Ownership and Allocation of Capital:
Evidence from 44 Countries

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Abstract

In an efficient economy, capital should be quickly (re)allocated from declining firms and sectors to more profitable investment opportunities. This process is affected by the concentration of corporate control, which in turn is affected by market institutions. We employ a panel of about 12,000 firms across 44 countries to estimate the functional efficiency of capital markets. We adapt a measure for the efficiency of capital allocation using the accelerator principle. Our empirical results show weak property rights and highly concentrated ownership reduce the functional efficiency of capital markets.

JEL classification: G32, L20, P00

Keywords: capital allocation, accelerator, ownership, property rights

1. Introduction

A strong economy is marked by the movement of capital to its most productive, value-creating ends. This implies swift (re)allocation from sectors and firms with poor prospects to higher expected returns. This process, the *functional efficiency* of capital markets[1] (Tobin, 1984), has important implications for overall economic performance and growth (see Levine, 1997). The mechanisms through which firms access and manage capital are crucial for firm performance. For example, incorporated firms can raise large amounts of capital but face problems of agency and incentives because control of assets is separated from ownership. How capital markets solve these problems ultimately affects the rate of economic growth[2], as investors seek to assure returns on their investments. A key stream in the corporate governance research addresses mechanisms through which agency and incentive problems can be overcome[3]. The way corporate governance institutions allocate resources among stakeholders affects structure and composition of ownership, as well as access to capital.

Comparative research on corporate governance suggests that distribution of control over capital assets is a key determinant of the functional efficiency of capital markets. Property rights and investor protection have played an important role in this research, but have been associated with mixed findings across countries or groups of countries. In this paper, we advance the existing literature in two ways. First, we offer an underexamined theoretical framework grounded in a corporate governance perspective, linking ownership with property rights and investor protection to explain capital market efficiency. In doing so, we discuss and test two relevant and popular perspectives: Economic entrenchment and legal origins. Second, we make a methodological contribution by using an accelerator approach to derive a measure of the efficiency of capital allocation, *elasticity of capital with respect to output (sales)*. Though our method is similar to estimations used in the existing research (Wurgler, 2000), our modifications allow for consistency with the accelerator principle, also referred to as the capital stock adjustment principle[4]. Wurgler (2000) examines elasticity of capital market flow in previous research, whereas our focus here is on elasticity of the stock, which is theoretically more appropriate. Using a panel of about 12,000 firms across 44 countries for a minimum of five years, we test for the impact of ownership, property rights and investor protection on functional efficiency of capital markets. We find that weak property rights and highly concentration ownership reduce the functional efficiency of capital markets. This is particularly so in the case of family

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[1] Note that this term differs from the *market efficiency*, which refers to how efficiently information is compounded into share prices. The term *functional efficiency* refers to how effectively capital is allocated to its highest value use. See Tobin (1984) and Morck et al. (2005) for more capital market efficiencies.

[2] For example, Beck et al. (2000) show the type and nature of investment are important for growth, rather than the overall level. See Levine (2004) for a review of theoretical and empirical research on how different capital markets allocate capital, handle information asymmetries, treat agency problems and affect growth.

[3] The implications of separating ownership from control were noted as early as Adam Smith, who observed that the "stewards of rich men," i.e., managers, had other objectives than their "masters," i.e., owners of corporations (1776). See Shleifer and Vishny (1997), Denis and McConnell (2003) and Gugler et al. (2004a) for current reviews of the literature.

[4] Wurgler (2000) measures the functional efficiency of capital markets by calculating the elasticity of industry investments with respect to industry value-added. He shows that the elasticity of investments depends on financial development. We focus on ownership and corporate governance; the relationship between financial markets and capital allocation is beyond the scope of this paper. See Wurgler (2000) and Levine (2004) for more on this relationship.

ownership. Our findings broadly support an economic entrenchment perspective and not the legal origins perspective.

In the next section, we discuss the relevant literature. In section three we derive our measure of the functional efficiency of capital markets. We describe the data in section four and present and analyze results in section five. We conclude in the final section.

2.   Ownership and allocation of capital: Relevant perspectives

Corporate governance perspectives on the allocation of capital are important because they can offer an explanation for not only the speed at which capital moves, but also the ends to which this capital is being applied. Policymakers interested in strengthening the effectiveness of firm investments in R&D activities, for example, might be concerned with the incentives driving the movement of capital among new firms and incumbents (Acemoglu et al., 2013). In an economy with the "right" incentives, net cash flow should move to the most promising investment opportunities, even if those opportunities are available outside a given firm (see Hubbard, 1998). Without the right incentives, even if promising opportunities exist outside a given firm, net cash flow is likely to stay within the firm and receive low returns. The movement of capital within and between firms is an important question facing potential entrepreneurs, owners and managers of incumbent firms, and policymakers interested in supporting a responsive and competitive economic environment. Questions of ownership are especially relevant because the ownership structure of a firm can drive how its resources are allocated. We expand on this further in this section.

In the seminal book *The Modern Corporation and Private Property*, Berle and Means (1932) describe the ownership structure of the corporation as diffused. They argue that dispersion of ownership shifts corporate control from owners to managers. As this occurs, managers become unaccountable to owners and gain incentives to cater to objectives other than shareholder value or profit maximization. This description of the corporation has been influential in a large literature on managerial objectives. Much research on corporate governance has focused on managerial behavior with different incentives based on owner participation. Jensen and Meckling (1976) show that dispersion of ownership leads to diversion of interests. At the firm level, more concentrated ownership provides large controlling owners with incentives to monitor managers and exercise control (Jensen and Meckling, 1976). DeMarzo and Urosevic (2006) note that if the stake of a large shareholder is high enough, they have the incentive to work, thereby performing what they consider the key social function of monitoring firm activity. From this, we might expect a positive incentive effect of ownership concentration at the firm level. However, Stulz (1988) shows that as insider ownership concentration increases, the scope for controlling owners to exploit minority investors also increases. The ability of insiders to extract value from the corporation at the expense of other shareholders is referred to as managerial entrenchment*,* or simply as the entrenchment effect*.* The net effect therefore depends on the balance between the positive incentive effect and the negative entrenchment effect. Morck et al (1988) provide empirical support for both by finding a nonlinear relationship between ownership concentration and Tobin's *q*.

Despite its role in the managerial economics literature, the widely held corporation described by Berle and Means (1932) is a largely Anglo-Saxon form of organization. Few corporations around the world have dispersed ownership structure, even in developed countries. La Porta et al. (1999) find one large controlling (ultimate) owner for corporations across 27 developed economies, and Faccio and Lang (2000) find family control dominates in continental Europe. Across countries, firms ranging in size are found to have controlling shareholders[5]. Claessens et al. (2000) find extensive family control in the majority of East Asian corporations, where problems of agency are greatest[6]. This is important because a growing literature also shows that family control often is inferior to professional management (Morck et al., 2000; Perez-Gonzales, 2001). Anderson and Reeb (2003) examine S&P 500 firms and find that family firms have a lower Tobin's *q* than non-family firms.

The ability of controlling shareholders to maintain control is closely related to institutional context of the country. Two institutions are particularly important in explaining cross country variation in ownership concentration: Property rights and investor right protection[7]. Shleifer and Vishny (1997) argue that very high ownership concentration may simply be reflective of poor investor and property protection. Ownership concentration may substitute in institutional environments where investors are poorly protected (La Porta et al., 1998). Therefore, high ownership concentration can be an equilibrium outcome in the presence of a weak institutional environment. If formal property rights weaken or the protection of minority shareholders is further reduced, this would result in an upward shift in ownership concentration. In countries where small investors are insufficiently protected, only large owners can realistically expect any return on investments (La Porta et al., 1998). Further, weak institutional environments do not adequately protect the security of transactions, which can create disincentives to exchange, and control-enhancing mechanisms such as control pyramids may simply be rational adaptations to poorly functioning markets (Morck et al., 2005). Laws protecting shareholders are shown to increase firm valuations (La Porta et al., 2002) and small investors may prevent the expropriation of bank resources by large shareholders (Caprio et al., 2007). Bebchuk (1999) shows that poor investor protection increases opportunities for extraction of private benefits and thereby renders dispersed ownership structures unstable.

Morck et al. (2005) argue that the diffused ownership of the Anglo-Saxon corporation is merely one possible end-point of capitalism. The other end-point is *oligarchic capitalism,* where firms are controlled by few families through control enhancing mechanisms[8]. The spectrum in between comprises systems with more or less concentrated ownership. Control-enhancing mechanisms allow owners to control firms without maintaining a proportional share of equity. This disproportionality between cash-flow rights and control

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[5] Most controlling shareholders belong to wealthy families (La Porta et al., 1999). Caprio et al. (2007) find a controlling shareholder, usually a wealthy family, for 75% of the ten largest banks in 44 countries.

[6] The authors find the ten largest families in the Philippines and Indonesia control of more than half of corporate assets – 52.5% in the Philippines and 57.7% in Indonesia. It is similarly high in Thailand and Hong Kong, at 46.2% and 32.1% respectively (Claessens et al., 2000).

[7] Legal protection of shareholders (outsiders) is associated with larger stock markets (La Porta et al., 1997), higher market-to-book values (Claessens et al., 2002; La Porta et al., 2002) and higher dividend payout ratios (La Porta et al., 2000). See also Shleifer and Wolfenzon (2002).

[8] The most common control enhancing mechanisms are: Dual-class shares, pyramid ownership and cross holdings. Outside of Anglo-Saxon countries these mechanisms are very common.

rights alters the incentives of controlling owners, which reduces the incentive effect and enhances managerial entrenchment (Claessens et al., 2002). Eklund (2007) uses a measure of Tobin's marginal q to show that vote-differentiation of shares significantly reduces the incentive effect and enhances the entrenchment effect. In general, firms with proportional ownership structures tend to invest efficiently whereas firms where control instruments separate cash-flow from control tend to over-invest.

Two key streams in the literature on law and finance and financial development relevant: legal origins and economic entrenchment.

2.1 Legal origins

The legal origins hypothesis suggests that legal origin affects finance (e.g, through regulations) and trajectory of financial development affects growth. In this perspective, legal origin is not a proxy for culture, history or politics (La Porta et al., 2008) and does not capture the interplay between these factors and financial development and corporate governance systems. However, there is a difference between legal origin and legal institutions or legal development. For example, differences between bank-based and market-based systems can evolve with financial development, such as a general tendency of countries with more effective legal systems and institutions to have more market-based systems (see Demirguc-Kunt and Levine, 2001). Arguably, legal origin is also important from an evolutionary perspective.

La Porta et al. (1998) examine ownership concentration across 49 countries and find a strong negative correlation between investor protection and aggregate ownership concentration. They conclude that in countries with insufficient legal protection of shareholders, small and diversified investors will be of minor importance. Further, they find that the quality of legal protection of investors differs systematically across countries of varying legal origin. For example, regulatory strategies in common law countries are designed to sustain markets and not replace them, explaining why these countries are more successful in finance (La Porta et al., 2008).

Whereas Anglo-Saxon-legal origin countries have the strongest protection, German- and Scandinavian-legal origin countries assume an intermediate position and French-origin countries have the poorest protection of investors. Gurgler et al. (2004b) use the rankings by La Porta et al. (1998) across a sample of some 19,000 companies across 61 countries. They find that legal origin is the most important determinant of return on investments and in fact, it dominates differences in ownership structure.

2.2 Economic Entrenchment

As defined by Morck et al. (2005), economic entrenchment is the macro-economic counterpart[9] to firm-level managerial entrenchment (Stulz, 1988). This ultimately leads to inefficient allocation of resources, stunted entrepreneurship, capital market development and growth (Morck et al., 2005). Extensive use of control instruments may prevent capital from being reallocated to promising new ventures. For example, nascent entrepreneurs need credit but if capital cannot be released from its current activities, the economy

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[9] We use the term economic entrenchment in a broad sense. Morck et al. (2004) (the NBER version of their 2005 *Journal of Economic Literature* article) define economic entrenchment as: *"(…) economy as exhibiting economic entrenchment if it has a highly oligarchic flavor of capitalism and exhibits signs of enduring economic inefficiency."*

demonstrates entrenchment[10]. Competition and the process of creative destruction are curbed in entrenched economies, causing persistent misallocation of assets[11]. Morck et al. (2005) argue that family ownership in the presence of weak property rights and investor protection preserves the status quo and lowers the functional efficiency of capital markets.

Economic entrenchment hinders growth in the short and long term. First, high ownership concentration means few families can control a large portion of the economy, affecting the immediate allocation of capital. For example, a new firm with no connection to a controlling family would be slow to receive capital tied up in firms controlled by the family, even if those existing firms perform poorly. Second, the process through which institutions become endogenous is affected by political power. Economic control can translate into political influence (Morck et al., 2005; Pagano and Volpin, 2005) and vice versa, thus affecting future institutions. Both conditions can worsen when banks engage in related lending – i.e, lending to firms controlled by bank owners. In Mexico, for example, related lending makes up twenty percent of commercial loans and posts higher default rates and lower recovery rates than unrelated lending (La Porta et al., 2003).

 In fact, a number of authors assume weak property rights benefit corporate insiders and the controlling owner at all times (Morck et al., 2000; Rajan and Zingales, 2003). The allocation of capital is affected by the way in which formal property rights govern transactions and transfer of assets. In this sense, formal property rights are a necessary precondition for low transaction costs. According to de Soto (2003), an optimal property rights regime lets people assemble their assets into increasingly valuable combinations[12].

Morck et al. (2005) identify three effects of changes in private property rights: transferal effect, cost of capital effect and competition effect. First, if protection of private property improves, wealth is transferred from the users of capital to its suppliers. Depending on the direction of change, wealth can be transferred between insiders and suppliers. Second, property rights affect the cost of capital. If private property rights weaken, the cost of capital for both insiders and entrepreneurs will increase. Finally, improvements in property rights will enhance competition. This depends on the cost of capital. If protection of property rights improves and the cost of capital is therefore reduced, new projects become viable and more entrepreneurs will enter the market[13].

Returning to ownership, large shareholders at the firm level will have both incentives and ability to monitor managers. This reduces agency costs. At the country level, ownership concentration can substitute for poor investor protection and weak property rights. As these rights improve, the equilibrium level of ownership concentration is reduced.

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[10] See Schumpeter (1934) for an early analysis of the role of credit in economic development

[11] Compare this with Mueller's (1977) approach to assess the efficiency of the market system by examining the persistency of profits.

[12] de Soto notes: "Formal property's contribution to mankind is not the protection of ownership… Property's real breakthrough is that it radically improved the flow of communications about assets and their potential. It also enhanced the status of their owners, who became economic agents able to transform assets within a broader network" (1990).

[13] For a discussion of these effects on financial development, see Morck et al. (2005).

We thus develop the following general hypothesis: **Countries with high ownership concentration, in combination with weak property rights and investor protection, will have poorer functional efficiency of capital markets.**

3.   The accelerator principle and capital stock adjustment

Investments are defined as the flow of expenditure intended to maintain or increase the capital stock in a firm. If expected returns to firm capital decline, this implies that desired capital stock also declines. The efficient allocation of capital requires shifts from industries and firms with poor prospects to more promising investment opportunities. In a perfectly competitive frictionless economy, capital will be efficiently allocated because investments immediately respond to changes in volume and quality of investment opportunities. That is: Investments will be made at the point where marginal return matches the real interest rate.

Wurgler (2000) estimates the industry elasticity of investments with respect to industry value-added. Elasticity indicates the speed of capital reallocation and in effect, is a way to estimate the functional efficiency of capital allocation. We derive a measure built from Wurgler's (2000) approach but with several important distinctions. We estimate the *elasticity of capital* with respect to *output,* using *sales* as the measure of output. Assuming constant prices, as Keynes did, changes in sales will be proportional to changes in output. We make the crucial assumption that changes in sales provide an approximation for future sales and thus, future demand for capital (investment opportunities). C*eteris paribus*, higher elasticity of capital with respect to sales means a quicker response to changes in future expected returns. Therefore, this means more efficient capital allocation.

To capture the time structure of investments and responses to changes in expectations, we employ an accelerator model of investments. Several different proxies for output are used as accelerators in the literature[14]. Tinbergen (1938; 1939) suggests that investments depend on level of profits, arguing that current profits are good predictors of future profits. Jorgenson and Siebert (1968) use gross value-added and Kuh (1963) use both retained earnings and sales. Our rationale for using sales rather than value-added is the inconsistency and unreliability of definition and data for measurements of firm value-added across countries. The accounting data is simply not reliable enough to assure a consistently defined value-added across countries[15]. Further, profits would not be useful in this case because we expect profits to have asymmetric effects on investments across countries, depending on the extent of market frictions (Hubbard, 1998). If firms in one country suffer relatively more from financial constraints, it is more difficult to raise external funds and will, for example, reflect in greater sensitivity of investments with respect to profits (as compared to other countries).

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[14] For a discussion of accelerator models of investment and review of empirical work, see Jorgenson (1971).

[15] Value-added is defined as compensation to production factors and can be calculated in two ways: 1) Sales – costs for intermediary goods, 2) Profits + cost of labor. From an accounting perspective, sales are relatively unproblematic, whereas costs of intermediary goods and labor expenses are count differently across countries. For this reason, the two alternative calculations of value-added typically do not match.

In accelerator models, the desired level of capital, K_t^*, is determined by output, Y_t:

$$K_t^* = kY_t \qquad\qquad (1)$$

where k is the capital coefficient (capital-output ratio)[16]. For simplicity, we assume K_t^* to be equal to actual capital, K_t. This means that net investments, I_t and $(K_t - K_{t-1})$, are proportional to changes in the desired stock of capital, $K_t^* - K_{t-1}^*$. Net investments, NI_t, can be expressed in following way:

$$NI_t = \lambda(Y_t - Y_{t-1}) \qquad\qquad (2)$$

In this formulation, net investments are proportional to an accelerator λ. If $K_t^* = K_t$ then $\lambda = k$. This is an equilibrium assumption which is typically not fulfilled, but this is not relevant for our purposes (see Jorgenson, 1971; Tinbergen 1938; 1939)[17].

For gross investments, we add replacement investments which are proportional to old capital, δK_{t-1}. We obtain gross investments in this manner:

$$I_t = \delta K_{t-1} + \lambda \Delta Y_t \qquad\qquad (3)$$

We divide both sides of equation 3 with K_{t-1} to obtain:

$$\frac{I_t}{K_{t-1}} = \delta + \lambda \frac{\Delta Y_t}{K_{t-1}} \qquad\qquad (4)$$

Since $K_t^* = kY_t$ this can be reformulated into the following:

$$\frac{I_t}{K_{t-1}} = \delta + \lambda^* \frac{\Delta Y_t}{Y_{t-1}} \qquad\qquad (5)$$

where $\lambda^* = (\lambda/k)$, which is the *elasticity of capital* with respect to *output* (as reflected by sales). This is also useful for empirical applications because it achieves a normalization that reduces heteroskedasticity, which makes equation 4 possible to empirically estimate. Note that if $K_t^* = K_t$ in every point in time, then $\lambda = k$ which means that $\lambda^* = 1$.

We estimate the following equation for each country:

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[16] See Kaldor's (1963) famous statement that this capital-output ratio remains approximately constant overtime.

[17] This assumption can be relaxed by using a flexible accelerator which allows for lags in the adjustment of the capital stock. However, using the simple accelerator as we do means that the coefficient will reflect relative adjustment costs.

$$\frac{I_{i,t}}{K_{i,t-1}} = \delta + \alpha_i + \theta_t + \lambda^* \frac{\Delta S_{i,t}}{S_{i,t-1}} + \varepsilon_{i,t} \tag{6}$$

where λ^* is the elasticity of investments with respect to sales, I is investments made by firm i in period t, K is capital stock in period t-1 and S is sales in period t. Since we use panel data and are primarily interested in country-specific estimates of elasticity of capital, we use a *fixed effects* model with *firm* and *time effects* (α_i and θ_t) for all estimations of λ^*. The time effects resolve possible cyclic trends of investments and the firm effects control for unobserved heterogeneity across firms. This is appropriate because we are interested in country averages, and previous studies show that investments decisions are subject to market frictions. These are, in turn, affected by firm- and industry-specific attributes (see Hubbard, 1998; Bjuggren et al., 2007).

We consider our amendments to Wurgler (2000) appropriate for measuring capital allocation at the firm level[18].

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[18] The original method used by Wurgler (2000) to measure elasticity of investments is inconsistent with the accelerator principle. His measure of the elasticity of investments with respect to value added, η, is estimated in following way:

$$\ln\left(\frac{I_{ict}}{I_{ict-1}}\right) = \alpha_c + \eta_c \ln\left(\frac{V_{ict}}{V_{ict-1}}\right) + \varepsilon_{ict}$$

where I and V are industry investments (gross fixed capital formation) and value added respectively. The subscripts denote industry, country and time respectively. Presumably he uses this approach for empirical reasons, since he uses aggregated industry data. However, one may still expect a high correlation between η and λ^*. For the elasticity of capital to be equal to the elasticity of investments, it is necessary that: $\Delta K_t^* = \Delta I_t$. This is the case only if $I_{t-1} = \delta K_{t-1}$ which implies that: $K_{t-1}^* = K_{t-1}$. For other alternative specifications of elasticity's see Clements and Theil (1987).

4.   Data and methodology

4.1. Elasticity of Capital

To estimate the elasticity of capital, we use firm level accounting data on investments, capital stock and sales collected from Standard & Poor's Compustat Global (see Table 1 for sources and definitions of data). Gross investments are measured as:

I = After tax profit – dividends + depreciation + ΔEquity + ΔDebt + R&D

This measure of investments is appropriate because it adequately reflects actual investments, which other accounting measures of investments do not. Using gross investments is also more appropriate than using net investments because it is not possible to obtain reliable estimates for replacement investments. Arguably, other expenditures such as advertising and marketing should also be included in investments (Mueller and Reardon, 1993) but the data is typically not available consistently across countries. For this reason, we exclude it.

The measure of capital is also selected for consistency across countries. All financial firms are excluded from the sample since the nature of investments in these firms differs from non-financial firms. Variables are adjusted for differences in inflation with 2000 constant prices, using inflation data from International Financial Statistics (IMF).

4.2. Institutional Measures

We use key institutional variables and appropriate measures that have been identified in the literature. Definitions and sources are presented in Table 1. As with la Porta et al. (2003), we measure property rights using the property rights index from Holmes et al. (1997). Anti-director or minority shareholder protection is measured by the Pagano and Volpin (2005) index, which is an extended and recoded version of the original index used by La Porta et al. (1998). This version[19] covers the years 1993 to 2001, and we use the average for the entire period. Following La Porta et. al (1998; 2003), we construct legal origins as a dummy variable: English-origin, German-origin, French-origin, Scandinavian-origin and Socialist/Communist-origin.

For ownership concentration we use two country-level measures (La Porta et al., 1998): Mean and median of the three largest owners in the ten largest firms. They compute combined cash flow rights for the three largest owners in each firm. In addition, we add two measures for family control of corporations, also compiled by La Porta et al. (1999)[20]. They measure family control as the share of the 20 largest firms in each

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[19] The new index is also called the LLSV Pagano-Volpin anti-director index.

[20] We recognize the problems with measures of ownership concentration and family control in La Porta et al. (1998; 1999). For example, they are likely to underestimate concentration of control in some countries by not explicitly considering pyramidal ownership structures and cross-holdings. Another problem is that these measures may be biased due to differences in absolute size of corporations across countries (for a discussion, see La Porta et. al 1999). The measures may for example reflect the fact that large corporations are likely to have less concentrated ownership simply because it requires more capital, all else equal (see Kumar et al.,

country that are controlled by families. Two measures are constructed, assuming control is inferred at the 10 percent and 20 percent levels of ownership. The ownership measures are shown in Appendix 1. In this case, ownership concentration is measured as control-rights and not cash-flow rights. This is appropriate considering that investment decisions are influenced by the level of control and not cash-flow rights. In addition we add family data on Indonesia, the Philippines, Taiwan and Thailand from Claessens et al. (2000).

We also use standard controls economic development and economic growth. For economic development, we take the logarithm of 1995 GDP levels. For economic growth, we use average GDP growth between 1980 and 2002. GDP data was collected from the World Development Indicators. Taiwan is missing from this dataset, so we have used its corresponding value from La Porta et al. (1997). See Appendix 2.

5.   Results and discussion

We estimate average capital elasticity $\hat{\lambda}^*$ for each country using a fixed effects model with firm and time effects. A total of 11984 firms are included, corresponding to 61292 observations. In order to minimize the weight of possible outliers, observations for each country are cut five percent in each end of the distribution[21]. Naturally, the usual accounting caveats apply. Estimated elasticity $\hat{\lambda}_j^*$'s are reported in Table 2 and have been grouped by legal origin.

There are several possible explanations for a capital elasticity greater than one. First, indivisibilities of production factors may make the production function discontinuous, so output cannot be produced proportionally to capital. This is typically the case for firms with economies of scale in production. This may explain the high capital elasticity for Norway. During the sample period, Norwegian growth was strong and presumably driven by the expansion of the oil industry. Second, "excessive expectations" may affect estimates of capital elasticity. If investors and managers have excessive expectations on returns to their investments, this can cause an elasticity larger than one. For example, Manne (1945) argues that the accelerator principle works differently at different stages of a business cycle, arguing that firms are more responsive to changes in output during periods of economic expansion. If this is the case, we might expect a positive relationship between capital elasticity and growth rates. However, our panel of firms has no less than six annual observations for any country and we use a fixed-effect estimation, which should control for possibly cyclical investment behavior. Finally, an elasticity greater than one could arise from measurement error. If I_t or K_t contain measurement errors, this can create scaling effects so estimated capital elasticity deviates from its true value. However, this is unlikely to be a problem in our study since our variables were specifically defined to provide consistent estimation across countries. This is the reason we replace value-added with sales as our measure of output. Any measurement error will be consistent across all countries,

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1999). However, despite these problems we believe that these measures provide a reasonable approximation of the concentration of corporate control across countries.

[21] Trimming the data leads to a consistent definition of outliers and makes the results more robust. It is also possible to apply a robust estimation technique, such as median regression or iteratively reweighed least squares. The results obtained using these techniques are essentially the same as with the simple trimmed OLS.

since elasticity is a relative measure of the efficiency of capital allocation. Thus, our results are ultimately unaffected. For example, we use a narrow measure of capital that includes only fixed tangible assets. This augments the measure of capital elasticity across all countries.

Table 3 presents the correlation matrix for all variables. Property rights is not significantly correlated with investor protection and is positive and significantly correlated (0.61 at the 5% level) with elasticity of investments.

Table 3 also contains Wurgler's original elasticity of industry investments with respect to industry value-added (2000). As a first step, we empirically evaluate the robustness of our model compared to Wurgler[22] (2000). The merit of our model is reflected in the correlations for our control variables. GDP growth is significant and negatively correlated with both our measure (-0.34) and Wurglers's measure (-0.4); current GDP is positively and significantly correlated with Wurgler's measure (0.44) but *not* with our measure. This suggests that our measure is not sensitive to current level of economic development but is sensitive to change (growth) and thus more robust for cross-country study. This is especially meaningful given the major differences in economic development across countries[23]. We regress Wurgler's estimates for investment elasticity on our measure of capital elasticity, yielding a regression coefficient close to one (see Table 4).

Next, we test the legal origin hypothesis (La Porta et al., 1998) by regressing legal-origin dummies on our elasticity measure $\hat{\lambda}^*$. Results are presented in Table 5. The all-country average $\hat{\lambda}^*$ is 0.98, which is not statistically different from an average of 1.0. We obtain the following: English origin is 0.81, French origin is 0.84, German origin is 1.10, Scandinavian origin is 1.53 and Communist/socialist origin is 0.74. Clearly, the within-group legal origin variation is greater than the between-group origin variation. Scandinavia is the only legal origin category which deviates significantly from the all-country average. It remains significant at 10 percent if the high elasticity of Norway is removed. We do not find any significant difference between common (English origin) and civil law (French, German and Scandinavian) countries (for detailed discussion see La Porta et al., 1999). Our findings are inconsistent with the legal origins hypothesis on stronger finance in common law countries.

We report regressions of institutional variables on ownership measures in Table 6. By and large, our results (see Table 4) are consistent with the results of La Porta et al. (1998, 1999). Interestingly, shareholder protection significantly reduces ownership concentration but has no significant impact on family ownership. Property rights has a negative and significant effect on all measures of ownership concentration and family control. GDP has a negative effect on ownership concentration. This may be due to reverse causality where high concentration of ownership reduces economic development.

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[22] Marginal *q* is, in effect, another measure of the functional efficiency of capital markets, developed by Mueller and Reardon (1993). It measures the return on investments relative to the opportunity cost. We also compare our elasticity measure with the estimates of marginal *q* by Gugler et al. (2004). Somewhat surprisingly, we find no significant correlation. However, marginal *q* is significantly correlated with ownership concentration, property rights and shareholder protection (see Appendix 2).

[23] For example, Norway has the highest elasticity of capital (2.34), likely due to the expansion of the oil industry. We do not treat Norway as an outlier because our measure of elasticity of capital allocation is not sensitive to the level of economic development (current GDP) and we have no reason to believe that the results are due to any measurement errors.

Next, we test the effect of our institutional variables and controls on our measure of elasticity of capital (see Table 7a). Property rights has a positive and significant effect on elasticity of capital, and family ownership with control inferred at 10 percent and 20 percent negatively impacts capital elasticity. As one might expect, the existing level of economic development (measured as GDP) has no impact on capital elasticity. However, economic growth (GDP growth) significantly reduces capital elasticity. This is logical given that the pressure for structural change can be reduced as growth rates increase. In Table 7b, we report results including interactions for: ownership concentration with property rights, family ownership with property rights, ownership concentration with shareholder protection, and family ownership with shareholder protection. We find that ownership concentration positively impacts elasticity of capital when it is allowed to vary with property rights. The negative effect of ownership becomes significant when the interaction of ownership with property rights is added. Allowing ownership concentration and family ownership to vary with shareholder protection does not significantly change results. Family ownership negatively impacts elasticity of capital consistently – the addition of interaction terms does not significantly change this.

Overall, we find that weak protection of private property in combination with high concentration of ownership, in particular family ownership, hampers the (re)allocation of capital. The intuition is that, all else equal, low capital elasticity is reflective of high transaction costs. This empirical result is consistent with the economic entrenchment hypothesis, which has important implications because most corporations around the world have at least one controlling owner (La Porta et al., 1999). This is typically achieved through mechanisms such as pyramid ownership and dual-class shares. The importance of property rights is not surprising and supports the idea that ownership concentration can be leveraged for protection when investors are inadequately protected[24] (La Porta et al., 1998).

6. Conclusion

Our paper contributes to the current literature by applying a corporate governance perspective focused on ownership, an underexamined topic, to understand the functional efficiency of capital markets. We examine the effect of ownership concentration along with property rights and investor protection on the allocation of capital in the economy. We measure capital elasticity with respect to output for 44 countries with a panel of about 12,000 firms and 61,000 observations. While we find support for the economic entrenchment hypothesis, we do not find support for legal origins.

We find that protection of private property is important for capital allocation. The obvious policy implication is property rights should be strengthened in order to improve capital allocation. This is consistent with the institutional approach to economic growth. However, we stress the importance of the gap between *de jure* and *de facto* institutions. For example, clauses may be written in law but unenforced or easily circumvented,

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[24] For example, Mexico has 100 percent family ownership, a weak score of 3 on the property rights index and the weakest score of 1 for anti-director rights, so our estimate of capital elasticity is fairly low at 0.715. Indonesia has 69 percent family ownership, a weak score of 3 on the property rights index and a weak score of 2 on the anti-director rights index, and we estimate low capital elasticity at 0.342.

such as through corruption. We also find that family control and ownership concentration negatively influence capital allocation. Economies with highly concentrated ownership structures display economic entrenchment and persistent misallocation of capital. We argue that it is not ownership concentration *per se* that creates inefficiencies in the allocation of capital but rather, key governing institutions. Therefore, strong private property and investor protection reduce equilibrium concentration ownership and improve allocation of capital. Legal origin has no significant impact.

In the long run, strengthening key institutions will shift the equilibrium towards maximum returns on investments because they facilitate the movement of capital to more productive purposes. This has significant implications for policies designed to encourage innovation in high-growth industries, not least because entrepreneurs require capital that would otherwise be tied up in other industries. Thus, we suggest that when institutions improve the allocation of capital, firms are better positioned for innovation and growth. This translates into overall better economic performance.

A next step in this area of research is to extend its scope to new firms. Note that the elasticity of capital is only a measure of how efficiently capital is allocated between firms. It is not a direct measure of how effectively an economy channels capital to entrepreneurs and new ventures. However, it is safe to expect that if established firms allocate capital efficiently, this is also reflective of the quality of access that new businesses and entrepreneurs have to external capital. Related to this, Wurgler (2000) shows highly elastic investments are positively correlated with financial development, and Love (2003) finds greater financial development can alleviate constraints for small firms. We consider this promising for further research. Another question related to this work concerns the effect of control-enhancing mechanisms on investment behavior at the firm level. In addition, the development of corporate governance institutions and their path to endogeneity are not well understood. For example, the extent to which property rights and investor protection are endogenous to ownership structure is still largely unresolved (see Morck et al., 2005).

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Table 1   Variables and data

Investments, *I*	Defined as: *I = after tax profit (IB) + depreciation (DP) – dividends (DVC) + ΔEquity (SSTK less PRSTKC) + ΔDebt (ΔDT) + R&D (XRD).* Compustat Mnemonics: Measures within brackets. Data ranges from 1997 to 2005. Number of years differs across countries with not less than 6 years for any given country. *Source: Standard and Poor, Compustat Global.*
Firm sales, *S*	Firm sales. Compustat Mnemonics: *SALE.* *Source: Standard and Poor, Compustat Global.*
Firm capital, *K*	Defined as net cost or valuation of tangible fixed property used in the production of revenue. Compustat Mnemonics: *PPENT*[25]. *Source: Standard and Poor, Compustat Global.*
Ownership concentration (mean and median)	Measured as average percentage and median of shares (cash-flow rights) held by the three largest shareholders in the ten largest firms in each country. *Source: La Porta et al. (1998)*
Family control (10 and 20 percent)	Measured as the share among the 20 largest firms in each country that are controlled by families. If a family has *control-rights* above a certain level the firm is assumed under family control. Control is inferred at 10 and 20 percent of control-rights. Data for 27 countries is from La Porta et al. (1999). Data for Indonesia, Philippines, Taiwan and Thailand is from Claessens, Djankov and Lang (2000). Contol is also inferred at 10 and 20 percent, but data is for all available firms. *Source: Claessens, Djankov and Lang (2000); La Porta et al. (1999)*
Legal origin	Dummy variable: German, French, English and Scandinavian and Socialistic. The commercial code or Company law is used to identify legal origin. *Source: La Porta et al (1998), Socialist/Communist origin (La Porta et al. 2003).*
Shareholder protection (Volpin-Pagano LLSV Index of Anti-director rights)	Index ranges from 1 to 6. The index is a summary of: 1) proxy by mail allowed, 2) deposit of share not required prior to shareholders meeting, 3) cumulative voting allowed, 4) oppressed minority mechanism, 5) less or equal 10 percent for calling an extraordinary meeting, 6) preemptive rights. The index is Pagano-Volpain updated and extended version of the La Porta et al. (1998) anti-director index. Pagano and Volpin (2005) extend the index to cover the period 1993-2001. This is based on questionnaires sent to legal experts in each country (47). *Source: Pagano and Volpin (2005)*
Property rights	Index of quality of protection ranges from 1 to 5. 5 is strongest. *Source: Holmes et al. (1997)*
Log GDP	The logarithm of GDP 1995. *Source: World Development Indicators. (Taiwan from La Porta et al., 1997)*
Growth of GDP	Average of annual GDP growth rates between 1980-2002. *Source: World Development Indicators. (Taiwan from La Porta et al., 1997)*

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[25] This is a narrow definition of capital. An alternative is total assets (*AT*). *PPENT* is one component of *AT*. Accounting methods differ more with respect to *AT* than *PPENT*, the treatment of intangible assets. However, the correlation between these two alternatives is high so choosing one has a minor scaling effect.

Table 2   Capital Elasticities with respect to Sales, $\hat{\lambda}_j^*$

Country	$\hat{\lambda}_j^*$	t-value	Std. Err.	R^2	No. firms	No. obs.	Period
Australia	0.621	13.7	0.045	0.09	377	2047	1999-2005
Canada	0.849	15.0	0.057	0.14	303	1646	1999-2005
Hong Kong	0.756	8.24	0.092	0.12	101	550	1999-2005
India	0.687	13.6	0.051	0.17	169	912	1999-2005
Ireland	1.464	6.99	0.210	0.26	33	178	1999-2005
Israel	0.609	2.05	0.297	0.06	26	140	1999-2005
Malaysia	0.400	16.4	0.024	0.15	524	2371	1999-2005
New Zealand	0.829	3.02	0.275	0.07	52	234	2000-2005
Pakistan	0.367	3.09	0.119	0.12	26	164	1998-2005
Singapore	0.776	18.9	0.041	0.25	301	1363	2000-2005
South Africa	1.064	6.26	0.170	0.09	114	512	2000-2005
Thailand	0.523	9.91	0.053	0.13	217	1182	1999-2005
United Kingdom	1.276	18.8	0.068	0.09	691	3774	1999-2005
United States	1.160	42.5	0.027	0.16	2137	11642	1999-2005
English legal origin average[a]	*0.884* *(0.813)*	*54.7*	*0.016*	*0.11*	*5071*	*26715*	*-*
Argentina	0.600	7.73	0.078	0.37	21	114	1999-2005
Belgium	1.266	8.05	0.157	0.18	72	400	1999-2005
Brazil	0.551	8.41	0.066	0.15	96	524	1999-2005
Chile	0.431	7.96	0.054	0.20	80	438	1999-2005
Colombia	0.283	1.88	0.151	0.13	10	54	1999-2005
France	1.575	14.8	0.106	0.10	362	1976	1999-2005
Greece	1.034	9.96	0.104	0.27	55	296	1999-2005
Indonesia	0.342	4.92	0.069	0.07	170	764	1999-2005
Italy	0.937	8.14	0.115	0.11	160	738	2000-2005
Mexico	0.715	8.58	0.083	0.31	57	308	1999-2005
The Netherlands	1.595	11.2	0.142	0.15	113	620	1999-2005
Peru	0.675	8.89	0.075	0.44	18	123	1997-2005
The Philippines	0.645	12.8	0.050	0.31	69	373	1999-2005
Portugal	1.219	6.62	0.184	0.30	26	140	1999-2005
Spain	0.942	11.8	0.080	0.25	76	410	1999-2005
Turkey	0.567	2.53	0.224	0.06	29	156	1999-2005
French legal origin average[a]	*1.155* *(0.836)*	*27.6*	*0.042*	*0.10*	*1414*	*7434*	*-*
Austria	1.167	7.47	0.156	0.25	43	248	1999-2005
Germany	1.579	18.7	0.085	0.12	431	2344	1999-2005
Japan	0.603	38.5	0.016	0.24	2860	13230	2000-2005
South Korea	0.817	21.4	0.038	0.35	203	927	2000-2005
Switzerland	0.946	12.6	0.075	0.21	142	782	1999-2005
Taiwan	0.725	16.0	0.045	0.26	180	972	1999-2005
German legal origin average[a]	*1.098* *(0.973)*	*48.6*	*0.023*	*0.13*	*3859*	*18503*	*-*
Denmark	0.977	7.08	0.138	0.12	86	470	1999-2005
Finland	1.619	9.21	0.176	0.20	84	454	1999-2005
Norway	2.340	5.38	0.435	0.07	89	404	2000-2005
Sweden	1.177	6.91	0.170	0.05	173	961	1999-2005
Scandinavian legal origin average[a]	*1.279* *(1.528)*	*11.2*	*0.115*	*0.06*	*432*	*2289*	*-*
China	0.482	30.5	0.016	0.21	1130	6108	1999-2005
Hungary	0.730	4.41	0.165	0.29	11	60	1999-2005
Poland	1.331	5.88	0.227	0.29	19	119	1998-2005
Russia	0.434	3.42	0.127	0.36	12	64	1999-2005
Socialist/communist legal origin average[a]	*0.492* *(0.744)*	*31.2*	*0.016*	*0.20*	*1172*	*6351*	*-*
Average / total[a]	*0.914* *(0.902)*	*77.5*	*0.012*	*0.10*	*11948*	*61292*	*-*

Note: Country categorization into legal origin follows La Porta et al. (2003). Elasticities are estimated with fixed effects model with firm and year effects.

[a] These are weighted averages. Note that this gives different weights to countries. Simple averages $\hat{\lambda}_j^*$ are in brackets.

Table 3   Correlation Matrix

	$\hat{\lambda}^*_j$	Ownership (mean)	Ownership (median)	Family ownership (10%)	Family ownership (20%)	Property rights	Shareholder protection	Log GDP	GDP growth	Marginal q, q_m
$\hat{\lambda}^*_j$	1									
Ownership (mean)	- 0.27	1								
Ownership (median)	- 0.32	0.96	1							
Family ownership (10%)	- 0.48*	0.53*	0.59*	1						
Family ownership (20%)	- 0.49*	0.54*	0.57*	0.95*	1					
Property rights	0.43*	- 0.51*	- 0.55	- 0.60*	- 0.61*	1				
Shareholder protection	- 0.20	- 0.21	- 0.20	- 0.30	- 0.29	- 0.10	1			
Log GDP	0.16	- 0.54*	- 0.54*	- 0.34	- 0.38*	0.19	- 0.02	1		
GDP growth	- 0.34*	- 0.26	- 0.22	0.27	0.30	0.17	0.10	0.03	1	
Marginal q, q_m	0.12	- 0.40*	- 0.47*	- 0.19	- 0.17	0.44*	0.33*	0.28	0.28	1
$\hat{\eta}_j$	0.53*	- 0.32	- 0.34	- 0.38	- 0.50*	0.59*	- 0.03	0.44*	- 0.48*	- 0.13

Note: * indicates significance at 5 percent. $\hat{\eta}_j$ is the elasticity of industry investments with respect to industry value added estimated by Wurgler (2000). Marginal q are estimates of the return on investments, i, relative the cost of capital, r ($q_m = i/r$). The estimates of marginal q are from Gugler et al. (2003). See Table 1 for definitions.

Table 4 Elasticity of capital, elasticity of investments and marginal q

Explanatory variables:	Dependent variable: $\hat{\lambda}^*_j$	
Constant	0.405** (2.38)	0.759*** (3.88)
$\hat{\eta}_j$	0.929*** (3.49)	-
$q_{m,j}$	-	0.192 (0.78)
R^2	0.28	0.01
No. observations	34	44

Note: *, ** and *** indicate significance at 10, 5 and 1 percent respectively. In this table our measure of capital allocation is compared with Wurgler (2000) measure of investment elasticity ($\hat{\eta}_j$), and Gugler et al. (2004) marginal q ($q_{m\,j}$). Ordinary Least Squares (OLS) is used as estimator.

Table 5   Elasticity of Capital and Legal Origin

Legal origin:	Dependent variable: $\hat{\lambda}_j^*$
Constant	0.979
	(13.81)
English	- 0.166
	(- 1.53)
French	- 0.143
	(- 1.37)
German	- 0.006
	(- 0.04)
Scandinavian	0.549
	(3.25)
Socialist/communist	- 0.235
	(- 1.39)
R^2	0.23
F-value	2.99
No. observations	44

*, ** and *** indicate significance at 10, 5 and 1 percent respectively. The dependent variable is country specific capital elasticity and explanatory variables are legal origin dummies. The dummy variables have been constrained to sum to zero, so legal origin coefficients are interpreted as deviations from the all-country mean. Ordinary Least Squares (OLS) was used as estimator.

Table 6   **Ownership Concentration and Corporate Governance**

	Dependent variable: Ownership concentration		Dependent variable: Family ownership	
	Mean ownership	Median ownership	Control inferred at 10%	Control inferred at 20%
	(1)	(2)	(3)	(4)
Constant	203.5***	254.07***	298.84***	301.13***
	(6.26)	(6.88)	(3.88)	(3.68)
Shareholder protection	-3.71***	- 5.53***	- 4.50	- 4.55
	(- 3.00)	(- 3.93)	(- 1.42)	(- 1.34)
Property rights	- 4.54**	-7.50***	- 22.36***	- 24.11***
	(- 2.27)	(- 3.30)	(3.88)	(- 3.26)
Log GDP	- 11.31***	- 14.08***	- 13.16*	- 12.84*
	(- 4.23)	(- 4.63)	(- 1.95)	(-1.79)
Legal origin dummies	Yes	Yes	Yes	Yes
R^2	0.68	0.73	0.54	0.55
No observations	39	39	30	30
F-value	11.49	14.34	4.43	4.63
VIF (mean)	2.27	2.27	2.17	2.17

*, ** and *** indicates significance at 10, 5 and 1 percent respectively. Dependent variables are ownership concentration (1 and 2) and family control (3 and 4) respectively. Explanatory variables are shareholder protection, law and order, property rights, GDP level and legal origin dummies. Ordinary Least Squares (OLS) have been used as estimator.

Table 7a   **Allocation of capital, legal origin and ownership**

Dependent variable: Elasticity of capital, $\hat{\lambda}_j^*$

	(1)	(2)	(3)	(4)	(5)
Constant	- 1.248	0.222	0.605	1.527	1.304
	(- 0.80)	(0.11)	(0.30)	(0.92)	(0.79)
Shareholder protection	- 0.033				
	(- 0.50)				
Property rights	0.200**				
	(2.15)				
Ownership concentration mean		- 0.006			
		(- 0.79)			
Ownership concentration median			- 0.006		
			(- 1.13)		
Family ownership, control inferred at 10%				- 0.010***	
				(- 2.86)	
Family ownership control inferred at 20%					- 0.009***
					(- 2.81)
Legal origin dummies	Yes	Yes	Yes	Yes	Yes
Log GDP	0.141	0.097	0.066	- 0.029	- 0.012
	(1.08)	(0.60)	(0.41)	(- 0.20)	(- 0.09)
Growth GDP	- 0.068	- 0.063*	- 0.065*	0.002	- 0.003
	(- 1.56)	(- 1.84)	(- 1.93)	(0.05)	(- 0.09)
R^2	0.45	0.36	0.38	0.48	0.48
No observations	39	40	40	31	31
F-value	3.61	3.14	3.31	3.73	3.66
VIF (mean)	1.71	1.81	1.75	1.55	1.52

Note: *, ** and *** indicates significance at 10, 5 and 1 percent respectively. Our dependent variable is elasticity of capital with respect to sales ($\hat{\lambda}_j^*$). Ordinary Least Squares (OLS) have been used as estimator.

Table 7b   Allocation of capital, legal origin and ownership

Dependent variable: Elasticity of capital, $\hat{\lambda}_j^*$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	- 0.369	- 0.250	1.560	1.560	0.496	0.847	1.579	1.338
	(- 0.17)	(- 0.12)	(0.86)	(0.79)	(0.23)	(0.42)	(0.92)	(0.79)
Ownership concentration mean	-0.020**				-0.001			
	(- 2.19)				(-0.32)			
Ownership concentration median		-0.020**				-0.003		
		(- 2.48)				(-0.40)		
Family ownership, control inferred at 10%			-0.019*				-0.009*	
			(- 1.90)				(-1.79)	
Family ownership control inferred at 20%				-0.017*				-0.009*
				(-1.76)				(-1.71)
Ownership mean * Property rights	0.004**							
	(2.34)							
Ownership median * Property rights		0.004**						
		(2.27)						
Family ownership 10% * Property rights			0.003					
			(1.09)					
Family ownership 20% * Property rights				0.002				
				(0.85)				
Ownership mean * Shareholder protection					-0.001			
					(-1.02)			
Ownership median * Shareholder protection						-0.001		
						(-1.05)		
Family ownership 10% * Shareholder protection							-0.000	
							(-0.27)	
Family ownership 20% * Shareholder protection								-0.000
								(-0.219
Legal origin dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log GDP	0.130	0.122	0.017	0.011	0.082	0.051	-0.032	-0.014
	(0.81)	(0.76)	(0.11)	(0.07)	(0.50)	(0.32)	(-0.22)	(-0.10)
Growth GDP	-0.068	-0.068	-0.014	0.000	-0.062*	-0.063*	0.003	-0.003
	(- 1.54)	(-1.55)	(- 0.22)	(0.00)	(1.84)	(-1.89)	(0.08)	(-0.08)
R^2	0.46	0.46	0.47	0.49	0.38	0.40	0.48	0.48
No observations	39	39	30	30	40	40	31	31
F-value	3.74	3.82	2.74	2.96	2.85	3.00	3.09	3.02
VIF (mean)	2.77	3.02	4.66	5.07	2.00	2.06	2.08	2.08

Note: *, ** and *** indicates significance at 10, 5 and 1 percent respectively. Our dependent variable is elasticity of capital with respect to sales ($\hat{\lambda}_j^*$). Ordinary Least Squares (OLS) was used as estimator.

Appendix 1:   Measures of Ownership Concentration
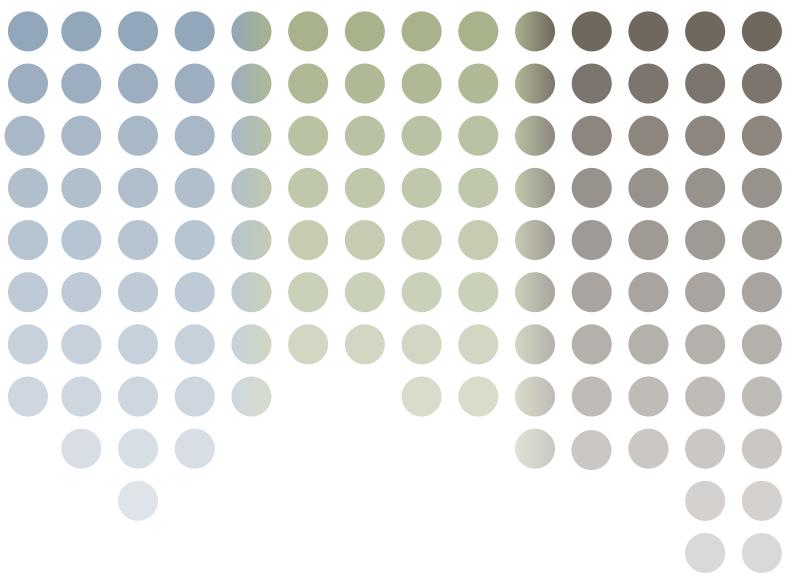
Country[a]	Family ownership (control inferred at 10%)	Family ownership (control inferred at 20%)	Ownership mean (3 largest)	Ownership median (3 largest)
Australia	10	5	28	28
Canada	30	25	40	24
Hong Kong	70	70	54	54
India	-	-	40	43
Ireland	15	10	39	36
Israel	50	50	51	55
Malaysia	-	-	54	52
New Zealand	45	25	48	51
Pakistan	-	-	37	41
Singapore	45	30	49	53
South Africa	-	-	52	52
Thailand	57	62	47	48
United Kingdom	5	0	19	15
United States	20	20	20	12
English origin	*35*	*30*	*41*	*40*
Denmark	35	35	45	40
Finland	10	10	37	34
Norway	25	25	36	31
Sweden	55	45	28	28
Scandinavian origin	*31*	*29*	*37*	*33*
Austria	15	15	58	51
Germany	10	10	48	50
Japan	10	5	18	13
South Korea	35	20	23	20
Switzerland	40	30	41	48
Taiwan	66	48	18	14
German origin	*29*	*21*	*34*	*33*
Argentina	65	65	28	28
Belgium	50	50	54	62
Brazil	-	-	57	63
Chile	-	-	45	38
Colombia	-	-	63	68
France	20	20	34	24
Greece	65	50	67	68
Indonesia	69	72	58	62
Italy	20	15	58	60
Mexico	100	100	64	67
The Netherlands	20	20	39	31
Peru	-	-	56	57
The Philippines	42	45	57	51
Portugal	50	45	52	59
Spain	25	15	51	50
Turkey	-	-	59	58
French origin	*48*	*45*	*53*	*53*
China	-	-	-	-
Hungary	-	-	-	-
Poland	-	-	-	-
Russia	-	-	-	-
Socialist/communist origin	*-*	*-*	*-*	*-*
Average / total	*38*	*33*	*45*	*44*

Note: Data on family ownership is from La Porta et al. (1999). Data for Indonesia, the Philippines, Taiwan and Thailand is from Claessens et al. (2000). Data on ownership concentration is from La Porta et al. (1998). For descriptions see text and Table 1.

Appendix 2 : Corporate Governance Indicators

Country[a]	Volpin-Pagano-LLSV Anti-director rights	Property rights	$\hat{\eta}_j$	Marginal q, $q_{m,j}$	GDP Growth (annual %)	Log GDP
Australia	4	5	0.68	0.94	3.31	11.57
Canada	5	5	0.58	1.16	2.72	11.76
Hong Kong	5	5	0.95	0.78	5.38	11.15
India	5	3	0.10	0.80	5.63	11.55
Ireland	4	5	0.67	1.10	5.42	10.82
Israel	3	4	0.26	1.27	4.19	10.95
Malaysia	4	4	0.29	0.86	6.27	10.95
New Zealand	4	5	0.90	0.86	2.45	10.78
Pakistan	5	4	0.26	0.40	5.13	10.78
Singapore	4	5	0.49	0.97	6.99	10.92
South Africa	5	3	-	0.97	2.01	11.18
Thailand	2	5	-	0.64	6.00	11.23
United Kingdom	5	5	0.81	0.85	2.26	12.05
United States	5	5	0.72	1.05	2.90	12.87
English origin	*4.29*	*4.5*	*0.56*	*1.02*	*4.33*	*11.33*
Denmark	2	5	0.85	0.65	1.84	11.26
Finland	3	5	0.56	0.96	2.60	11.11
Norway	4	5	0.58	1.04	3.12	11.17
Sweden	3	4	0.85	0.65	2.02	11.40
Scandinavian origin	*3*	*4.8*	*0.71*	*0.78*	*2.40*	*11.24*
Austria	2	5	0.84	0.71	2.26	11.37
Germany	1	5	0.99	0.57	1.94	12.39
Japan	4	5	0.82	0.86	2.57	12.72
South Korea	2	5	0.65	0.70	6.81	11.69
Switzerland	2	5	-	0.64	1.52	11.49
Taiwan	3	-	-	1.26	11.56	12.34
German origin	*2.33*	*5*	*0.83*	*0.74*	*4.44*	*12.00*
Argentina	4	5	-	0.78	3.31	11.57
Belgium	0	5	0.80	0.51	2.08	11.44
Brazil	3	3	-	0.25	2.42	11.85
Chile	5	5	0.29	1.24	5.13	10.81
Colombia	3	3	0.13	0.43	2.98	10.97
France	3	4	0.89	0.57	2.11	12.19
Greece	2	4	0.64	0.54	1.71	11.07
Indonesia	2	3	0.22	0.84	5.40	11.31
Italy	1	4	0.65	0.64	1.93	12.04
Mexico	1	3	0.34	0.50	2.77	11.46
The Netherlands	2	5	0.57	0.69	2.37	11.62
Peru	3	3	0.65	0.11	1.90	10.73
The Philippines	3	4	0.31	1.00	2.67	10.87
Portugal	3	4	0.54	0.46	2.95	11.03
Spain	4	4	0.87	0.54	2.75	11.77
Turkey	2	4	0.24	0.52	3.79	11.23
French origin	*2.56*	*3.9*	*0.51*	*0.59*	*2.89*	*11.37*
China	-	-	-	0.45	9.48	11.85
Hungary	-	-	-	-	1.19	10.65
Poland	-	-	-	-	-	11.04
Russia	-	-	-	-	-	11.60
Socialist/communist origin	*-*	*-*	*-*	*-*	*5.52*	*11.29*
Average / total	*3*	*4*	*0.65*	*0.75*	*3.61*	*11.42*

Note: $\hat{\eta}_j$ is the elasticity of industry investments with respect to industry value-added, as estimated and reported by Wurgler (2000). Marginal q are estimates of the return on investments, *i*, relative the cost of capital, *r* ($q_m = i/r$). The estimates of marginal q have been collected from Gugler et al. (2004b). Both Wurgler (2000) and Gugler et al. (2004b) report estimates for more countries than are included in our sample. See text and Table 1 for variable definitions.