements regarding outside contracts by the issuers of new shares, and disclosure regarding transactions between the issuers and related parties like its directors.
Opacity	Index of accounting "opacity" published by PriceWaterhouseCoopers (2001)
Morck R^2	Average R^2 of firm-level regression of bi-weekly stock returns in each country in 1995. Source: Morck et al. (2000).

Table IV: **Ownership concentration, stock correlations and Antidirectors rights.**

	Own. Concentr.	Antidir. rights	Local Mkt. Correlation	Morck R^2	Variance
Argentina	0.53	4	0.68	-	0.0139
Australia	0.28	4	0.23	0.064	0.0025
Austria	0.58	2	0.51	0.093	0.0062
Belgium	0.54	0	0.53	0.146	0.0052
Brazil	0.57	3	0.62	0.161	0.0154
Canada	0.40	5	0.40	0.062	0.0080
Chile	0.45	5	0.56	0.209	0.0069
Denmark	0.45	2	0.26	0.075	0.0060
Finland	0.37	3	0.48	0.142	0.0170
France	0.34	3	0.53	0.075	0.0079
Germany	0.48	1	0.40	0.114	0.0077
Greece	0.67	2	0.71	0.192	0.216
Hong Kong	0.54	5	0.59	0.150	0.0133
Indonesia	0.58	2	0.55	0.140	0.0241
Ireland	0.39	4	0.29	0.058	0.0085
Israel	0.51	3	0.55	-	0.0100
Italy	0.58	1	0.53	0.183	0.0087
Japan	0.18	4	0.43	0.234	0.0061
Malaysia	0.54	4	0.80	0.429	0.0238
Mexico	0.64	1	0.63	0.290	0.0109
Netherlands	0.39	2	0.37	0.103	0.0073
New Zealand	0.48	4	0.43	0.064	0.0056
Norway	0.36	4	0.48	0.119	0.0101
Peru	0.56	3	0.26	0.288	0.0088
Philippines	0.57	3	0.65	0.164	0.0138
Portugal	0.52	3	0.61	0.068	0.0092
Singapore	0.49	4	0.60	0.191	0.0155
South Africa	0.52	5	0.61	0.197	0.0140
South Korea	0.23	2	0.59	0.172	0.0345
Spain	0.51	4	0.62	0.192	0.0083
Sweden	0.28	3	0.39	0.142	0.0109
Switzerland	0.41	2	0.54	-	0.0065
Taiwan	0.18	3	0.56	0.412	0.0141
Thailand	0.47	2	0.62	0.271	0.0363
Turkey	0.59	2	0.80	0.393	0.0509
UK	0.19	5	0.36	0.062	0.0054
USA	0.20	5	0.41	0.021	0.0056
Venezuela	0.51	1	0.59	-	0.0388

Sources: Ownership concentration and Antidirectors rights are from La Porta et al. (1998); Local market correlation is the weighted average of correlations between industry indexes in the single countries; Morck R^2 is the measure of stock returns synchronicity constructed by Morck et al. (2000); Variance is the average of variances of industry indexes in the single countries.

Table V: **Univariate statistics of the variables**

	Mean	Std. Dev.	Max	Min	N. of Obs
Ownership concentration	0.45	0.13	0.67	0.18	38
Antidirectors rights	3.03	1.35	5.00	0.00	38
Accounting	63.25	11.45	83.00	36.00	36
Mandatory dividend	0.03	0.10	0.50	0.00	38
Legal reserve required	0.14	0.20	1.00	0.00	38
Local mkt. correlation	0.52	0.13	0.80	0.23	38
Variance	0.01	0.01	0.05	0.01	38
Gini Coefficient	38.89	8.95	59.00	24.9	38
Ln (GDP)	7.55	2.86	15.86	4.97	38
Ln (GNP per capita)	2.25	1.06	3.58	-0.30	38

Table VI: **Correlation between main variables**

	1	2	3	4	5	6	7	8	9
1. Ownership concentration	1	-0.37	-0.48	0.25	-0.25	0.50	-0.15	-0.49	0.41
2. Antidirectors rights		1	0.37	0.04	-0.28	-0.13	-0.02	0.09	0.22
3. Accounting			1	-0.25	-0.19	-0.23	0.02	0.02	-0.24
4. Mand. dividends				1	0.07	0.23	-0.08	-0.24	0.10
5. Legal reserves required					1	0.14	0.11	0.09	-0.34
6. Local market correlation						1	0.14	-0.45	0.36
7. Ln(GDP)							1	-0.33	0.11
8. Ln(GNP per ca.)								1	-0.57
9. Gini Coefficient									1
N. of Observations	38	38	36	38	38	38	38	38	38

Table VII: **Regression of ownership concentration on local market correlation, investor protection and economy structural variables (Robust standard errors in parentheses).**

Dependent variable	Ownership concentration		
Ln(GDP)	-0.014^c	-0.011	-0.015^b
	(0.007)	(0.008)	(0.007)
Ln(GNP per capita)	-0.023	-0.020	-0.008
	(0.029)	(0.023)	(0.024)
Gini Coefficient	0.005	0.004	0.002
	(0.003)	(0.003)	(0.002)
English Origin	0.012	0.012	-0.012
	(0.063)	(0.063)	(0.064)
French Origin	0.086	0.022	-0.035
	(0.070)	(0.058)	(0.064)
German Origin	-0.087	-0.019	-0.046
	(0.073)	(0.058)	(0.058)
Antidirectors rights		-0.041^a	-0.037^a
		(0.014)	(0.013)
Accounting		-0.002	-0.003
		(0.002)	(0.002)
Mandatory dividend		0.176	0.116
		(0.134)	(0.091)
Legal reserve required		-0.153	-0.220^a
		(0.093)	(0.072)
Local market correlation			0.440^a
			(0.138)
Intercept	0.386^c	0.679^a	0.644^a
	(0.197)	(0.210)	(0.239)
Number of observations	36	36	36
F-statistic	4.155^a	3.893^a	5.942^a
Adjusted R^2	0.351	0.452	0.608

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table VIII: **Regression of ownership concentration on the product among local market correlation and investor protection and economy structural variables (Robust standard errors in parentheses).**

Dependent variable	Ownership concentration	Ownership concentration
Ln(GDP)	-0.011	-0.015[b]
	(0.008)	(0.007)
Ln(GNP per capita)	-0.020	-0.008
	(0.023)	(0.024)
Gini Coefficient	0.004	0.002
	(0.003)	(0.002)
English Origin	0.012	-0.012
	(0.063)	(0.064)
French Origin	0.022	-0.035
	(0.058)	(0.064)
German Origin	-0.019	-0.046
	(0.058)	(0.058)
Directors rights	0.041[a]	0.037[a]
	(0.014)	(0.013)
Accounting	-0.002	-0.003
	(0.002)	(0.002)
Mandatory dividend	0.176	0.116
	(0.134)	(0.091)
Legal reserve required	-0.153	-0.220[a]
	(0.093)	(0.072)
Local market correlation X Director rights		0.440[a]
		(0.138)
Intercept	0.679[a]	0.644[a]
	(0.210)	(0.239)
Number of observations	36	36
F-statistic	3.893[a]	5.942[a]
Adjusted R^2	0.452	0.608

a=significant at 1% level, *b*=significant at 5% level, *c*=significant at 10% level.

Table IX: **Parsimonious regression of ownership concentration on local market correlation, investor protection and economy structural variables (Robust standard errors in parentheses).**

Dependent variable	Ownership concentration		
Ln(GDP)	-0.0164^b	-0.014^b	-0.017^a
	(0.007)	(0.007)	(0.005)
Ln(GNP per capita)	-0.076^a	-0.067^a	-0.043^b
	(0.013)	(0.013)	(0.016)
Antidirectors rights		-0.041^a	-0.038^a
		(0.012)	(0.009)
Legal reserve required		-0.195^b	-0.243^a
		(0.082)	(0.066)
Local market correlation			0.444^a
			(0.122)
Intercept	0.746^a	0.858^a	0.597^a
	(0.071)	(0.071)	(0.106)
Number of observations	38	38	38
F-statistic	9.336^a	9.111^a	13.699^a
Adjusted R^2	0.310	0.467	0.632

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table X: **Univariate statistics of the variables**

	Mean	Std. Dev.	Max	Min	N. of Obs
Morck R^2	0.17	0.10	0.43	0.02	34
Equally weighted correlation	0.50	0.14	0.80	0.23	38
Correlation of 4 common industries	0.55	0.13	0.78	0.28	38
Ln(Number of listed stocks)	5.97	0.99	8.43	4.85	38
Variance	0.01	0.01	0.05	0.01	38
Disclosure	0.62	0.22	1.00	0.17	38
Opacity	2.91	0.26	3.41	2.5	21

Table XI: **Correlation between main variables**

	Morck R^2	Eq.w.cor	Cor. 4 ind.	Ln(N stocks)	Variance	Disclosure	Opacity
Ownership concentration	0.24	0.56	0.36	-0.56	0.23	-0.44	-0.25
Antidirectors rights	-0.17	-0.03	0.01	0.41	-0.29	0.54	0.40
Mandatory dividend	0.05	0.18	-0.03	-0.06	0.04	-0.35	0.04
Legal reserves required	0.46	0.09	0.19	-0.11	0.13	-0.12	-0.27
Local market correlation	0.59	0.92	0.74	-0.38	0.60	-0.02	-0.39
Ln(GDP)	0.43	0.29	0.24	0.11	0.54	0.19	-0.41
Ln(GNP p. capita)	-0.49	-0.59	-0.36	0.38	-0.54	0.15	0.61
Gini Coefficient	0.33	0.51	0.36	-0.21	0.25	0.18	0.07
N. of Observation	38	38	38	38	38	38	21

Table XII: **Regression of ownership concentration on shareholders rights, Morck R^2, and economy structural variables (Robust standard errors in parentheses).**

Dependent variable	Ownership concentration		
Ln(GDP)	-0.013	-0.008	-0.013
	(0.009)	(0.007)	(0.008)
Ln(GNP per capita)	-0.026	-0.022	0.001
	(0.029)	(0.028)	(0.033)
Gini Coefficient	0.005	0.004	0.002
	(0.004)	(0.003)	(0.003)
English Origin	-0.027	0.015	0.018
	(0.069)	(0.069)	(0.073)
French Origin	0.090^c	0.001	-0.010
	(0.048)	(0.063)	(0.066)
German Origin	-0.008	-0.051	-0.054
	(0.087)	(0.062)	(0.065)
Antidirectors rights		-0.047^b	-0.042^b
		(0.017)	(0.018)
Accounting		-0.003^c	-0.005^c
		(0.002)	(0.002)
Mandatory dividend		0.162	0.210
		(0.144)	(0.144)
Legal reserve required		-0.182^b	-0.322^a
		(0.079)	(0.106)
Morck R^2			0.547^b
			(0.256)
Intercept	0.388^c	0.805^a	0.844^a
	(0.204)	(0.241)	(0.259)
Number of observations	32	32	32
F-statistic	3.534	3.725^a	4.189^a
Adjusted R^2	0.329	0.467	0.531

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table XIII: **Regression of ownership concentration on shareholders rights, alternative measures of diversification opportunities, and economy structural variables (Robust standard errors in parentheses).**

Dependent variable	Ownership concentration		
Ln(GDP)	-0.016^b	-0.016^b	-0.010
	(0.006)	(0.007)	(0.009)
Ln(GNP per capita)	-0.012	-0.021	0.0001
	(0.023)	(0.023)	(0.023)
Gini Coefficient	0.002	0.003	0.004
	(0.003)	(0.003)	(0.003)
English Origin	-0.039	-0.036	0.152^c
	(0.070)	(0.077)	(0.078)
French Origin	-0.038	-0.011	-0.076
	(0.071)	(0.062)	(0.067)
German Origin	-0.041	-0.031	-0.051
	(0.060)	(0.053)	(0.057)
Antidirectors rights	-0.037^a	-0.040^a	-0.055^a
	(0.013)	(0.013)	(0.016)
Accounting	-0.003	-0.002	-0.001
	(0.002)	(0.002)	(0.002)
Mandatory dividend	0.129	0.202^b	0.351^b
	(0.085)	(0.094)	(0.145)
Legal reserve required	-0.233^b	-0.225^b	-0.098
	(0.085)	(0.086)	(0.140)
Equally weighted correlation	0.409^a		
	(0.142)		
Correlation of 4 common industries		0.322^b	
		(0.149)	
Ln(Number of listed stocks)			-0.062^c
			(0.030)
Intercept	0.666^a	0.536^a	0.864^b
	(0.232)	(0.241)	(0.315)
Number of observations	36	36	36
F-statistic	5.414^a	4.532^a	4.538^a
Adjusted R^2	0.581	0.526	0.526

a=significant at 1% level, *b*=significant at 5% level, *c*=significant at 10% level.

Table XIV: **Regression of ownership concentration and local market correlation on disclosure variable (Robust standard errors in parentheses).**

Dependent variables	Loc. mkt corr.	Own. conc.	Own. conc.	Own. conc.
Ln(GDP)	0.008	-0.010	-0.013	-0.010
	(0.009)	(0.007)	(0.006)	(0.006)
Ln(GNP per capita)	-0.025	-0.021	-0.010	-0.021
	(0.037)	(0.023)	(0.025)	(0.024)
Gini Coefficient	0.004	0.004^c	0.003	0.004
	(0.004)	(0.002)	(0.002)	(0.002)
English Origin	-0.042	-0.039	0.020	0.038
	(0.111)	(0.082)	(0.082)	(0.082)
French Origin	0.125	0.040	-0.015	0.040
	(0.102)	(0.065)	(0.076)	(0.076)
German Origin	-0.055	-0.007	-0.032	-0.007
	(0.104)	(0.061)	(0.067)	(0.067)
Antidir. rights	-0.011	-0.037^b	-0.032^b	-0.037^b
	(0.022)	(0.014)	(0.015)	(0.014)
Accounting	0.003	-0.001	-0.002	-0.001
	(0.004)	(0.002)	(0.002)	(0.003)
Mand. dividend	0.161	0.121	0.050^b	0.121
	(0.249)	(0.177)	(0.132)	(0.135)
Legal res. req.	0.141	-0.123	-0.186^b	-0.123
	(0.165)	(0.233)	(0.078)	(0.072)
Disclosure	0.046	-0.108	-0.129	-0.108
	(0.216)	(0.558)	(0.171)	(0.172)
Loc. mkt corr.			0.445^a	
			(0.139)	
Res. Loc. mkt. corr.				0.445^a
				(0.138)
Intercept	0.109	0.614^a	0.567^b	0.611^b
	(0.364)	(0.195)	(0.232)	(0.228)
Number of observations	36	36	36	36
F-statistic	1.319	3.495^a	5.477^a	5.477^a
Adjusted R^2	0.091	0.439	0.606	0.606

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table XV: **Parsimonious regression of ownership concentration and local market correlation on disclosure variable (Robust standard errors in parentheses).**

Dependent variable	Local mkt correlation	Ownership concentration	Ownership concentration	Ownership concentration
Ln(GNP) per capital	-0.045^c	-0.033^b	-0.016	-0.033^b
	(0.025)	(0.016)	(0.016)	(0.014)
English origin	0.013	0.125^b	0.120^b	0.120^b
	(0.025)	(0.057)	(0.056)	(0.057)
French Origin	0.115^c	0.085^c	0.042	0.086
	(0.065)	(0.045)	(0.048)	(0.049)
German Origin	0.079	-0.038	-0.069	-0.039
	(0.061)	(0.059)	(0.062)	(0.063)
Antidirectors rights	-0.008	-0.032^b	-0.029^b	-0.032^b
	(0.014)	(0.012)	(0.014)	(0.012)
Disclosure	0.177	-0.220^c	-0.287^b	-0.220^c
	(0.124)	(0.122)	(0.122)	(0.120)
Local market correlation			0.380^a	
			(0.115)	
Residual Loc. mkt. corr.				0.380^a
				(0.115)
Intercept	0.470	0.690	0.509^a	0.688^a
	(0.120)	(0.100)	(0.119)	(0.101)
Number of observations	38	38	38	38
F-statistic	2.100^c	6.111^a	8.003^a	8.004
Adjusted R^2	0.152	0.453	0.569	0.569

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table XVI: **Regression of ownership concentration and local market correlation on opacity, measures of diversification opportunities, and economy structural variables (Robust standard errors in parentheses).**

Dependent variable	Local mkt correlation	Local mkt correlation	Ownership concentration
Ln(GDP)		0.003	-0.022^a
		(0.013)	(0.006)
Ln(GNP per capita)		-0.006	-0.057^b
		(0.049)	(0.023)
Antidirectors		-0.009	-0.038^b
rights		(0.017)	(0.014)
Legal reserve required		0.028	-0.263^a
		(0.094)	(0.062)
Opacity	-0.184^c	-0.126	0.006
	(0.095)	(0.132)	(0.051)
Local market correlation			0.594^b
			(0.207)
Intercept	1.089^a	0.930^b	0.562^b
	(0.278)	(0.338)	(0.233)
Number of observations	21	21	21
F-statistic	3.26	0.605	9.146^a
Adjusted R^2	0.101	0.109	0.709

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table XVII: **Regression of ownership concentration and local market correlation on disclosure and opacity (Robust standard errors in parentheses).**

Dependent variable	Ownership concentration	Local mkt correlation	Ownership concentration
Ln(GDP)	-0.019^c	-0.002	-0.020^a
	(0.009)	(0.012)	(0.005)
Ln(GNP per capita)	-0.053^c	-0.011	-0.046^c
	(0.028)	(0.049)	(0.024)
Antidirectors rights	-0.038^c	-0.013	-0.030
	(0.020)	(0.019)	(0.017)
Legal reserve required	-0.245^a	0.027	-0.263^a
	(0.081)	(0.097)	(0.057)
Disclosure	-0.091	0.060	-0.124
	(0.125)	(0.125)	(0.107)
Opacity	-0.059	-0.133	0.021
	(0.089)	(0.132)	(0.040)
Local market correlation			0.613^a
			(0.199)
Intercept	1.100^a	0.939^b	0.523^a
	(0.264)	(0.346)	(0.206)
Number of observations	21	21	21
F-statistic	3.925	0.497	8.364^a
Adjusted R^2	0.47	0.177	0.720

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

Table XVIII: **Hausman test on the endogeneity of local market correlation (Robust standard errors in parentheses)**

Dependent variable	Local market correlation	Ownership concentration
Ln(GDP)	-0.003	-0.015^b
	(0.007)	(0.006)
Ln(GNP per capita)	-0.025	-0.061^a
	(0.029)	(0.022)
Antidirectors rights	0.007	-0.041^a
	(0.014)	(0.010)
Legal reserve required	0.087	-0.207^a
	(0.074)	(0.071)
Variance	6.977^a	
	(2.261)	
Local market correlation		0.110
		(0.293)
Reduced form residuals (u)		-0.413
		(0.298)
Intercept	0.472^a	0.793^a
	(0.125)	(0.195)
Number of observations	38	38
F-statistic	4.212^a	12.187^a
Adjusted R^2	0.303	0.645

a=significant at 1% level, b=significant at 5% level, c=significant at 10% level.

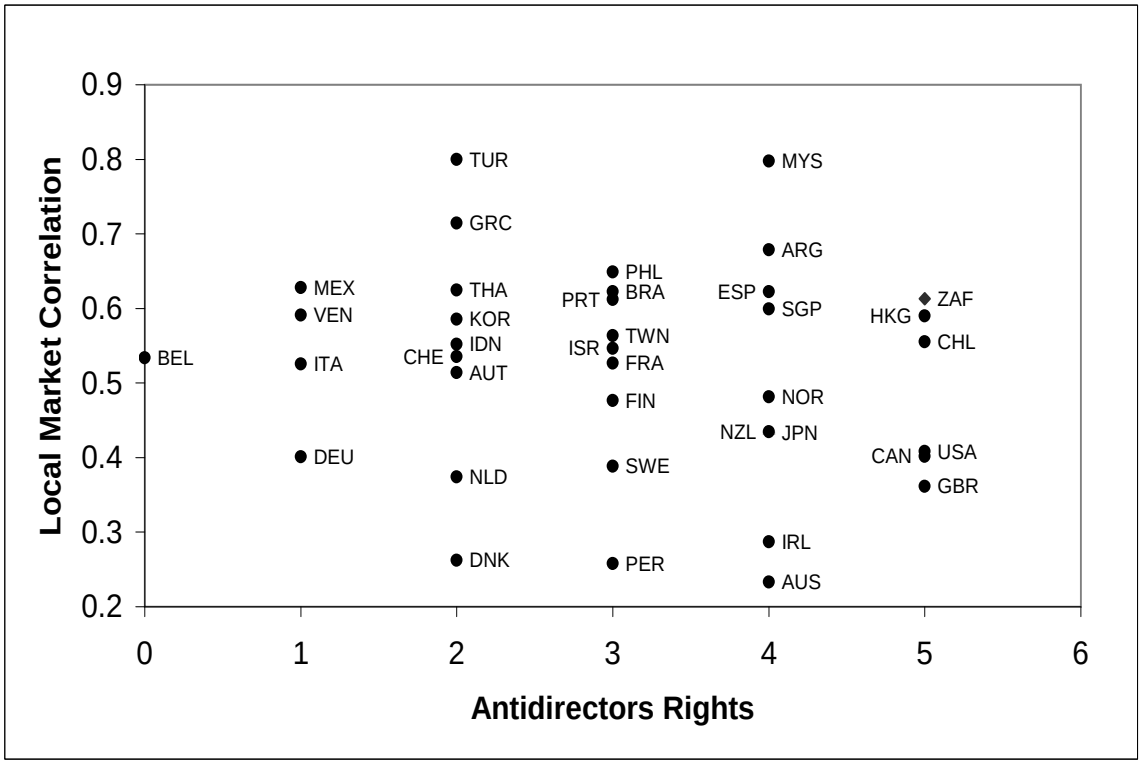

Figure 1: **Local market correlation vs. minority shareholders protection**
ARG=Argentina, AUS=Australia, AUT=Austria, BEL=Belgium, BRA=Brazil, CAN=Canada, CHL=Chile, DNK=Denmark, FIN=Finland, FRA=France, DEU=Germany, GRC=Greece, HKG=Hong Kong, IDN=Indonesia, IRL=Ireland, ISR=Israel, ITA=Italy, JPN=Japan, MYS=Malaysia, MEX=Mexico, NLD=Netherlands, NZL=New Zealand, NOR=Norway, PER=Peru, PHL=Philippines, PRT=Portugal, SGP=Singapore, ZAF=South Africa, KOR=South Korea, ESP=Spain, SWE=Sweden, CHE=Switzerland, YWN=Taiwan, THA=Thailand, TUR=Turkey, GBR=UK, USA=United States and VEN=Venezuela.