



BANK OF GREECE

DOES CORPORATE OWNERSHIP
STRUCTURE MATTER FOR
ECONOMIC GROWTH?
A CROSS - COUNTRY ANALYSIS

Panayotis Kapopoulos
Sophia Lazaretou



Working Paper

No. 21 March 2005

DOES CORPORATE OWNERSHIP STRUCTURE MATTER FOR ECONOMIC GROWTH? A CROSS-COUNTRY ANALYSIS

Panayotis Kapopoulos
Emporiki Bank, Division of Economic Analysis and Research

Sophia Lazaretou
Bank of Greece, Economic Research Department

ABSTRACT

The role of corporations in allocating resources has been of great importance in the debate about the manner in which enterprises should be governed to enhance economic growth. Corporate governance features seem to be central to the dynamics by which successful firms and economies improve their performance over time as well as relative to each other. In this paper we try to clarify the relationship between corporate ownership structure and output growth by using the data of La Porta *et al.* (1999) on ownership structure of large- and medium-sized corporations in 27 wealthy economies. To search for empirical linkages, we use cross-country growth regressions. The evidence provided in the paper suggests that an environment with a higher percentage of directly and indirectly widely-held companies and a lower degree of state than private ownership is associated with a higher growth rate of per capita income. We also conclude that a higher degree of institutional investment does not seem to enhance the growth performance of an economy.

Keywords: corporate ownership structure, cross section growth model

JEL Classification: G320, P430, P480, O160

Acknowledgements: We would like to thank Heather Gibson and George Tavlas whose detailed comments and suggestions led to substantial improvements in the paper. Needless to say, the views expressed here are those of the authors and do not necessarily represent those of the Emporiki Bank and the Bank of Greece, while any remaining errors are solely the authors' responsibility.

Address for correspondence:

Sophia Lazaretou
Economic Research Department
Bank of Greece, 21 E. Venizelos Ave.,
102 50 Athens, Greece,
Tel. +30210-320.2992
Fax +30210-323.3025
Email: slazaretou@bankofgreece.gr

1. Introduction

The role of corporations in allocating resources has been at the center of the debate about the manner in which the enterprises should be governed to enhance economic performance. The system of corporate governance determines, firstly, who makes investment decisions in the firm, secondly, what kinds of investments are made, and thirdly, how returns from investments are distributed (see O' Sullivan, 2000). Corporate governance features seem to be central to the dynamics by which successful firms and economies improve their performance over time as well as relative to each other.

Recent empirical studies have examined a variety of factors related to economic growth. Some of the determinants found in cross-country samples include education (Barro, 1991), financial structure (Rajan and Zingales, 1998; Levine *et al.*, 2000), openness of trade (Sachs and Warner, 1997) and firm size (Shaffer, 2002). In corporate finance there exists an extensive theoretical and empirical literature that considers the relationship between corporate governance, takeovers, management turnover, corporate ownership structure and capital structure with corporate performance. However, in most economic growth analysis it is assumed that the nature of the shareholders and stakeholders of a country's firms is irrelevant. Although growth theory focuses on owner-run firms, the literature on the evolution of large business organizations has taken a very different route. Conceptually and empirically, in the latter literature considerable attention has focused in recent years on the impact - at the level of the firm - of ownership structure on economic performance. To the best of our knowledge, the linkage between corporate ownership structure and economic growth at the country level is a neglected area.

The standard definition of corporate governance among economists and legal scholars refers to problems arising from the separation of ownership and control, namely, the agency relationship between a principal (investors in publicly-traded firms, voters for utilities) and an agent (managers for corporations, politicians for state-controlled firms). A divergence of interest between managers and shareholders (or between politicians and voters) may cause managers (politicians) to take actions that are costly to shareholders (voters).

One of the most striking differences between countries' corporate governance systems relates to the cross-country difference between firm ownership and control. This difference is not simply an accident of history, but the result of major differences among the legal and regulatory environments of countries. Systems of corporate governance can be distinguished according to the degree of ownership and control as well as the identity of controlling shareholders. According to OECD terminology, in 'outsider' systems of corporate governance (i.e. the Anglo-Saxon countries) the conflict of interest tends to be between strong managers and widely-dispersed shareholders. In contrast, in 'insider' systems (for example, Continental Europe and Japan), the core conflict tends to be between controlling shareholders (and sometimes between strong stakeholders) and weak minority shareholders.

A main benefit of concentrated ownership is that it permits a more effective monitoring of management. But the costs associated with concentrated ownership involve low liquidity and reduced risk diversification, whereas dispersed ownership is associated with higher liquidity and more efficient resource allocation. A liquid market for equity allows the link between the preferences of successful capitalists for consumption and saving to be separated from the productive process. However, in the context of a liquid stock market, dispersed ownership may not encourage the long-term relationships required for long-term business investments that increase the productive capacity of the economy.

In this paper we try to clarify the relationship between corporate governance and economic growth by using the data of La Porta *et al.* (1999) on ownership structures of large- and medium-sized corporations in 27 advanced economies for the period 1990-2002 in order to identify the ultimate controlling shareholders of these firms. To determine empirical linkages, we use cross-country growth regressions. The results suggest that an environment with a higher percentage of directly and indirectly widely-held companies and a lower degree of state than private ownership is associated with a higher growth rate of per capita income. We also find that a higher degree of institutional investment does not seem to enhance the growth performance of an economy.

The rest of the paper is organized as follows. Section 2 explains why corporate governance is important for economic prosperity. Section 3 presents the model specification and describes the data and variables used in our empirical analysis. Section 4 reports and discusses the empirical results. Section 5 concludes.

2. Why Corporate Governance is Important for Economic Prosperity?

2.1 Identity of Owners and Agency Costs

A broad definition of corporate governance refers to the exercise of power over corporate entities. However, the existence of a corporate enterprise itself does not give rise to governance issues; such issues arise when ownership of the enterprise is separated from its management. Principal agent theory suggests that good corporate governance needs to address ‘both an adverse selection and a moral hazard problem’ (see Tirole, 2001). This definition leads to the view that a good structure of corporate governance is one that leads to the selection of the most efficient managers, and simultaneously, makes them fully accountable to the suppliers of finance (Shleifer and Vishny, 1997).

In their classic study, Berle and Means (1932) warned that the growing dispersion of ownership of US stocks gave rise to a potentially value-reducing separation of ownership and control. When capital is dispersed among small shareholders, control is concentrated in the hands of managers. Moral-hazard considerations suggest that a divergence in interests between managers and shareholders can cause managers to take actions that are costly to shareholders¹. Contracts between the two groups cannot preclude this activity if shareholders are unable to observe managerial behaviour directly. Adverse selection arises from differences in managerial ability that cannot be observed by shareholders. In moral-hazard considerations the power of ownership could be used to induce managers to act in a manner that is consistent with the interests of shareholders. In adverse selection ownership may be used to induce managers to reveal private information about their ability to generate cash flow.

¹For the original formulation of the agency theory, see Jensen and Meckling (1976).

The share of the firm's stock, owned by its manager, is at the core of the agency problem. If this share, say λ , equals unity, the firm is privately-held and managers pay the cost in terms of a lower value of the firm of any perks and corporate resources they consume (for example, a corrupt hiring policy, an unprofitable but prestigious expansion of the firm, or a merger/acquisition aimed at empire building). If $\lambda \in [0,1]$, the enterprise has more than one shareholder who subsidizes any perks. If the perks correspond to one per cent of the firm's total assets, the agency cost for public shareholders is $(1-\lambda)$ because of lower equity value. If the firm goes public (λ typically declines), the manager can raise his or her consumption of perks. However, rational shareholders would behave in such a way so as to depress the firm's market value. The problem has the appearance of a prisoner's dilemma situation; the costs to any small shareholder of monitoring the manager exceed the benefits of monitoring, even though shareholders in general would gain.

2.2 Shareholder versus Stakeholder Models of Governance

Before investigating the relationship between corporate ownership structure and economic growth, it is necessary to briefly review the leading theories of corporate governance, namely the shareholder and stakeholder models. According to the shareholder model, the objective of the firm is to maximize shareholder value through allocative, productive and dynamic efficiency. Managers have an implicit obligation to ensure that firms are run in the interests of shareholders. The origin of this model is the implicit assumption that employees, suppliers, creditors, customers and other natural stakeholders are well protected by effective contracts or laws that force controlling investors to perfectly internalize their welfare. The stakeholders have contractual claims for fixed pre-arranged amounts (i.e. wages, interest payments or other invoice amounts) against the firm's assets. Consequently, the shareholders are entitled to the residual value left over once all the contractual claims are settled². They are the residual claimants, who seek to maximize the value

²Contractual claimants' strategy may typically involve two stages. In the first stage, they aim at the maximization of the values of their claims, determined by demand and supply conditions in labour markets (employees and managers), in money markets (creditors) and in capital or final goods markets (suppliers and customers). In a second stage, they attempt to minimize the probability that the firm will default before contractual claims are paid.

of their residual claims, which is equivalent to maximizing the value of the firm's assets. In this theoretical framework³, control rights should be assigned to residual claimants. By maximizing the value of their own claims, they ensure that the contractual claimants are paid. One of the shortcomings of the shareholder model arises if the firm is in, or near, bankruptcy; in such circumstances, the creditors usually become residual claimants.

The debate among the economists and legal scholars mainly concerns the practical implementation of shareholder value principle as well as its legitimacy. Attention is paid to what constitutes an efficient monitoring structure. Owners hire managers to run the firm so as to generate returns on their investment. An asymmetric information problem can arise, however, since managers tend to be better informed about the best alternative uses for the shareholders' funds. Tirole (2001) specifies three mechanisms toward a partial alignment of the firm's decision-making with the interests of its shareholders or generally investors. Two of these relate to managerial incentives. First, monetary compensation (bonuses and stock options) may encourage managers to behave in the owners' interest; and, second, managers' career concerns may stimulate them to please their shareholders. The third mechanism relates to the control structure. Investors may engage in 'monitoring and exercise voice' aiming at making the firm more efficient and raising the firm's net present value.

Turning to the stakeholder model, the basic arguments in favour of this model are associated with the weaknesses of the shareholder value model. The shareholder model is based on weak assumptions in that it specifies relations only between shareholders and owners. Specifically, shareholders are not the only ones who invest in the corporation. The competitiveness and the ultimate success of an enterprise is the consequence of group-work, which includes the attempts of a wide variety of resource providers, including portfolio investors, employees, creditors, suppliers, customers etc. The performance of the enterprise will be influenced by the industrial relations among several stakeholders (see Kester, 1992). This model takes a broader view of the enterprise⁴. For example, Blair (1995) argued that while

³The incomplete contracts' view of the firm has been developed by Coase (1937), Jensen and Meckling (1976), Fama and Jensen (1983) and Williamson (1985).

⁴In its traditional version, the stakeholder model includes some other social partners, such as members of the community in which the enterprise is located, environmental institutions or national

shareholders have a residual claimant status, the physical capital assets in which they invest are not the only assets that create value in the firm. Employees also invest in their own human capital and to some extent their skills are specific to the enterprise for which they work (see also Becker, 1975). As a consequence, they bear some of the risk related to the company's activities.

2.3 The Relationship between Ownership and Performance at Firm Level

Agency costs in public corporations will determine the way in which ownership structure may influence the dynamic efficiency of the business sector. This occurs because agency costs represent reductions in value because of the separation of ownership from control. Jensen (1986, 1989) argues that dispersed ownership is leading to major inefficiencies in US companies. In his view, the rise of hostile takeovers and LBOs in the 1980s is a value-increasing response by capital markets through the removal of inefficient managers and concentrations of corporate ownership, respectively. However, Demsetz (1983) and Demsetz and Lehn (1985) argue that concentrated ownership also entails significant costs. Specifically, concentrated ownership not only provides stronger incentives to maximize value, but also incurs serious costs that arise from excessive concentration of risk and the potential for expropriating minority holders. Thus, at low levels of ownership concentration, the incentive effect would lead to a positive relation between ownership concentration and performance. At higher levels of ownership concentration, it has been argued (see Morck *et al.*, 1989) that control mechanisms, such as the market for takeovers, LBOs and boards of directors, may be ineffective as ownership becomes more concentrated. In such a case (high values of λ), the CEO effectively has uncontested control over his or her enterprise. He or she is not vulnerable to hostile takeovers, significant board challenges or attacks by large investors. Minority shareholders can rarely affect corporate policy, and ultimately,

governments, together with the contractual and residual claimants. In addition, the traditional perspective is often expounded in terms of a political position rather than as an economic theory of governance. For example, Kelly *et al.* (1997) take as given that the enterprises that rely on the experience of their stakeholders will be more efficient, whereas the solidarity between social classes of a country is a requirement for international competitiveness. It has been argued (see Maher and Anderson, 1999 and OECD, 1999) that, from this perspective, it is difficult, if not impossible, to make sure that firms fulfil these wider objectives.

the manager is 'entrenched', so as to maximize his or her own utility⁵. This means that a negative correlation between ownership concentration and performance will emerge. For even greater levels of ownership, the incentive effect would again dominate leading to a positive relation.⁶ Apparently, the relationship is non-linear.

Another dispute about the ability of widely held ownership (small values of λ) to generate efficiency and growth deals with the short-sightedness of the stock market (see O' Sullivan, 2000). Financial historians support (see Lazonick and O' Sullivan, 1997a, 1997b, 2000) that the notion of public shareholders investing in productive assets has little basis in the history of the successful industrial development of the US or any other industrial economy. They find that the stock market does not serve as the main source of funds for long-term business investment. They also find that, although portfolio investors play a crucial role in the development of the corporate economy, these investors do not play a significant financing role. In other words, investors do not wait until the planned investments 'bear fruit'. Moreover, this kind of historical analysis incriminates the rise of the shareholder value principle in Anglo-Saxon countries in the shift of corporate strategy from a retention of earnings and reinvestment, towards a downsizing of labour costs (in an attempt to raise the return on equity) and a distribution of earnings to shareholders.

⁵ It has been argued that entrenchment may be possible at values of λ below 0.5 if, for example, managers direct activities to areas where they have unique expertise (Shleifer and Vishny, 1990).

⁶ Stulz (1988) models the trade-off between low and high levels of λ . The empirical literature has used accounting-based performance measures, such as the return on capital, or market-based measures, such as Tobin's q, to investigate the matter. For a detailed presentation of the micro econometrics of corporate governance studies, see Baghat and Jefferis (2002). Gugler (2001) provides a detailed survey of empirical studies on the relationship between ownership concentration and firm performance. The studies about the relation between both variables seem to have yielded conflicting results. Some papers find that the owner-controlled firms significantly outperform manager-controlled ones (see Morck *et al.*, 1988; Loderer and Martin, 1997; Agrawal and Knoeber, 1996; Cho, 1998). Other papers find no evidence of a relation between ownership concentration and firm performance (see, for example, Demsetz and Lehn, 1985) and some others treat ownership structure as an endogenous variable (Himmelberg *et al.*, 1999; Demsetz and Villalonga, 2001; Gugler and Weigand, 2003). The ownership structure of the firm may be endogenously determined by the firms' contracting environment. For example, superior firm performance could lead to an increase in the value of stock options owned by the management. All empirical studies rely chiefly

2.4 *The Relationship between Ownership and Performance at Country Level*

International corporate structures are not homogenous and this circumstance has a direct impact on incentives in any economy and an indirect impact on business culture. A simple structural difference is the often-cited split between the Anglo-American model, the German model and the Japanese model (sometimes called the *keiretsu*). A complete discussion of these models is beyond the scope of the paper. We only describe an ideal model in each area that abstracts from the actual diversity and complexity in real situations.⁷

For the United States, the ideal type of corporation is that with equity ownership diffused between a multitude of small stockholders and a self-perpetuating management firmly in control under most circumstances. However, the separation of ownership from control results in so-called agency costs. The degree of discipline over management is provided by the threat, and occasionally the reality, of proxy contests, hostile takeovers and leveraged buy-outs. US managerial concern with shareholder value is merely a specific application of the cultural attitude of American society where the ‘individual is the king’. As Miller (2003, p.519) put it ‘not the nation, not the government, not the producers, not the merchants, but the individual – and especially the individual consumer – is sovereign’.

By contrast, the ideal type of corporation in the Japanese tradition is the *keiretsu*, thought of as a group of companies linked by stable cross-shareholdings and seller-buyer relationships. A parent company, or more often a main bank, is supposed to act as the administrator for the group by monitoring management performance (see Nakamura, 2002; Aoki *et al.*, 1994; Morck and Nakamura, 1999). However, important changes in the operating environment of Japanese banks – such as deregulation, increasing exposure to globalisation, the collapse of asset prices in the 1990s and the banking crisis that followed – may be leading to a decline of the *keiretsu* system (Hoshi and Kashyap, 2001; Anderson and Campbell, 2004).

on Tobin’s *q* as a measure of firm performance, although a few examine accounting profit rate as an alternative measure of firm performance.

⁷ For a description of the evolution of corporate governance in Japan and the euro area, see Yafeh (2000) and Hartmann, Maddaloni and Manganelli (2003), respectively. For a comparison of the British and American corporate governance structures with those of Germany and Japan, see Dove, Lazonick and O’Sullivan (1999) and Gugler, Mueller and Yortoglou (2004), respectively.

In Germany, the standard account for the business sector looks at only a few hundred large firms, listed on the stock exchange and operating under the supervisory board system required for companies with more than 2,000 employees who elect half the supervisory board. German banks, as universal banks, can own corporate stock, unlike US banks (Franks and Mayer, 2003). Only three cases of hostile takeovers have taken place in Germany during the post-WWII period, and in all cases the banks' influence has derived from the chairmanship of supervisory boards and the proxy votes which they cast on behalf of individual shareholders (see Franks and Mayer, 1998). Banks may influence corporate governance *via* their control of proxy votes, their position on supervisory boards and their provision of loan finance⁸. In addition to the usual emphasis placed on the role of the German banks, it is increasingly recognised that in large firms ownership is highly concentrated. As Edwards and Nibler (2000) have shown, any case of German corporate governance superiority should be based on high ownership concentration rather than on the special role of the banks.

Following the Asian financial crisis of 1992-98, there has been renewed interest in Japan as well as in Europe, in identifying the aspects of the Anglo-American corporate governance system that might be implementable elsewhere (see OECD, 1999). Indeed, some writers have expressed the view that Japan's prolonged economic slump may, in part, reflect deeper maladies in the Japanese corporate governance (Morck and Nakamura, 1999).

The specific institutional characteristics of each country's average corporate structure will mark the emergence of a shareholder or a stakeholder society. Effectively, these can be viewed as two extreme cases of the spectrum. A mixed type of corporate culture may be closer to one or the other extreme case. The main potential problem with countries close to the stakeholder society model is that the interests of equity investors may be insufficiently represented in corporate governance. In other words, it can be argued that Germany's main banking system and the Japanese financial *keiretsu* system, which leave corporate governance largely in the hands of creditors rather than shareholders, could lead to a misallocation of capital. It can also be argued that, when corporations are run to

⁸ For a detailed analysis of the significance of ownership structure of German firms on bank corporate control, see Edwards and Fischer (1994).

maximize the shareholder value, the performance of the economy as a whole, and not only the interests of the shareholders, are enhanced.⁹

Additionally, investments in stakeholder relationships might reduce short-term external flexibility, which may lower the value of the company in case of external shocks. Also, if strong fixed claimants transfer wealth to themselves from equity claimants by using their influence and control to reduce the riskiness of firms, they may provoke contractionary effects in a nation's economy.¹⁰ In countries with concentrated corporate ownership, like Japan and Germany, there are large blocks of shareholders that take an active role in management to reduce managerial shirking and misconduct. The takeover market in these countries is too restricted and fixed claimants are completely unable to protect themselves contractually from the moral hazard, which influences the behaviour of those who have borrowed. Besides, allocative efficiency may be reduced by raising the cost of capital. Managers in such an environment remain oriented towards a strategy that stresses retention and reinvestment rather than simply using corporate revenues to increase dividends or to repurchase shares in order to boost stock prices. The pursuit of such strategies may permit a lot of different stakeholders to gain (workers, suppliers and consumers). Finally, Morck *et al.* (2004) argue that pyramidal control structures, cross shareholding and super voting rights are common outside the Anglo-Saxon world. Using these devices, a family can control corporations without making a commensurate capital investment. These ownership structures create agency and entrenchment problems simultaneously. In other words, the extensive control of corporate assets by a few families may reduce the rate of innovation and lead to an economy-wide misallocation of resources and, thus, a slower growth rate of the economy.

3. The Model and the Variables

Following the empirical growth literature (see, for example, Levine and Renelt, 1991, 1992), we use cross-country regressions to examine the empirical

⁹ Shareholders' returns are regarded as incentives for waiting, risk bearing and monitoring of managers.

linkage between long-run growth rates and corporate governance. In previous studies, cross-country regressions have been widely used to investigate whether a statistically significant relationship exists between growth and a wide variety of macroeconomic, political and institutional indicators. In what follows, we extend the literature by examining whether corporate ownership is significantly correlated with long-run per capita growth rates. We also provide the correlation between output growth and the particular variable of interest. Such a correlation would imply that the partial correlation between per capita growth rates and corporate ownership remains statistically significant with the sign predicted by theory even when the vector of the exogenous control variables in the growth regression changes.

The basic empirical growth equation estimated is:

$$\mathbf{Y}_j = \alpha_i \mathbf{I}_j + \alpha_m \mathbf{M}_j + \alpha_z \mathbf{Z}_j + u_j \quad (1)$$

where a subscript j indicates that the variable refers to the j th country. We assume, as in most cross-country growth regressions, that the explanatory variables are entered linearly (see Kormendi and Meguire, 1985). To examine the robustness of the main results, we estimate several versions of equation (1) for 27 developed economies.¹¹ \mathbf{Y} is the average annual percentage change of real GDP per capita from 1990 to 2002. \mathbf{I} is a set of explanatory variables always included in the cross-country growth regressions. The particular variables used correspond to those found in previous empirical studies as well as in theoretical considerations (see Barro, 1991).

\mathbf{M} is the variable of interest, which is a measure of corporate ownership structure. We are interested in whether firms in each country have substantial owners. Our purpose is not to measure ownership structure but to use several definitions of the ‘average’ or the ‘usual’ owner. In particular, we use the ownership definitions of La Porta *et al.* (1999), who do not try to measure ownership

¹⁰ Perhaps, the most expansionary impact on growth might come from a corporate culture that reaches the appropriate bargaining equilibrium between the risk taking proclivities of the shareholders and the risk avoidance proclivities of the other stakeholders.

concentration, because a theoretically appropriate measure would require a model of the interactions between large shareholders, which does not exist. Rather, they try to define owners. The idea that motivates their definitions of ownership is to know whether corporations have shareholders with a substantial proportion of the voting rights, either directly or through a chain of holdings. For this purpose, their definitions rely on voting rights rather than cash flow rights.

Using the data of La Porta *et al.*, we can assign firms to one of two categories – widely-held (either directly or indirectly) and narrowly-held (that is, with a limited number of owners).¹² Firms are assigned on the basis of either a 10 per cent threshold or a 20 per cent threshold. Thus, using the 10 (20) per cent threshold, a firm is categorized as narrowly-held if 10 (20) per cent or more of the voting rights associated with shares in that firm are held by one shareholder. In this way, firms defined as narrowly-owned under the 20 per cent threshold are a subset of those defined as narrowly-owned under the 10 per cent threshold. Firms can be categorized as narrowly-held even if control by a shareholder is indirect. Thus a shareholder may have indirect control over firm A if it directly controls firm B which directly controls firm A or if it directly controls firm C which directly controls firm B which, in turn, directly controls 10 (20) per cent or more of the voting rights in firm A (La Porta *et al.*, 1999, pp.476-77).

La Porta *et al.* use two samples of corporations for each country. The first sample contains the 20 largest firms in each country according to their stock market capitalization at end-1995 (we call this the large-sized corporation sample). The second consists of the smallest 10 firms with a stock market capitalization of at least \$500 million at end-1995 (the medium-sized corporation sample).

Our variable of interest, CO, which is calculated at the country level, is the number of widely-held corporations (including the number of corporations controlled by another widely-held corporation or financial institution) divided by the number of narrowly-held corporations. Four variations on this variable are used depending on the sample of corporations and the threshold used. Thus:

¹¹ The economies in our sample are Argentina, Australia, Canada, Hong Kong, Ireland, Japan, New Zealand, Norway, Singapore, Spain, the UK, the US, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Israel, Italy, Korea, Mexico, Netherlands, Portugal, Sweden and Switzerland.

- (i) COL10 uses the large-sized corporation sample with the 10 per cent threshold;
- (ii) COL20 uses the large-sized corporation sample with the 20 per cent threshold;
- (iii) COM10 uses the medium-sized corporation sample with the 10 per cent threshold;
- (iv) COM20 uses the medium-sized corporation sample with the 20 per cent threshold.

We also consider two other alternative measures of corporate ownership structure. In particular, a widely-accepted strand of the empirical literature documents the view that private enterprises are generally more efficient than state enterprises.¹³ This argument is associated with the increasing interest world-wide during the last two decades in the privatisation process. The main reasons for the superior efficiency of private ownership are (Phelps 1993): stronger entrepreneurship; lower pressure from special interest groups and lobbying activities; a longer time horizon of managers than politicians, and a larger penalty for failing to maximize profits. More recently, a cross-country study (La Porta *et al.*, 2000) finds that government ownership of banks is associated with lower subsequent growth of per capita income, an underdeveloped financial system and a poor protection of property rights. In line with our model specification, we use the ratio of the number of state-controlled corporations to the rest of corporations as a proxy for state ownership for the sample of large- and medium-sized firms using 10 and 20 per cent threshold (namely, COLS10 COLS20, COMS10, COMS20). This measure is used to capture the effect of state ownership on per capita output growth.

The second measure is used to estimate the effect of institutional ownership on output growth. Institutional investors, because of their greater bargaining power

¹² The database of La Porta *et al.* (1999) allows for five types: family-owned/individual-owned firms; state-owned firms; widely-held financial institutions; widely-held corporations, and finally, miscellaneous (e.g. a cooperative, a voting trust or a group with no single controlling investor).

over the firm relative to individuals, are well placed to minimize the corporate governance problems arising from the separation of ownership and control.¹⁴ However, institutional shareholders typically do not adopt a monitoring role, preferring to sell their holdings in problematic corporations rather than intervening in their management. Three factors are said to contribute to this situation (see Keasey and Wright, 1997). First, if institutional shareholders intervene publicly, they may draw attention to the difficulties facing the corporation. Such a move may cause the share price to fall, reducing the value of their investment. Second, getting involved in the management may give them access to inside information precluding them from trading their shares. Finally, effective monitoring is costly in terms of time and money for investors who hold such diversified portfolios.

To estimate the effects of institutional ownership we introduce as a proxy the ratio of the number of widely-held corporations controlled by a widely-held financial institution as a proportion of all remaining corporations. Again, we use all the criteria of La Porta *et al.* (1999). Thus, we take both the sample of large- and medium-sized firms and use both the 10 and 20 per cent thresholds (i.e. COLF10, COLF20, COMF10, COMF20).

\mathbf{Z} is the conditioning information set. This is a vector of exogenous control variables used as indicators of macroeconomic and political stability. They are taken from a pool of variables contained in past empirical studies on economic growth. Finally, u is a serially uncorrelated, but possibly heteroskedastic, random error term.

The \mathbf{I} -variables consist of a constant; investment as a share of GDP (representing the accumulated level of physical capital); the logarithm of the initial level of real GDP per capita, as of the beginning of the sample period (1991) (it is intended to capture the convergence effect noted by Barro and Sala-i-Martin, 1992)¹⁵; the average annual rate of population growth; and the share of public

¹³ For a detailed review of these empirical studies, see World Bank (1995). For a theoretical modelling of the relationship between state ownership and economic growth, see Gylfason *et al.* (2001).

¹⁴ Davis (2002) provides a literature survey on micro evidence. Even though the outcome is mixed, he on balance suggests a positive effect of institutional corporate governance on equity returns.

¹⁵ The coefficient on the initial level of real GDP per capita is often used to test the convergence hypothesis: a poor country, *ceteris paribus*, tends to grow faster than a rich country and hence the per capita income level of the former will catch up with the latter. Specifically, countries with low level of real GDP per capita at the beginning of the period will experience higher rates of output growth throughout the period through the transfer of technology and knowledge from the leaders.

expenditure on education as a proportion of GDP as an index of education (a proxy for the accumulated level of human capital).¹⁶

The **Z**-variables consist of the average rate of government consumption expenditures to GDP (a fiscal policy indicator); the ratio of exports to GDP (openness of trade); the average inflation rate or the standard deviation of inflation (a monetary policy indicator). The conditioning information set is built up stepwise, starting with a simple vector of explanatory variables (**I**-variables) and then adding other variables (**Z**-variables) (see also Cetorelli and Gambera, 2001).

Table 1 presents descriptive statistics for the **I**-, **M**- and **Z**-variables. It reports the mean values, standard deviations, maxima and minima of the variables in our sample as well as skewness and kurtosis. Figure 1 maps real GDP per capita growth rates (Y_j) and corporate ownership structure ($COM10_j$).

4. Empirical Results

Table 2 reports estimates from the ‘basic’ regression containing only the usual variables found in the literature (the **I**-variables) and the particular variable of interest, whereas Tables 3-6 report estimates for a variety of the control variables (**Z**-variables), so as to examine the robustness of the main results. Empirical findings from the basic regression indicate a positive and statistically significant effect of education on growth. The investment coefficient is also positive and significant. Population growth, even though it has the sign predicted by theory (negative), is not significant in the majority of the regressions, while the correlation between growth and initial income is negative as expected and significant.

In the regressions reported in Table 2, we examine whether the control of large publicly-traded firms plays a significant role in the determination of the growth rate of real GDP per capita. We find that corporate ownership structure has a strong statistically significant positive impact on growth performance, when the 10 per cent criterion for control is employed. However, when we employ the 20 per cent criterion, the regression coefficient is negative but does not differ statistically significantly from zero.

¹⁶ The initial secondary-school enrolment rate is also a proxy for education (Barro, 1991). However, missing values for some countries make the problem of small sample size very important.

By looking for shareholders who control more than 10 per cent of the votes, we adopt a more rigorous definition of a widely-held company. The 10 per cent criterion for control may have two advantages in the attempt to clarify the direction of the relationship between corporate structure and economic growth. Firstly, the cutoff of 10 per cent provides a significant threshold of votes by including the most active owners. Secondly, most countries mandate disclosure of 10 per cent, and usually even lower, ownership stakes. As La Porta *et al.* (1999) note, their standard procedures of data collection do not work for several countries because disclosure is so limited. For example, the data for Greece and Mexico have been collected from the 20 largest corporations for which they could find ownership data, whereas for Israel and Korea they used Internet sources and information for the year 1984¹⁷ respectively.

Consistent with the findings of the impact of COL10, we conclude that a ‘widely-held’ corporate structure facilitates economic growth when we use the COM10 and COM20 versions of our variable of interest. In all the estimates, the regression coefficients have a positive sign and are statistically different from zero (see Tables 5 and 6). The effect of the ownership structure of medium-sized publicly-traded firms on economic growth is not only statistically significant, but also more economically important than the ownership structure of large publicly-traded firms. We can use the estimate of the regression coefficient in Table 2 to infer how much higher the growth rate of a country would be if a re-structuring of the country’s corporate ownership were to take place.

The estimated coefficient of COL10 is 0.0004 while the coefficient of COM10 is 0.021. We can set the two variables of interest at their overall means. In this case, the regression coefficient estimates predict an increase of 0.063% in the average annual growth rate after a doubling of COL10 (1.568) and an increase of 0.63% after an equivalent increase in COM10 (0.302). The larger impact of the variable COM10 in comparison with the other specifications could be interpreted as an indication that the control of medium-sized publicly-traded firms is the most representative definition of ownership structure for a country. This definition is based on a sample of firms with stock capitalisation of at least \$500million and not only on the largest ones.

¹⁷ It was the last available date with reliable data.

The importance of the effect of corporate ownership structure on economic growth can also be demonstrated by a comparison of two countries in the sample with completely different ownership structure, for example Argentina and the USA. Argentina is a country with a relatively low percentage of widely-held companies, whereas the US is a country with a relatively high percentage of widely-held companies. The regression coefficient estimate predicts that if Argentina had the same ownership structure as the US, the average annual growth rate of per capita income would increase, *ceteris paribus*, by 2.1 percentage points (i.e. the coefficient of COM10 in the 'basic' regression times the value that COM10 takes for the US).¹⁸

The degree of state control - measured by the ratio of state controlled firms to the rest of the corporations in each country - has a negative and statistically significant effect on per capita income growth (see Table 7). This result provides support for the view that a divergent interest between politicians as agents and voters as principles may lead to incompetence and corruption. This explanation is consistent with considerable evidence documenting the inefficiency of government enterprises, the political motives behind public provision of services and the benefits of privatisation (see Megginson *et al.*, 1994; Barberis *et al.*, 1996; Lopez de Silanes *et al.*, 1997; Frydman *et al.*, 1999).

Again, comparing two countries in the sample with a different degree of state control, for example, Austria and the US, we can detect how important the effect of corporate control on economic growth is. Austria is a country with a relatively high percentage of state-controlled firms, whereas the US is a country with a relatively low degree of state control. The regression coefficient estimate predicts that if Austria had the same degree of state ownership as the US, the average annual growth rate of per capita income would improve, *ceteris paribus*, by 0.5 percentage points (i.e. the coefficient of COMS10 in the 'basic' regression times the value that COMS10 takes for the US).

As far as the institutional ownership variable is concerned, the regression coefficients are not significantly different from zero, as the results reported in Table

¹⁸ As Figure 1 suggests, Ireland may play a substantial role in the empirical results, especially in the light of the relatively low t-ratios on the variables of interest. One might suspect that the results are being driven by the observation at the top right hand corner. Thus, we re-estimate equation (1) excluding Ireland from the sample. We note that the empirical results, in general, do not change

8 reveal. However, it is very difficult to conclude whether this factor is irrelevant to output growth, or simply the result of two opposing effects related to institutional investing. The first one concerns the greater bargaining power of institutional investors over the enterprises relative to individual investors. Consequently, the problem arising from the separation of ownership and control is minimized and the asset allocation becomes more efficient. The second one refers to the disincentives – mentioned above – for institutional investors to undertake an active monitoring rule.

Finally, the relationship between ownership structure and economic growth seems to be robust to changes in model specification. In particular, adding the Z-variables stepwise, the empirical findings do not change considerably.¹⁹ Furthermore, Ramsey's Reset stability test fails to indicate specification error in all cross-country regressions. The estimated coefficients of all measures of corporate ownership structure do not change sign or level of significance compared with the results in the 'basic regression'. The fiscal policy indicator has a positive and robust effect on growth, whereas inflation and its standard deviation are negatively related to growth. Openness also enters positively and significantly in the growth equation. However, this link between exports and growth is only found when investment is dropped from the set of I-variables.

5. Conclusions

Countries differ in many ways, including in terms of corporate ownership structures. In this paper we have investigated a rather neglected aspect of cross-section economic growth modelling, that of the structure of corporate ownership. Empirical findings suggest that an environment with a higher percentage of directly and indirectly widely-held companies and a lower degree of state ownership is associated with a higher growth rate of per capita income. We also conclude that a higher degree of institutional investing does not seem to enhance the growth performance of an economy. These findings might be very informative on the benefits received from the disciplinary effect of a well-developed and more liquid stock market, as well as from privatisations.

substantially, even though in some regressions the t-ratios become a little lower. Overall, the sign and the statistical significance of the estimated coefficients of the variables of interest remain unaffected.

¹⁹ The tables reporting the empirical results are available upon request.

Three caveats, however, are in order. First, the simple reasoning that if Argentina had the same corporate structure as the US, she might have had a higher growth rate overlooks the fact that a change in corporate ownership structure will change the entrepreneurial culture, the level of financial development as well as many other structural determinants of economic growth. This suggests that our calculations of the effect of corporate ownership change on economic growth – which is based upon a single equation model – underestimate the actual influence of such structural change. Moreover, corporate ownership structure can be treated as an endogenous variable. Ownership structure is as likely to affect economic growth as economic growth is likely to affect corporate ownership structures. This endogeneity should be taken into account when seeking to ascertain the relation between economic growth and ownership. For example, Doidge *et al.* (2004) present a model which shows that the incentives to adopt better ownership structures at firm level increase with a country's financial and economic development. Second, country coverage is limited due to data availability. Third, the empirical analysis compares only a very short time period, 1990-2002. This is because country indices of corporate governance do not exist for a longer time period. The choice of the sample period might test the reliability of the empirical results. For example, Japan clearly grew much faster than the US during the 20th century and has grown more slowly in the last decade of the century. So, it might be perfectly sensible to conclude that different corporate structures contribute to different growth rates at different stages of an economy's development. No particular way of structuring corporate finances is better than any other in all circumstances; different systems have different strengths and weaknesses.

Suggestions for future research would include the construction of a larger database involving more refined country indices of corporate governance. This should take into account the role of the structure of the board of directors, the importance of takeovers and managerial compensation and other incentives.

Data Appendix: Definitions and Sources

- Real GDP per capita is the average growth rate of real GDP per capita, in percent, 1990-2002. Source: IFS, IMF (Yearbook).
- The data for corporate ownership structure are from La Porta *et al.* (1999).
- Education is public expenditures on education as percent to GDP as of 1999/2000. Source: Unesco, Institute of Statistics.
- Population is the average growth rate of population, in percent, 1990-2002. Source: IFS, IMF (Yearbook).
- Initial real per capita GDP is the level of real GDP per capita as of 1991 in US dollars. Source: IFS, IMF (Yearbook).
- Investment is the average share of gross fixed capital formation in GDP, in percent, 1990-2002. Source: IFS, IMF (Yearbook).
- Government consumption is the ratio of government consumption spending to GDP, in percent, 1990-2002. Source: IFS, IMF (Yearbook).
- Openness is the ratio of total exports of goods and services to GDP, in percent, 1990-2002. Source: IFS, IMF (Yearbook).
- Inflation is the mean rate of CPI inflation, in percent, 1990-2002. Source: IFS, IMF (Yearbook).

References

- Agrawal, A and C. Knoeber (1996), "Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders", *Journal of Financial and Quantitative Analysis*, 31, 377-397.
- Anderson, Ch. and T. Campbell (2004), "Corporate Governance of Japanese Banks", *Journal of Corporate Finance*, 10, 327-354.
- Aoki, M., Patrick, H. and P. Sheard (1994), "The Japanese Main Bank System: An Introductory Overview", in: Aoki, M., Patrick, H. (eds.), *The Japanese Main Bank System: its Relevance for Developing and Transforming Economies*, Oxford University Press, 1-50.
- Baghat, S. and R. Jefferis (2002), *The Econometrics of Corporate Governance Studies*. The MIT Press, Cambridge, Massachusetts.
- Barberis, N., M. Bocko, A. Shleifer and T. Tsukanova (1996), "How Does Privatization Work? Evidence from the Russian Shops", *Journal of Political Economy*, 104, 764-790.
- Barro, R. (1991), "Economic Growth in a Cross Section of Countries", *Quarterly Journal of Economics*, 106, 407-444.
- Barro, R. and Sala-i-Martin, X. (1992), "Convergence", *Journal of Political Economy*, 100, 223-251.
- Becker, G. (1975), *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, New York, NBER.
- Berle, A. and G. Means (1932), *The Modern Corporation and Private Property*, New York: MacMillan.
- Blair, M. (1995), *Ownership and Control: Rethinking Corporate Governance for the Twenty-First Century*, Washington, Brookings Institution.
- Cetorelli, N. and M. Gambera, (2001), "Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data", *Journal of Finance*, 56, 617-648.
- Coase, R. (1937), "The nature of the firm", *Economica*, 4, 386-405.
- Cho, M. (1998), "Ownership Structure, Investment and the Corporate Value: an Empirical Analysis", *Journal of Financial Economics*, 47, 103-121.
- Davis, P. (2002), "Institutional Investors, Corporate Governance and the Performance of the Corporate Sector", *Economic Systems*, 26, 203-229.
- Demsetz, H. (1983), "The Structure of Ownership and the Theory of the Firm", *Journal of Law and Economics*, 26, 375-390.
- Demsetz, H. and K. Lehn (1985), "The Structure of Corporate Ownership: Causes and Consequences", *Journal of Political Economy*, 93, 1155-1177.
- Demsetz, H. and B. Villalonga (2001), "Ownership Structure and Corporate Performance", *Journal of Corporate Finance*, 7, 209-233.
- Doidge, C., G. Karolyi and R. Stulz (2004), "Why Do Countries Matter so much for Corporate Governance?", NBER, *Working Paper* no 10726, August.

- Dore, R., W. Lazonick and M. O'Sullivan (1999), "Varieties of capitalism in the twentieth century", *Oxford Review of Economic Policy*, 15, 102-120.
- Edwards J. and K. Fischer (1994). *Banks, Finance and Investment in Germany*, CEPR, Cambridge University Press.
- Edwards, J. and M. Nibler (2000), "Corporate Governance: Banks versus Ownership Concentration in Germany", *Economic Policy*, 239-267.
- Fama, E. and M. Jensen (1983), "Agency Problems and Residual Claims", *Journal of Law and Economics*, 26, 327-349.
- Franks, J. And C. Mayer (1998), " Bank Control, Takeovers and Corporate Governance in Germany", *Journal of Banking and Finance*, 22, 1385-1403.
- Franks, J. and C. Mayer (2003), "Corporate Ownership and Control in the UK, Germany and France", in: Stern J. And D. Chew (eds), *The Revolution of Corporate Finance*, 36, 534-551, Blackwell publishing.
- Frydman, R., C. Gray, M. Hessel and A. Rapaczynki, (1999), "Private Ownership and Corporate Performance: Evidence from the Transition Economies", *Quarterly Journal of Economics*, 114, 1153-1192.
- Gugler, K. (2001), *Corporate Governance and Economic Performance*. Oxford: Oxford University Press.
- Gugler, K and J. Weigand (2003), "Is Ownership really Endogenous?", *Applied Economics Letters*, 10, 483-486.
- Gugler, K., D. Mueller and B. Yurtoglou (2004). "Corporate Governance and Globalisation", *Oxford Review of Economic Policy*, 20, 129-156.
- Gylfason, T., T. Herbertsson and G. Zoega (2001), "Ownership and Growth", The World Bank, *Economic Review*, 15, 431-449.
- Hartmann, P. A. Maddaloni and S. Manganelli (2003), "The Euro Area Financial System: Structure, Integration and Policy Initiatives", *Oxford Review of Economic Policy*, 19, 180-213.
- Himmelberg, C. Hubbard, R. and D. Palia (1999). "Understanding the Determinants of Managerial Ownership and the Link between Ownership and Performance", *Journal of Financial Economics*, 53, 353-384.
- Hoshi, T and A. Kashyap (2001), *Corporate Finance and Governance in Japan: The Road to the Future*. MIT Press.
- Jensen, M. (1986), "The Agency Costs of Free Cash Flow: Corporate Finance and Takeovers", *American Economic Review*, 76, 323-329.
- Jensen, M. (1989), "The Eclipse of Public Corporation", *Harvard Business Review*, 89, 61-74.
- Jensen, M. and W. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics*, 3, 305-360.
- Keasey, K. and M. Wright (1997), *Corporate Governance: Responsibilities, Risks and Remuneration*. John Wiley and Sons.

- Kelly, G., Kelly, D. and A. Gamble (1997), *Stakeholder Capitalism*, Basingstoke, MacMillan.
- Kester, W.C. (1992), "Industrial Groups as Systems of Contractual Governance", *Oxford Review of Economic Policy*, 8, 24-44.
- Kormendi, R. and P. Meguire (1985), "Macroeconomic Determinants of Growth: Cross-Country Evidence", *Journal of Monetary Economics*, 16, 141-163.
- La Porta, R., F. Lopez-de-Silanes and A. Shleifer (1999), "Corporate Ownership Around the World", *Journal of Finance*, LIV, 471-517.
- La Porta, R., F. Lopez-de-Silanes and A. Shleifer (2000), "Government Ownership of Banks", Harvard Institute of Economic Research, *Discussion Paper* no. 1890.
- Lazonick, W. and M. O'Sullivan (1997a), "Finance and Industrial Development: The United States and the United Kingdom", *Financial History Review*, 4, 7-29.
- Lazonick, W. and M. O'Sullivan (1997b), "Finance and Industrial Development: Japan and Germany", *Financial History Review*, 4, 32-54.
- Lazonick, W. and M. O'Sullivan (2000), "Maximizing Shareholder Value: a New Ideology for Corporate Governance", *Economy and Society*, 29, 13-35.
- Levine, R., Loayza, N. and T. Beck (2002), "Financial Intermediation and Growth: Causality and Causes", *Journal of Monetary Economics*, 46, 31-77.
- Levine, R. and D. Renelt (1991), "Cross-Country Studies of Growth and Policy: Some Methodological, Conceptual and Statistical Problems", World Bank, *Working Paper Series*, no 608.
- Levine, R. and D. Renelt (1992), "A Sensitivity Analysis of Cross-Country Growth Regressions", *American Economic Review*, 82, 942-963.
- Loderer, C. and K. Martin (1977), "Executive Stock Ownership and Performance: Tracking Faint Trace", *Journal of Financial Economics*, 45, 223-255.
- Lopez-de-Silanes, F., A. Shleifer and R. Vishny (1997), "Privatisation in the United States", *Rand Journal of Economics*, 28, 447-471.
- Maher, M. and T. Anderson (1999), "Corporate Governance: Effects on Firm Performance and Economic Growth". OECD. www.oecd.org/dataoecd/10/34/2090569.pdf.
- Meggison, W., R. Nash and M. van Randenborgh (1994), "The Financial and Operating Performance of Newly Privatised Firms: An International Empirical Analysis", *Journal of Finance*, 49, 403-352.
- Miller, M. (2003), "Is American Corporate Governance Fatally Flawed?" In: Stern J. and D. Chew (eds), *The Revolution of Corporate Finance*, 34, 518-525, Blackwell publishing.
- Morck, R. and M. Nakamura (1999a), "Japanese Corporate Governance and Macroeconomic Problems", Harvard Institute of Economic Research, *Discussion Paper* no 1893.
- Morck, R. and M. Nakamura (1999b), "Banks and Corporate Control in Japan", *Journal of Finance*, 54, 319-339.

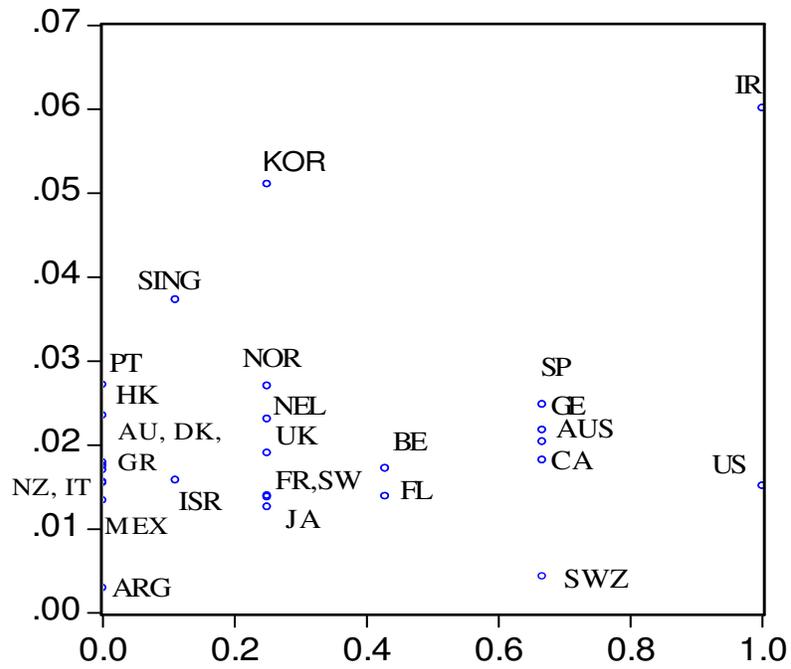
- Morck, R., Shleifer, A. and R. Vishny (1989), "Alternative Mechanisms for Corporate Control", *American Economic Review*, 79, 842-852.
- Morck, R., D. Wolfenzon and B. Yeung (2004), "Corporate Governance, Economic Entrenchment and Growth", NBER, *Working Paper* no 10692, August.
- Nakamura, M. (2002), "Mixed Ownership and Industrial Firms in Japan: Debt Financing, Banks and Vertical Keiretsu Groups", *Economic Systems*, 26, 231-247.
- OECD (1999), *OECD Principles of Corporate Governance*. Paris.
- O' Sullivan, M. (2000), "The Innovative Enterprise and Corporate Governance", *Cambridge Journal of Economics*, 24, 393-416.
- Phelps, E. (1993), "The Argument for Private Ownership and Control", In: Annual Economic Report, London, European Bank for Reconstruction and Development.
- Rajan, R. and L. Zingales, (1998), "Financial Dependence and Growth", *American Economic Review*, 88, 559-586.
- Sachs, J. and A. Warner, (1997), "Fundamental Sources of Long-run Growth", *American Economic Review*, 87, 184-188.
- Shaffer, S. (2002), "Firm Size and Economic Growth", *Economic Letters*, 76, 195-203.
- Shleifer, A. and R. Vishny (1990), "Managerial Entrenchment: the case of Manager Specific Investments", *Journal of Financial Economics*, 25, 123-139.
- Shleifer, A. and R. Vishny (1997), "A Survey of Corporate Governance", *Journal of Finance*, 52, 737-783.
- Stulz, R. (1988), "On Takeover Resistance, Managerial Discretion and Shareholder Wealth", *Journal of Financial Economics*, 20, 25-54.
- Tirole, J. (2001), "Corporate Governance", *Econometrica*, 69, 1-35.
- Williamson, O. (1985), *The Economic Institutions of Capitalism*. The Free Press, New York.
- World Bank (1995), *Bureaucrats Business: The Economics and Politics of Government Ownership*. New York: Oxford University Press.
- Yafeh, Y. (2000), "Corporate Governance in Japan: Past Performance and Future Prospects", *Oxford Review of Economic Policy*, 16, 74-84.

Table 1
Descriptive Statistics

<i>Variables</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>minimum</i>	<i>maximum</i>	<i>Skewness</i>	<i>kurtosis</i>
real GDP per capita	2.07	1.21	0.29	6.00	1.757	6.345
education	5.26	1.32	3.40	8.00	0.653	2.436
population	0.81	0.69	0.00	2.73	1.384	4.379
initial per capita real GDP	20693.5	7526.9	6891.0	36578.6	-0.138	2.492
investment	21.88	4.51	16.91	34.42	1.525	4.630
government consumption	18.81	5.48	8.69	30.36	0.255	2.738
openness	36.07	26.17	10.06	138.1	2.437	9.810
inflation	4.93	7.10	0.74	37.07	3.741	17.008
COL10	1.57	3.71	0.00	19.00	0.108	19.609
COL20	1.66	2.39	0.00	9.00	1.313	7.523
COM10	0.30	0.32	0.00	1.00	0.827	2.589
COM20	0.92	1.74	0.00	9.00	0.876	18.431

Notes: *skewness* is a measure of asymmetry of the distribution of the series around its mean. The skewness of a symmetric distribution is zero. Positive (negative) skewness means that the distribution has a long right (left) tail. *Kurtosis* measures the peakedness or flatness of the distribution of the series. If the kurtosis exceeds 3 is peaked relative to the normal; if the kurtosis is less than 3, the distribution is flat relative to the normal.

Figure 1
Real GDP per capita growth rates and corporate ownership structure



Note: Y_j is on the vertical axis while COM10_j is on the horizontal axis.

Table 2
Widely-Held Corporate Structure and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002

Independent variable: growth rate of real GDP per capita.

Basic regressions containing only the variable of interest and the always included variables (I-variables).

<i>Explanatory Variables</i>	<i>Regressions</i>			
	(1)	(2)	(3)	(4)
Intercept	0.048 (0.722)	0.045 (0.647)	0.093 (1.342)	0.061 (0.943)
Education	0.055 (2.318)	0.024 (2.156)	0.236 (1.650)	0.102 (2.871)
Population	-0.214 (-1.118)	-0.204 (-1.100)	-0.346 (-1.912)	-0.374 (-1.273)
initial real GDP per capita	-0.006 (-2.189)	-0.006 (-1.994)	-0.013 (-1.811)	-0.008 (-1.949)
Investment	0.146 (1.665)	0.140 (1.598)	0.182 (4.473)	0.164 (2.718)
COL10	0.0004 (2.151)	-	-	-
COL20	-	-0.00008 (-0.112)	-	-
COM10	-	-	0.021 (1.664)	
COM20	-	-	-	0.002 (2.147)
<i>Statistics</i>				
Adj-R ²	0.114	0.100	0.359	0.196
se	0.011	0.012	0.010	0.011
DW	2.516	2.639	2.223	2.469
Reset Ramsey Test	1.889	1.991	0.494	0.561
ARCH(1)	0.099	0.067	0.014	0.099
ARCH(2)	0.238	0.224	0.458	0.247

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

Table 3
Widely-Held Corporate Structure and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002

Independent variable: growth rate of real GDP per capita.

Regressions containing the full conditioning information set.

Variable of interest: *COL10*

<i>Explanatory Variables</i>	<i>Regressions</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.044 (0.679)	0.200 (1.669)	0.176 (2.208)	0.065 (1.051)	0.196 (3.348)	0.213 (3.741)
Education	0.124 (2.558)	0.228 (2.872)	0.152 (2.853)	0.526 (3.205)	0.343 (2.704)	0.366 (3.394)
Population	-0.087 (-0.466)	-0.140 (-0.616)	-0.214 (-0.905)	-0.201 (-0.561)	-0.187 (-0.926)	-0.386 (-2.753)
initial real GDP per capita	-0.005 (-2.110)	-0.018 (-2.061)	-0.016 (-2.925)	-0.005 (-2.777)	-0.018 (-3.070)	-0.019 (-3.459)
Investment	0.121 (2.477)	0.020 (2.179)	0.061 (1.857)	-	-	-
COL10	0.0002 (2.643)	0.0002 (2.472)	0.0006 (2.186)	0.0001 (2.750)	0.0002 (1.934)	0.0001 (2.246)
Gov. consumption	0.049 (1.509)	0.058 (1.796)	0.052 (1.518)	0.122 (2.881)	0.082 (2.566)	0.079 (3.915)
Openness	-	-	-	0.020 (2.110)	0.014 (1.809)	0.021 (3.120)
Inflation	-	-0.122 (-1.866)	-	-	-0.112 (-3.934)	-
Std. Deviation	-	-	-0.356 (-2.416)	-	-	0.416 (-3.739)
<i>Statistics</i>						
Adj-R ²	0.098	0.304	0.313	0.371	0.413	0.541
<i>se</i>	0.011	0.010	0.010	0.011	0.009	0.008
DW	2.314	2.365	1.191	1.985	2.412	2.158
Reset Ramsey Test	1.162	1.045	1.005	0.674	1.243	1.108
ARCH(1)	0.059	0.007	0.283	0.139	0.082	0.190
ARCH(2)	0.203	0.018	0.291	1.021	0.093	0.269

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

Table 4
Widely-Held Corporate Structure and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002

Independent variable: growth rate of real GDP per capita.

Regressions containing the full conditioning information set.

Variable of interest: *COL20*

<i>Explanatory Variables</i>	<i>Regressions</i>					
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Intercept	0.038 (0.568)	0.193 (1.623)	0.169 (2.211)	0.072 (0.952)	0.197 (2.983)	0.213 (3.358)
Education	0.182 (2.904)	0.269 (2.082)	0.223 (2.226)	0.497 (2.728)	0.337 (2.501)	0.364 (2.972)
Population	-0.066 (-0.372)	-0.141 (-0.767)	-0.241 (-1.124)	-0.190 (-0.485)	-0.181 (-0.823)	-0.388 (-2.588)
initial real GDP per capita	-0.004 (-1.845)	-0.017 (-1.875)	-0.015 (-2.744)	-0.006 (-2.701)	-0.018 (-2.570)	-0.019 (-2.933)
Investment	0.114 (1.940)	0.021 (2.208)	0.059 (1.927)	-	-	-
COL20	-0.0003 (-0.436)	-0.0005 (-1.068)	-0.0007 (-1.624)	-0.0003 (-0.272)	-0.0001 (-0.202)	-0.0007 (-0.113)
Gov. consumption	0.056 (1.962)	0.055 (1.528)	0.038 (1.360)	0.121 (2.900)	0.082 (2.530)	0.079 (3.742)
Openness	-	-	-	0.021 (1.882)	0.014 (1.592)	0.021 (2.775)
Inflation	-	-0.122 (-1.963)	-	-	-0.111 (-4.019)	-
Std. Deviation	-	-	-0.369 (-2.534)	-	-	-0.416 (-3.807)
<i>Statistics</i>						
Adj-R ²	0.087	0.301	0.322	0.175	0.404	0.532
<i>se</i>	0.012	0.010	0.010	0.011	0.010	0.008
DW	2.388	2.404	2.034	2.015	2.491	2.233
Reset	1.289	1.668	0.322	0.799	1.176	1.093
Ramsey Test						
ARCH(1)	0.009	0.076	0.008	0.174	0.049	0.285
ARCH(2)	0.163	0.097	0.004	0.972	0.061	0.361

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

Table 5

Widely-Held Corporate Structure and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002

Independent variable: growth rate of real GDP per capita.

Regressions containing the full conditioning information set.

Variable of interest: *COM10*

<i>Explanatory Variables</i>	<i>Regressions</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.089 (1.225)	0.196 (2.175)	0.167 (2.766)	0.101 (1.326)	0.222 (3.693)	0.220 (4.327)
Education	0.149 (2.530)	0.064 (2.282)	0.064 (2.289)	0.406 (2.275)	0.240 (1.742)	0.311 (2.907)
Population	-0.277 (-1.427)	-0.082 (-0.401)	-0.012 (-0.067)	-0.176 (-0.394)	-0.168 (-0.588)	-0.361 (-1.693)
Initial real GDP per capita	-0.012 (-1.961)	-0.021 (-2.407)	-0.018 (-2.925)	-0.009 (-1.954)	-0.021 (-3.299)	-0.020 (-3.789)
Investment	0.171 (3.626)	0.096 (1.839)	0.118 (2.590)	-	-	-
COM10	0.020 (2.448)	0.015 (1.921)	0.013 (2.060)	0.013 (2.203)	0.011 (2.163)	0.006 (1.812)
Gov. consumption	0.025 (2.505)	0.025 (2.541)	0.019 (2.365)	0.115 (2.654)	0.077 (2.219)	0.078 (3.497)
Openness	-	-	-	0.020 (2.665)	0.015 (2.347)	0.022 (3.540)
Inflation	-	-0.091 (-2.705)	-	-	-0.106 (-4.207)	-
Std. Deviation	-	-	-0.250 (-3.178)	-	-	-0.382 (-4.202)
<i>Statistics</i>						
Adj-R ²	0.334	0.437	0.404	0.457	0.503	0.567
<i>se</i>	0.010	0.009	0.009	0.010	0.008	0.008
DW	2.163	2.333	2.010	1.646	2.185	2.005
Reset	1.164	1.461	1.869	1.384	1.927	1.631
Ramsey Test						
ARCH(1)	0.031	0.005	0.415	0.152	0.166	0.311
ARCH(2)	0.411	0.010	0.407	1.506	0.231	0.353

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

Table 6**Widely-Held Corporate Structure and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002**

Independent variable: growth rate of real GDP per capita.

Regressions containing the full conditioning information set.

Variable of interest: *COM20*

<i>Explanatory Variables</i>	<i>Regressions</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.057 (0.896)	0.187 (1.761)	0.168 (2.242)	0.081 (1.262)	0.200 (3.561)	0.213 (3.958)
Education	0.053 (2.348)	0.120 (2.700)	0.109 (1.820)	0.494 (3.554)	0.324 (2.620)	0.354 (3.147)
Population	-0.244 (-1.808)	-0.007 (-0.361)	-0.136 (-0.697)	-0.135 (-0.305)	-0.145 (-0.512)	-0.365 (-1.882)
Initial real GDP per capita	-0.007 (-2.402)	-0.018 (-2.097)	-0.016 (-2.812)	-0.007 (-2.037)	-0.018 (-3.237)	-0.019 (-3.604)
Investment	0.144 (2.728)	0.058 (2.750)	0.078 (2.404)	-	-	-
COM20	0.002 (1.873)	0.001 (1.860)	0.0006 (2.515)	0.002 (1.947)	0.001 (2.804)	0.0005 (2.493)
Gov. consumption	0.047 (1.654)	0.043 (2.300)	0.032 (1.792)	0.127 (3.194)	0.087 (2.664)	0.081 (3.767)
Openness	-	-		0.022 (2.329)	0.016 (1.942)	0.022 (3.092)
Inflation	-	-0.106 (-2.019)	-	-	-0.105 (-3.777)	-
Std. Deviation	-	-	-0.326 (-2.540)	-	-	-0.401 (-3.901)
<i>Statistics</i>						
Adj-R ²	0.184	0.325	0.319	0.420	0.443	0.544
<i>se</i>	0.011	0.010	0.010	0.010	0.009	0.008
DW	2.988	2.366	2.004	1.825	2.288	2.094
Reset	0.036	1.731	0.939	1.552	1.954	1.654
Ramsey Test						
ARCH(1)	0.068	0.004	0.262	0.275	0.187	0.162
ARCH(2)	0.230	0.018	0.265	1.654	0.178	0.268

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

Table 7

State Corporate Control and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002

Independent variable: growth rate of real GDP per capita.

Basic regressions containing only the variable of interest and the always included variables (I-variables).

<i>Explanatory Variables</i>	<i>Regressions</i>			
	(1)	(2)	(3)	(4)
Intercept	0.046 (0.661)	0.046 (0.652)	0.047 (0.687)	0.047 (0.690)
Education	0.024 (2.182)	0.027 (2.204)	0.032 (2.225)	0.033 (2.235)
Population	-0.225 (-1.136)	-0.219 (-1.129)	-0.242 (-1.218)	-0.244 (-1.231)
initial real GDP per capita	-0.006 (-1.977)	-0.006 (-1.974)	-0.006 (-2.028)	-0.006 (2.034)
Investment	0.139 (1.713)	0.140 (1.711)	0.139 (1.698)	0.139 (1.701)
COLS10	-0.002 (-1.816)	-	-	-
COLS20	-	-0.002 (-1.955)	-	-
COMS10	-	-	-0.001 (-1.564)	-
COMS20	-	-	-	-0.001 (-1.638)
<i>Statistics</i>				
Adj-R ²	0.106	0.107	0.109	0.109
<i>se</i>	0.011	0.012	0.011	0.011
DW	2.512	2.518	2.517	2.517
Reset Ramsey Test	1.717	1.735	1.769	1.791
ARCH(1)	0.195	0.192	0.174	0.170
ARCH(2)	0.387	0.383	0.351	0.345

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

Table 8

Institutional Investing and Economic Growth, cross-sectional regressions, 27 countries, 1990-2002

Independent variable: growth rate of real GDP per capita.

Basic regressions containing only the variable of interest and the always included variables (I-variables).

<i>Explanatory Variables</i>	<i>Regressions</i>			
	(1)	(2)	(3)	(4)
Intercept	0.049 (0.719)	0.050 (0.737)	0.047 (0.623)	0.069 (0.927)
Education	0.030 (2.215)	0.028 (2.216)	0.008 (1.736)	0.137 (1.585)
Population	-0.259 (-1.164)	-0.292 (-1.375)	-0.217 (-1.103)	-0.254 (-1.080)
initial real GDP per capita	-0.006 (-1.790)	-0.006 (-1.701)	-0.006 (-1.860)	-0.009 (-1.970)
Investment	0.135 (1.664)	0.138 (1.746)	0.134 (1.637)	0.146 (1.916)
COLF10	-0.005 (-0.785)	-	-	-
COLF20	-	-0.015 (-1.170)	-	-
COMF10	-	-	-0.0005 (-0.365)	-
COMF20	-	-	-	-0.001 (-1.136)
<i>Statistics</i>				
Adj-R ²	0.104	0.115	0.101	0.178
se	0.012	0.011	0.012	0.011
DW	2.527	2.531	2.507	2.561
Reset Ramsey Test	1.797	1.469	2.174	0.014
ARCH(1)	0.156	0.228	0.105	2.205
ARCH(2)	0.337	0.425	0.275	3.001

Note: *T*-statistics computed from Newey-West HAC standard errors are presented in parentheses. *se* is the standard deviation of the average growth rate, Reset Ramsey Test is a stability test for specification error, ARCH (1) and ARCH (2) are Engle LM test for autoregressive conditional heteroskedasticity.

BANK OF GREECE WORKING PAPERS

1. Brissimis, S. N., G. Hondroyiannis, P.A.V.B. Swamy and G. S. Tavlás, "Empirical Modelling of Money Demand in Periods of Structural Change: The Case of Greece", February 2003.
2. Lazaretou, S., "Greek Monetary Economics in Retrospect: The Adventures of the Drachma", April 2003.
3. Papazoglou, C. and E. J. Pentecost, "The Dynamic Adjustment of a Transition Economy in the Early Stages of Transformation", May 2003.
4. Hall, S. G. and N. G. Zonzilos, "An Indicator Measuring Underlying Economic Activity in Greece", August 2003.
5. Brissimis, S. N. and N. S. Magginas, "Changes in Financial Structure and Asset Price Substitutability: A Test of the Bank Lending Channel", September 2003.
6. Gibson, H. D. and E. Tsakalotos, "Capital Flows and Speculative Attacks in Prospective EU Member States", October 2003.
7. Milionis, A. E., "Modelling Economic Time Series in the Presence of Variance Non-Stationarity: A Practical Approach", November 2003.
8. Christodoulopoulos, T. N. and I. Grigoratou, "The Effect of Dynamic Hedging of Options Positions on Intermediate-Maturity Interest Rates", December 2003.
9. Kamberoglou, N. C., E. Liapis, G. T. Simigiannis and P. Tzamourani, "Cost Efficiency in Greek Banking", January 2004.
10. Brissimis, S. N. and N. S. Magginas, "Forward-Looking Information in VAR Models and the Price Puzzle", February 2004.
11. Papaspyrou, T., "EMU Strategies: Lessons From Past Experience in View of EU Enlargement", March 2004.
12. Dellas, H. and G. S. Tavlás, "Wage Rigidity and Monetary Union", April 2004.
13. Hondroyiannis, G. and S. Lazaretou, "Inflation Persistence During Periods of Structural Change: An Assessment Using Greek Data", June 2004.
14. Zonzilos, N., "Econometric Modelling at the Bank of Greece", June 2004.
15. Brissimis, S. N., D. A. Sideris and F. K. Voumvaki, "Testing Long-Run Purchasing Power Parity under Exchange Rate Targeting", July 2004.
16. Lazaretou, S., "The Drachma, Foreign Creditors and the International Monetary System: Tales of a Currency During the 19th and the Early 20th Century", August 2004.

17. Hondroyannis G., S. Lolos and E. Papapetrou, " Financial Markets and Economic Growth in Greece, 1986-1999", September 2004.
18. Dellas, H. and G. S. Tavlas, "The Global Implications of Regional Exchange Rate Regimes", October 2004.
19. Sideris, D., "Testing for Long-run PPP in a System Context: Evidence for the US, Germany and Japan", November 2004.
20. Sideris, D. and N. Zonzilos, "The Greek Model of the European System of Central Banks Multi-Country Model", February 2005.