FINANCIAL DEVELOPMENT, INSTITUTIONAL INVESTORS AND ECONOMIC PERFORMANCE[1]

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Introduction

Institutional investors comprise pension funds, insurance companies and mutual funds. A salient feature of many OECD countries, and some Emerging Market Economies in recent years, is growth of institutional investors, notably in the wake of pension reform shifting retirement income provision from pay-as-you-go to funding. The ongoing ageing of the population and financing difficulties of pay-as-you-go systems suggests that such reforms will become yet more common in the future. Accordingly, it is important to analyse the impact of institutional investment on the economy.

In this context, this paper seeks to address the role of institutional investors in financial development, and trace the effects on economic performance. We first provide background on the stylised facts and economic interpretation of financial development before summarising the results of existing work on financial development and growth, noting the absence of explicit consideration of institutionalisation. We then survey the literature on the specific ways in which institutional investors may assist in economic development before undertaking tentative econometric work. The first empirical section uses G-7 data to assess the impact of institutional investors on the performance of the corporate sector. The second part seeks to undertake simple growth regressions to assess the effect of institutional investors on growth in 16 OECD countries.

1 The evolution of financial structure

There is a widespread perception, backed by empirical observation that financial systems go through stages of development. For example, Rybczinski (1997) suggests that one can distinguish a bank, market and securitised phase. Most Emerging Market Economies (EMEs) are still in the bank-oriented phase, while OECD countries are either in the market or securitised phase (where "securitised" implies a growing importance of securities finance generally rather than just packaging of loans in the form of securities). Whereas institutional investors are absent at the bank dominated stage, they begin to develop in the market stage and may become dominant in the securitised stage.

Stylised facts drawn from empirical observation suggest a somewhat more complex pattern (see Allen and Gale 2000), although the idea of phases remains helpful. Schmidt et al (1999, 2001) argue that there is path dependence, meaning that a bank based system such as Germany will not automatically develop into a market based system. However, they acknowledge that a financial crisis, perhaps triggered by "uncoordinated, far-reaching reforms" could lead to that result, because elements such as trust, implicit contracts and mutually consistent expectations which underpin relationship banking would be very difficult to rebuild after such a crisis.

On average, as shown by Demirguc-Kunt and Levine (2000), banks, nonbanks and stock markets are larger, more active and more efficient in richer countries. Furthermore, in OECD countries, stock markets become more active and efficient relative to banks, and there is some tendency for financial systems to become more market oriented as the countries become richer. Meanwhile, countries with a Common Law tradition, protection of shareholders' rights, good accounting, low corruption and no explicit deposit insurance tend to be market based – and hence have large institutional sectors - whatever their income level, see also La Porta et al (1999). In contrast, countries with a French Civil Law tradition, poor protection of the rights of shareholders and creditors, poor contract enforcement and accounting standards, restrictive banking regulation, high corruption and inflation tend to have underdeveloped banks and markets – and institutions. The few countries with a German law tradition, which offers strong protection for creditors, tend to have strong bank based systems, with small institutional investor sectors.

Rajan and Zingales (2000) show that financial development has not been monotonic. The major OECD countries were on some measures more financially developed in 1913 than 1980, and a significant reversal in financial development and financial integration took place between 1913 and 1950. A tightening of regulation in that period led to a decline in the size and importance of the financial sector relative to GDP. The imposition of such "structural regulation" implied that the service provided to the non-financial sector was sub optimal, with for example low deposit rates and rationing of credit to households. It did however prevent banks from taking excessive risks in response to the guarantee provided by the safety net of deposit insurance and the lender of last resort – a factor that has come to the fore in the aftermath of more recent liberalisation. Note that growth of institutional investors tended to precede financial liberalisation but has accelerated in the wake of it.

2 Benefits of large size of the financial system

What of the impact on economic performance of a given size and development of the financial sector? A number of papers have sought to address the relation of financial development and economic growth. King and Levine (1993) used four measures of financial structure, namely the size of liquid liabilities, the role of banks relative to the central bank in allocating credit, credit allocation to private business versus total credit to the non financial sector and the ratio of credit to private firms to GDP. Across a large sample of countries, the financial variables were found to have a strong relation to three growth variables, namely capital accumulation, economic growth and productivity growth, even controlling for other influences on growth such as education and government expenditure.

An implication of this and related papers is that the overall development of financial services is important to growth and not its bias to bank or market financing (Levine 1997). On the other hand, note that Levine and Zervos (1998) found that stock market liquidity (but not size, international

integration or volatility) as well as banking development were related to growth. Extensions such as Levine (1999) have additionally allowed for the role of certain legal aspects (linked to creditor and investor rights, contract enforcement and accounting standards) in financial development, and found that these are crucial for economic growth more generally. This influence may operate, inter alia, by influencing the proportion of firms that have access to external finance (Demirguc-Kunt and Maksimovic 1998, 2000). Note that none of these studies looked explicitly at institutional investors, although they may be correlated with stock market liquidity, investor rights and accounting standards.

3 Benefits of market or bank orientation

On the micro side, research on the best form of corporate finance and governance is inconclusive (Mayer 1996). Whereas relationship banking systems are good at monitoring and controlling debt exposures, they may also provide such funds beyond the firms' investment opportunities, leading to overinvestment when funds are abundant. Take-overs mitigate such problems in arms' length systems, where institutional investors are important, although such systems may be inferior when funds are scarce. In other words, whereas relationship based systems are good at control and monitoring, arm's length systems are better at governance. In a similar vein, relationship banking systems ease the renegotiation of contracts, which helps overcome liquidity problems but worsens the issue of discipline, leading to so-called soft budget constraints. Arm's length systems can stop unprofitable projects more readily, given lack of long term monitoring, while liquidity difficulties are worsened.

Taking a broader view, Allen and Gale (1997) suggest that Anglo-American capital markets dominated by institutional investors may have a disadvantage in terms of risk sharing, whereby competition and opportunities for arbitrage constrain intermediaries to carry out only cross-sectional risk sharing—exchanges of risk among individuals at a given point in time. This leaves individuals and companies vulnerable to undiversifiable risks arising over time, for example, owing to macroeconomic shocks, which cannot be eliminated by portfolio diversification. In contrast, financial systems in which long-lived banks have some monopoly power over savers facilitate the elimination of such intertemporal risks by accumulation of reserves and smoothing of returns over time. Firms may then obtain rescue finance in recessions, for example.

These benefits may be lost as openness to global markets increases via institutional investor growth, as discussed further below. (There is an obvious application to the current situation in Germany.) Also collapse of relationship banks may be highly damaging to the economy, given the dependence of the economy on these institutions. The banking crises in relationship banking based Scandinavia and Japan (Davis 1995a) were certainly highly damaging to the real economy.

Meanwhile, in Anglo American countries, the so-called multiple avenues of intermediation are said to cushion the effect of crises in either banks or securities markets on corporate financing (Greenspan (1999), Davis and Ioannidis (2003)). Arguably, most securities market crises tended to harm householders' wealth but not the infrastructure underlying securities market functioning. It is market liquidity crises that may be more serious in this regard than price volatility, see Davis and Steil (2001). Furthermore, in Anglo-American countries, the focus on cross-sectional risk sharing may help to explain the intense focus on risk management via derivatives (Allen and Santomero 1999).

It may of course be that the benefits of relationship banking in terms of lower agency costs and possibly also costs of bankruptcy are totally offset by higher debt-equity ratios[2], and generally there is little evidence that bank based systems are "better" for overall economic performance (Levine 2000). Moreover, the relationship banking system requires that bank margins should widen in a recovery to recoup the "insurance premia", which may not be compatible with a competitive financial system with sizeable institutional investors. Indeed, as argued in Davis (1999) EMU together with institutionalisation may lead to eventual shifts to market based systems in both types of country in Europe.

On the other hand, relationship banking applies even in market-based systems such as the US to small firms (Berger and Udell 1995), in that small firms for which public information is not available tend to depend on a relationship with a single bank. There are also issues linked to the differing abilities of bank and market based systems to finance different types of firm. A reasonable conclusion may be that of Allen and Gale (2000), who suggested "since neither markets nor intermediaries work in exactly the way theory suggests, we would do well to exercise some humility in making recommendations about policies to reform our financial systems".

4 Benefits from the existence of institutional investors

Developing from the survey above, this section outlines more specifically the effects on economic performance of the presence of institutional investors, against the background of the functions the financial system fulfils. These offer material for judging their likely impact on financial development and growth. Following Merton and Bodie (1995), the functions are;

(i) *clearing and settling payments* to facilitate exchange of goods, services and assets.
(ii) the provision of a mechanism for *pooling of funds* from individual households so as to facilitate large-scale indivisible undertakings, and *the subdivision of shares* in enterprises to facilitate diversification.

[2] Certainly, debt equity ratios are much higher in bank-dominated than market oriented systems, see Byrne and Davis (2003).

(iii) provision of ways to *transfer economic resources* over time, across geographic regions or among industries. By these means, households may optimise their allocation of funds over the life cycle and funds may be optimally allocated to their most efficient use.
(iv) provision of ways to *manage uncertainty and control risk* whereby through securities and through financial intermediaries, risk pooling and risk sharing opportunities are made available to households and companies.
(v) providing *price information,* thus helping to co-ordinate decentralised decision making in various sectors of the economy.
(vi) providing ways to *deal with incentive problems* when one party to a financial transaction has information the other does not, or when one is agent of the other, and when control and enforcement of contracts is costly.

We now go on to assess in detail the consequences of a large institutional investor sector for financial markets[3], drawing where appropriate on these functions as well as the discussion above to show how their performance is affected. Overall, institutional investor growth tends to shift financial markets towards a "capital market oriented" stage of financial development, where the functions outlined above may at least in some ways be more efficiently fulfilled than in an economy dominated by banks[4]. The effects may be conveniently divided into a number of categories; effects on saving, effects on demand for capital market instruments and various qualitative effects. These effects have been to some extent identified by research on OECD economies and on Chile.

Under the function of transfer of resources across time, there are a number of *mechanisms whereby institutional investment, and notably pension funding may increase personal saving*; imperfect substitution arising, for example, from illiquidity of pension assets may mean that other saving is not reduced one-to-one for an increase in pension wealth; liquidity constraints may imply that any forced saving (such as pension contributions) cannot be offset either by borrowing or reducing discretionary saving (Hubbard 1986)[5]; forced saving may reduce myopia of savers in respect of retirement (Morandé 1998); low income workers may not save otherwise (Bernheim and Scholz 1992); the interaction between pensions and retirement behaviour may increase saving in a growing economy, as workers increase saving in order to provide for an earlier planned retirement (Feldstein 1974); tax incentives which raise the rate of return on saving via pension funds may encourage higher aggregate

[3] See also Davis (1999).
[4] As argued by Allen and Gale (1994), a major shift to capital market financing could well be economically beneficial if the future lies with emerging industries, with high financial and economic risks and where knowledge about industry is uncertain (IT, biotechnology). In contrast, banking may have a comparative advantage in industries where markets are mature and innovation and uncertainty are low, as banks can then accurately monitor and diversify risk among companies.
[5] It might be anticipated that liquidity effects on saving may weaken where credit markets are liberalised and thus access to credit less restricted, or participation in pension funds is optional.

saving;[6] and finally, a cut in social security as part of a shift to funding should increase saving, given the effect on implicit wealth (World Bank 1994). If not offset by higher fiscal deficits, higher personal saving may of course permit higher aggregate investment without recourse to potentially unstable foreign inflows.

On balance, research suggests that growth in funded pension schemes in particular does appear to boost personal saving, subject to a partial offset arising via declines in discretionary saving. Much of the literature, such as Pesando (1992), which is focused on US defined benefit funds, suggest an increase in personal saving of around 0.35 results from every unit increase in pension fund assets, though the cost to the public sector of the tax incentives to pension funds reduces the overall benefit to *national* savings to around 0.2. Effects may be less marked for defined contribution funds, where the worker is more likely to be able to borrow against pension wealth and participation is generally optional. On the other hand, Poterba, Venti and Wise (1996) suggest that 401(k) accounts in the US have added to aggregate saving, with tax incentives being the main reason. In EMEs, Corsetti and Schmidt-Hebbel (1997) and Morandé (1998) find a positive effects of pension reform on saving in Chile; World Bank (1993) finds similar effects in Singapore. These effects may link to prevalence of credit constraints for low-income households who would not otherwise have saved. Finally, regarding social security Edwards (1995) shows it lowers private saving in EMEs; Feldstein (1995b) suggests personal saving rises 0.5 for every unit decrease in social security wealth.

All these estimates abstract from effects on public saving in the transition (e.g. in deficit-financing of existing social security obligations) that may be fully offsetting at a national level. Even tax financed transitions may according to some authors have at most a small positive effect on saving in the long term (Cifuentes and Valdes Prieto 1997).

The quantitative impact of development of institutional investors on capital markets, abstracting from potential increases in saving, arises mainly from differences in behaviour from the personal sector. Institutional investors in most cases hold a greater proportion of capital-uncertain, long-term assets than households (see portfolios shown in Table 1)[7]. These differences can be explained partly by time horizons, which for households are relatively short, whereas given the long term nature of liabilities, institutional investors may concentrate portfolios on long term assets yielding the highest returns. But given their size, institutional investors also have a comparative advantage in compensating for the increased risk by pooling and diversifying across assets whose returns are imperfectly correlated, an advantage linked also to lower transactions costs for large deals and ability to invest in large

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[6] On the other hand, one should note that taxation provisions boosting rates of return will only influence saving at the margin for those whose desired saving is below that provided by social security and private pensions; for those whose desired saving exceeds this level, there will be an income effect but no offsetting substitution effect, and saving will tend to decline.

[7] Differences in portfolios link to a variety of factors, notably regulation and historical developments.

indivisible assets such as property. Unlike banks, they tend to rely on more on public than private information in investment and hence seek relatively liquid assets. However, owing to economies of scale, specialisation, links to investment banks etc. their information may be typically superior to that of private individuals.

It may be added that build-up of long term funds from pension schemes can be rapid (see the data for selected OECD and EME countries in Table 2). In considering the numbers in Table 2, it may be noted that the assets of the Singapore CPF were only 28% of GDP in 1976; the Malaysian fund was 18% in 1980 and the Chilean only 1% in 1981.If labour income is 50% of GDP, a compulsory pension scheme covering 50% of the labour force at a contribution rate of 10% will accumulate funds equivalent to 2.5% of GDP annually. If the nominal rate of return is equal to GDP growth, and initially pension payments are low, 25% of GDP could easily be accumulated in long-term financial assets in 10 years. Increases in coverage or contribution rates as well as higher asset returns may of course increase these growth rates further.

The implication is that even if saving and wealth did not increase, *a switch to funding would increase the supply of long term funds to capital markets,* thus improving notably the performance of the function of transferring resources. There may be increases in equities, long term corporate bonds and securitised debt instruments and a reduction in bank deposits, so long as individuals do not adjust the liquidity of their portfolios to fully offset effects of growth of institutional investors - and so long as the macroeconomic environment favours long term financing. A priori, one can argue that full offsetting is unlikely, especially if pension assets are defined benefit and/or implicitly substitute for highly-illiquid implicit social security wealth. Empirical work by King and Dicks-Mireaux (1988) found no such offset for Canada, while Davis (1988) obtained similar results for the G-5. Certainly there seems to be a correlation in OECD countries between equity market capitalisation and the size of the institutional investor sector[8]. Moreover, radical changes in financial structure - inconsistent with full offsetting - have been widely observed to accompany growth of funding, not least in Chile, as discussed below. More generally, the size and activity of equity markets and the number of listed companies differs little between the emerging markets with large institutional sectors and the OECD markets (Table 3).

As regards the broader economic benefits of such overall shifts to long term assets, they should tend to reduce the cost and increase the availability of equity and long term debt financing to companies, and hence may raise productive[9] capital formation. Economically efficient capital formation could in turn

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[8] Simple estimation for the EU-15, the US, Japan and Canada gives a correlation of 0.97. In emerging markets, the activities of foreign investors may be relatively more important.

[9] This also requires allocation of funds to their most profitable uses and adequate shareholder-monitoring of the investment projects, which as detailed below should also tend to occur in capital markets dominated by pension funds.

raise output and "endogenously", growth itself (Holzmann 1997). Higher growth will of course feed back on saving. "Endogenous growth" effects of an increase in capital investment on labour productivity, may be particularly powerful in developing countries if a switch from pay-as-you-go to funding induces a shift from the labour-intensive and low productivity "informal" sector to the capital-intensive and high productivity "formal" sector (Corsetti and Schmidt-Hebbel 1997).

As noted, equity market development per se has been shown to enhance overall economic development (Demirgüç-Kunt and Levine 1996). Levine and Zervos (1998) show *how* stock market development may aid growth potential, e.g. by increasing liquidity and thus facilitating financing of long term, high return projects; enabling international diversification thus encouraging investment in riskier long term projects; increasing incentives to acquire information about firms; facilitating the tying of management compensation to share prices via stock options; and facilitating take-overs to resolve corporate governance difficulties. But they point out that there are often counter arguments to these. Meanwhile as noted Demirgüç-Kunt and Maksimovic (1998) show that access to an active stock market increases firms' ability to borrow at long maturities, especially in developing financial markets. Finally, access to a range of securities in domestic currency should limit the incentive for companies to borrow in foreign currency, which was a feature of the recent Asian crisis.

One note of caution is that if governments force institutional investors to absorb the significant issues of bonds that may be needed in a debt financed transition strategy, or if government issuance crowds out corporate issues, many of the benefits outlined will not be realised.

Besides inducing shifts to longer term assets, funding would also *increase international portfolio investment*, where this is permitted, i.e. transfer of resources cross-border, given the benefits it offers in terms of risk reduction to institutional investors while household activity in this area is low. This has been a particular feature of OECD countries in recent years. Important, and conflicting, issues are raised, notably for developing and transition countries. On the one hand, international investment may be seen as a loss of potential to develop domestic capital markets. It may also be seen as posing a risk of capital flight. On the other, it may be seen as beneficial to institutional investors as volatility of returns could be reduced. In addition, it will forestall the point at which institutional investor investment becomes so large as to face diminishing returns domestically. Also there may be a benefit at a national level if national income is subject to frequent terms-of-trade shocks owing to the position of being largely dependent on commodities for export earnings, while export earnings account for a large proportion of GDP, as is common in developing countries. Hence, holdings of assets offshore can actually help to contribute to greater stability of national income (Fontaine 1997).

Besides the quantitative effects noted above, the development of institutional investors is also likely to trigger *qualitative developments in financial markets,* which will facilitate in particular the functions

of managing uncertainty and controlling risk, and providing price information. They are in general subject to positive externalities, as once instituted other investors may also benefit from them. One qualitative improvement is *financial innovation*, which early on in financial development may include equities per se, junior markets, corporate bonds, securitisation, CDs, derivative markets[10] and indexed instruments. In OECD countries, pension funds' need for hedging against shortfalls of assets against liabilities has led to the development of a number of recent financial innovations such as zero coupon bonds and index futures (Bodie 1990). Similarly, immunisation strategies and the development of indexation strategies by and for pension funds has increased demand for futures and options. There may be important indirect benefits in this context, as institutional investors press for improvements in what Greenwald and Stiglitz (1990) call the "architecture of allocative mechanisms", including better accounting, auditing, brokerage and information disclosure. Modern banking and insurance supervision, new securities and corporate laws, junior equity markets and credit rating agencies are also stimulated to develop. Such improvements are crucial for financial development more generally.

Modernisation of the infrastructure of securities markets as required by institutional investors and other institutional investors which should entail improved performance of the function of clearing and settlement on the one hand and provide more sensitive price information on the other, thus improving resource allocation. As a consequence it may help reduce the cost or increase the availability of capital market funds, and hence aid industrial development *per se* as well as facilitating privatisations. In developing countries, their influence may be seen in terms of development of the overall market infrastructure (such as trading and settlement systems) and enhancement of liquidity. In OECD countries, given their focus on liquidity[11] and lesser emphasis on investor protection, institutional investors offer benefits to wholesale equity markets as opposed to heavily regulated retail markets (Steil 1996). They are footloose in their trading, and thus make the business of trading “contestable” rather than monopolistic, and facilitate its concentration. Increased pension-funding would raise the proportion of “wholesale” trading activity which would be willing to translocate. It would also put pressure on cartels in bond issuance and price fixing in equity trading.

An aspect which could weaken the function of providing price information, is *institutional investors' direct effect on liquidity and price formation*. Do institutional investors increase or dampen volatility? In normal times institutions, being willing to trade, having good information and facing low transactions costs, should tend to speed the adjustment of prices to fundamentals. It need hardly be added that such market sensitivity generates an efficient allocation of funds and acts as a useful discipline on lax macroeconomic policies. Again, the liquidity that institutional activity generates may dampen volatility, as is suggested by lower average share price volatility in countries with large

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[10] On the development of derivatives exchanges in emerging markets see Tsetsekos and Varangis (1997).

[11] Liquidity may be less important where pension funds focus on buy-and-hold strategies, as in Chile.

institutional sectors[12]. And evidence on average day-to-day asset price fluctuations shows no tendency for such volatility to increase (Davis and Steil 2001). (We provide some econometric evidence on this point below.)

Sias (1996) examined directly the relationship between the volatility of securities returns and the level of institutional ownership generally. He found a positive contemporaneous relation between institutional ownership and securities market volatility after accounting for capitalization.[13] This is surprising, given that institutions are subject to prudent man rules and seem to avoid the more volatile smaller stocks. The relationship could be consistent either with institutions seeking high volatility stocks, owing to the high return they offer (and because informed trading is easier to conceal for large stocks), or because higher volatility results directly from institutional ownership. Sias suggests that the latter is the case. This is contrary to the view that institutions play a stabilizing role owing to their superior information[14] and rationality compared to individual investors. Possible reasons for a linkage of higher volatility to institutional ownership may include larger average trade size of institutions, which may induce volatility by overwhelming market liquidity and the greater use of program trading by institutional investors. It may also reflect a greater tendency for institutions to engage in noise trading or herding.

Furthermore, some medium term deviations of asset prices from levels consistent with fundamentals - at times affecting global capital markets - may link to institutionalisation. Clearly, these imply a weakening of the financial market function of providing price information. Correction of such situations may involve massive price adjustments or even market liquidity failure. Examples (see Davis 1995c) are the stock market crash of 1987, the ERM crises of 1992-3, the bond markets in 1993-4 and the Mexican crisis of 1994-95. Such events were characterised by features such as heavy involvement of institutional investors in both buying and selling waves; international investment; signs of overreaction to the fundamentals and excessive optimism prior to the crisis; at times, inappropriate monetary policies; a shock to confidence which precipitated the crisis, albeit not necessarily sufficient in itself to explain the scale of the reaction; and rapid and wholesale shifts between markets, often facilitated by financial innovations. Such patterns have been part of the background for renewed discussion of capital controls in recent years. Underlying factors appear to be, crucially, influences on fund managers which induce herding behaviour (notably the prevalence of performance measurement[15], due in turn to principal-agent incentive problems between the sponsor and the fund

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[12] This is not to deny that markets may be subject to forms of excess volatility relative to fundamentals, but that the scope of average volatility does not seem to be linked to institutionalisation

[13] The adjustment is needed, since institutions focus on larger stocks; the result is that within each decile of size, the stocks most held by institutions are also the most volatile.

[14] Also because higher institutional involvement may generate more interest among analysts.

[15] It is important to add, however, that the "cure" (of seeking to reduce performance pressure) may be worse than the "disease" (potential for herding). An uncompetitive fund management sector without pressure from performance assessment may actually be "value deducting", investing in securities which do not minimise

manager[16]). In countries such as Chile, 'herding' may also be stimulated by regulations which require institutional investors to obtain similar returns.

By leading to disintermediation, growth of institutional investors is likely to entail increased *competition to the banking sector*. Besides increasing demand for capital market financing generally, disintermediation is facilitated in an institutionalised capital market as the scope of public as opposed to private information and the efficiency of its use by markets may be increased by the development of information technology and the related growth in influence of rating agencies, investment banks and credit assessors covering a wider range of firms. The traditional comparative advantages of banks in this area resulting from economies of scale in information gathering, screening and monitoring (Diamond 1984) may be eroded, even abstracting from price considerations. Meanwhile on the liabilities side of banks' balance sheets, institutional investors tend to be ready customers for repos, commercial paper and other money market instruments rather than bank deposits, thus undermining banks' comparative advantage in liquidity provision (Diamond and Dybvig 1983).

On the one hand such competition may lead to heightened efficiency of banks, thus aiding economic development. There are also complementarities in corporate finance between bank and market funding; and banks are essential components of capital market activity per se (as providers of collateral, clearing, settlement etc. services). By providing an alternative source of liquidity and long term finance to banks, institutional and capital market growth helps the economy to diversify against the risks of banking problems. But it may also help to generate them; the lessons of history from OECD countries suggest a need for vigilance, particularly if disintermediation coincides with deregulation and hence heightened competition within the banking sector (Davis 1995a). Banks may respond to the associated pressure on their profits partly by increasing their focus on non-interest income – including asset management income per se, mutual funds and insurance – and reducing excess capacity by merger or branch closure. However, disintermediation historically also led at times to increased risk-taking via aggressive balance sheet expansion (e.g. by lending to property developers) with risk premia which in retrospect proved to be inadequate[17]. Attention to shifts in the riskiness of banks portfolios, focus on capital adequacy and the issue of excess banking capacity are warranted by regulators in this context.

Turning to the *corporate sector*, as outlined, the availability of long term debt and of equity capital should be increased by a wider investor base as funding develops. These are not independent; as noted, access to long term finance may also be aided by flotation. Besides equity issues by existing firms,

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risk for given return and possibly investing client funds in a way which favours holdings of a parent institution (e.g. "front running").

16 See Scharfstein and Stein (1990), Froot et al (1990).

17 It may be added that rapid economic growth and at times inappropriate monetary policy also played a role in this typical late 1980s pattern.

IPOs and privatisations would tend to be facilitated. Particularly for existing firms with small equity bases, there may be important competitive advantages to be reaped from equity issuance in terms of growth potential as well as reducing risks of financial distress in case of economic downturn; long term debt finance is correlated with higher growth for manufacturing firms (Caprio and Demirgüç-Kunt 1998).

Experience suggest that firms would also need to fulfil certain requirements in order for equity funds to become available from institutional investors, which would improve performance of the financial function of dealing with incentive problems. They may need to adapt themselves in various ways, as well as putting pressure on governments for appropriate legal provisions. The types of adaptation required are clear from the existing "shareholder value" based demands made by Anglo-Saxon institutional investors both on their own domestic companies and overseas - demands which would be multiplied by growth of domestic institutions via funding (Davis 2002). For example, companies would face enhanced pressure for higher and more sustained dividend payments; more-profitable fixed investment; primacy of equity holders as owners of the firm over stakeholders; greater provision of information by firms; removal of underperforming managers; appropriate management structures; equal voting rights for all shares; pre-emption rights; and equal treatment in take-overs. To back up these requirements, institutional investors would demand laws and regulations such as firm take-over codes, insider information restrictions and limits on dual classes of shares, which seek to protect minority shareholders, as well as equal treatment of creditors in bankruptcy, to protect their holdings of corporate bonds.

Such an overall development would have implications not just for balance sheet structure - with potentially lower debt-equity ratios - but also for corporate governance, implying a greater degree of control by capital markets and institutional investors (for a survey see Schleifer and Vishny (1997)). In this context, the "corporate governance movement" in OECD countries reflects dissatisfaction among institutional investors with costs of the take-over mechanism, and preference for direct influence as equity holders on incumbent management (Davis 1995b, 2002). It also links to indexation by large funds, which seek to improve the performance of firms they have to hold, as well as more generally where institutional investors are very large and cannot readily sell their participations without significant market movements against them. In practice, however, the scope of "direct influence" is limited in most emerging market countries; Brazil and South Africa are two exceptions.

There is a growing literature on the impact of corporate governance initiatives on performance, albeit mainly focusing on the effects on share prices per se. For example, on the positive side, Wahal (1996), in a sample of forty-three cases, found that efforts by institutions to promote organizational change via negotiation with management (as opposed to proxy proposals) are associated with gains in share prices. Strickland et al. (1996) report that firms that were targeted for pressure by the United

Shareholders Association[18] experienced positive abnormal stock returns, although corporate governance proposals per se had no effect. On the negative side, Del Guercio and Hawkins found no evidence that activism had a significant effect on stock returns over the three years following the proposals. In earlier work, Wahal (1994) had surveyed activism by nine public pension funds over the 1987–1993 period and also concluded that there was no evidence of improvement in the long-term stock price performance of targeted firms, which rather continued to decline for three years after targeting. Gillan and Starks (1995) found some positive returns in the short term but no statistically significant positive returns over the long term, leading them to question the overall effectiveness of shareholder activism.

Evidence from outside the United States on the effectiveness of corporate governance initiatives is sparse, but Faccio and Lasfer (2000) show that the monitoring role of U.K. pension funds is concentrated among mature and low-performing firms and that in the long run, the firms in which pension funds have large stakes markedly improve their stock returns.

One can trace a potential transition path for the various types of corporate governance structure that exist when capital markets are rudimentary or absent, as institutional investors become dominant. Family enterprises which seek equity capital from the market may have to reduce their role in governance; privatisation would obviously tend to diminish the role of the state. Meanwhile "relationship banking" would tend to diminish (Davis 1993). There remain limits to such shifts of corporate finance and corporate governance to capital markets; even in a securitised financial system companies may prefer to incur some bank debt as a signal to capital markets that they are being monitored (James and Wier 1990). In all countries, there would remain a size class of firms too small for even IPOs which would still need a close bank link.

Indeed, there is evidence that institutional investors are reticent in *investing equity in small firms*, (i.e. there are limits to potential transfer of resources) despite the fact that their potential for innovation, growth and job creation is widely seen as crucial for economic growth[19]. For example, Revell (1994) shows that in 1989, UK pension funds held 32% of large firms and only 26% of smaller ones. Sias (1996), shows that for the United States institutional holding of the largest firms on average over 1977-91 is over 47% and for the smallest, only 8%. The consequence of neglect of small firms by institutional investors (assuming individual investors do not fill the gap) may be biases economy towards sectors with larger firms (for even if small firms can obtain bank loan finance, growth potential via debt is likely to be more restricted than with equity in addition). This may be contrary to

[18]Note that this is actually a coalition of small investors rather than an institutional investor per se.

[19] This tendency may link to illiquidity or lack of marketability of shares, levels of risk which may be difficult to diversify away, difficulty and costs of researching firms without track records and limits on the proportion of a firm's equity that may be held. The development and improvement of stock markets for small company shares is one initiative that may make such holdings more attractive to pension funds.

the comparative advantage of the economy as a whole[20]. It suggests a need for venture capital funds, junior equity markets and appropriate institutional investor regulation.

As is the case for excess volatility as outlined above, regular performance evaluation of institutional investor managers by trustees is said to underpin *the short-termist hypothesis*, (entailing under-valuation of firms with good earnings prospects and willingness of funds to sell shares in take-over battles). This in turn is held to discourage long term investment or R&D as opposed to distribution of dividends, which would imply a suboptimal transfer and allocation of resources. Schleifer and Vishny (1990) provide an empirical model suggesting that short time horizons are an equilibrium property of capital markets, owing to the higher cost of long-term than short-term arbitrage[21]. Some recent empirical research seems to confirm the existence of short termist effects in the UK, with overvaluation of profits in the short term (Miles 1993). Evidence from a survey of US CEOs goes in the same direction (Poterba and Summers 1992) Against this, Marsh (1990) notes that in the absence of information relevant to valuations, excessive turnover will hurt performance of asset managers, and reaction to relevant information on firms' long term prospects, which itself generates turnover, is a key function of markets. High stock-market ratings of drug companies, with large research expenditures and long product lead times, would seem to tell against the short-termist hypothesis.

5 Developments in Chile

Besides being typical of OECD financial markets with large institutional investor sectors such as the UK and US (Davis and Steil 2001), a number of these phenomena highlighted in the section above are illustrated by the experience of Chile. It provides a testbed for the effects of institutionalisation on a relatively simple financial system.

Holzmann (1997) points to the fact that Chilean pension funds grew from zero in 1980 to 39% of GDP in 1995. They may have played a major role in stimulating the rise in private saving observed over this period (Morandé 1998)[22]. This accompanied an expansion of overall financial assets from 28% of GDP in 1980 to 68% in 1993 (Fontaine 1997), with pension assets accounting for a third of this total. Initially funds were invested mainly in debt securities owing to regulatory prohibition of equity investment, but not solely those of the government - also bank CDs and mortgage bonds. Debt maturities increased as a consequence of the development of pension funds to 12-20 years by 1990. Equity investment was permitted in 1985 and holdings have grown to over 30% of assets. This

[20] Of course, problems of equity provision to small firms are much more severe with book-reserve pension financing, which tends to preserve the existing industrial structure and not aid equity financing of new firms.

[21] It is interesting to add that Von Thadden (1992) has noted that bank monitoring can in theory increase investment time horizons by enabling banks to detect at an early stage whether projects will be viable. This argument implies that a weakening of "relationship banking" may induce a further shortening of time horizons.

[22] However, Holzmann (1997) notes that the initial effect on private saving was low or even negative.

accompanied and encouraged a marked expansion of equity market capitalisation from 32% of GDP in 1988 to 90% in 1993; in the early 1990s, closed companies were encouraged by high P/E ratios to go public and accept standard record keeping and auditing practices, thanks to better access to pension fund financing. In 1991 the pension funds held 1/3 of public bonds, 2/3 of private bonds and 10% of equities.

Holzmann (1997) shows econometrically that the development of financial markets in Chile correlates with strong development of the real side of the economy, via rising total factor productivity and capital accumulation. Holzmann also estimates that long term growth in Chile is 1-3% higher owing to the effects of the pension reform operating via financial markets, although he also points out that the structuring of the transition may have played an important role[23]. As shown in Table 4 (EBRD 1996), pension fund growth was accompanied inter alia by rising stocks of corporate bonds, often placed direct by large companies into pension funds, the bond market having been improved by a new risk-classification industry. The life insurance sector grew to provide annuities as well as survivorship and invalidity reinsurance as required by the new system. And other investor groups such as mutual funds and foreign investor funds have emerged, increasing the diversity of market participants.

Fontaine (1997) also notes that pension fund development facilitated internal resource transfers, enabling the Chilean government to service its international debts without extreme fiscal adjustment which was elsewhere damaging to the real economy, by providing a domestic source of borrowing without requiring excessively high interest rates (in fact the debt was generally CPI-indexed). Correspondingly, public sector debt rose from 5% of GDP in 1980 to 28% in 1990. Later, the demand of pension funds enabled debt conversion - by both private and public institutions - to occur smoothly. In addition, the fact that pension funds were not permitted to invest internationally till 1989, and then only in a limited way, is considered to explain why the capital markets in Chile grew in size and depth so rapidly. Again, given the existence of domestic long-term institutions and the high domestic saving that pension reform helped to stimulate, Chile is probably better insulated from the shifting behaviour of international investors, as witness the lower correction after the Mexican crisis than for other Latin American markets.

Hansell (1992) suggests development of pension funds has been a major factor behind Chile's bonds being rated investment-grade, the first Latin American country to be so rated since the debt crisis. Disclosure standards are reportedly higher than elsewhere in Latin America. Corporate governance is improved by requirements that pension fund managers vote for independent directors. On the other hand, Chileans have been rather unsuccessful at ownership dispersion, one reason being unwillingness

[23] The tight fiscal stance may have contributed to economic performance by crowding in of private investment and offering a higher credibility to the reform programme within and outside the country.

of closely held companies to accept dilution of control. Rating regulations have till recently prevented funds investing in start-up companies and venture capital.

6 Econometric work 1 – institutional investors and corporate sector performance

Section 4 suggests that growth of institutional investors may have major effects on the performance of the corporate sector. Outworkings might include the following:

- The distribution of profits in the form of dividends should be stimulated, rather than their being ploughed back into potentially unremunerative fixed investments.
- Owing to corporate governance pressures, capital accumulation itself may accordingly be lower in the presence of institutional shareholders than would otherwise be the case, other things being equal.
- On the other hand if the efficient use of capital and labour is ensured by governance systems driven by institutional investment, one would anticipate that productivity growth might be improved.
- There may be more research and development, following the suggestion that market based financial systems with large institutional investors may be better placed to finance such investment than banks.
- On the other hand, if volatility is increased by institutional holding, then the cost of capital could be boosted.

In this section we report on and extend an empirical investigation of these hypotheses at a macro level for the G-7+ countries plus Australia (G-7+ for short), as well as on the subgroups of the Anglo Saxon and CEJ countries, (the first three regressions were previously presented in Davis (2002)). We estimate the effects of high and rising levels of institutional ownership of shares, be it domestic or foreign, on aspects of corporate performance, in the presence of variables which capture the "normal behaviour" of the variables in question. The institutional-share variables, being in the form of proportions, are independent of the level of share prices and purely indicate the changing nature of ownership of the outstanding volume of securities. They are not thus vulnerable to the criticism of purely reflecting share price expectations of dividends, productivity growth etc., unless institutions behave systematically in relation to such expectations in their asset allocation.

The exercise of course contrasts strongly with the firm level studies typically undertaken in this area and cited in Section 4. However, we would contend that the results are complementary, if the view is taken that the effects of takeovers, institutional activism etc are not just apparent in the performance of targeted firms but also in the wider economy. This may plausibly be the case of managers of "unaffected" firms nonetheless change their behaviour in response to the threat of such action. There remain grounds for caution, for example we only have eight advanced countries (and four Anglo

Saxon ones); deregulation of product markets could also lead to effects on productivity (although it is less likely to affect dividend distribution or investment); and our "conventional independent variables" cannot perfectly capture the normal developments in the dependent variables in question.

Results in Davis (2002) show that the relevant variables are all 1(1) in levels, except volatility. This result includes the shares of institutional investors, whereas these could obviously not be trended in the long run. Equally, the real long-term interest rate is non-stationary, probably due to the impact of inflation on real rates in the 1970s. Technically the fact that these variables are difference stationary implies stationarity in variance. This is consistent with them being I(0) about a trend or drifting I(0) variables, which can still be bounded (in the shape of an ogive) over a longer term sample.

Following these tests, the overall specifications are set in an error-correction format, with normal macroeconomic variables to determine the variable in question, and with the share of foreign and domestic life and pension funds in total equity as additional regressors. As noted, mutual funds are omitted from our general results owing to lack of consistent data; we add results including mutual funds as a variant for Canada, the UK and US only at the end of this section. The drifting I(0) variables, i.e. the shares as well as interest rates, can be seen in the long run as shifting the level equilibrium in the long-run cointegrating relation (similarly to the role of unemployment in a wage equation where wages and productivity are cointegrated, and changes in unemployment change the wage/productivity relation). The difference term shows the effect of the drift in the variable over one time period, which in the long run has no effect.

By this means, we seek to capture the influence of new purchases from other holders and the long run level of institutional holdings, respectively. There is clearly a potential issue of reverse causality, meaning the results need careful interpretation. In other words, there is a need to ensure that we are not merely capturing the investment-response of institutions to aspects of performance already apparent in the outturns. This may in particular affect the difference term; since the level variable is taken with a lag it should be less vulnerable to such misinterpretation.

The estimates were made using a cross-section weighted GLS balanced panel, with fixed effects for each country and cross section weights. The cross-section weights allow for the common disturbances that affect the panel, such as world economic growth, growth in world trade, share prices and global bond yields. We considered this more appropriate than the alternative seemingly unrelated regressions (SUR) given there is a clear relation between equations. The fixed effects should deal with the inevitable heterogeneity between countries in the panel, in terms of levels of the variables concerned. The standard errors are White heteroskedasticity consistent.

One point emphasised above is that institutional investors may seek higher dividend distribution, especially in the case that there is considered to be "free cash flow" and a lack of profitable investment opportunities. Table 5 accordingly shows estimates for growth of real dividends. In this case we include the lagged real dividend flow and lagged GDP as error correction terms as well as the growth of GDP (current and lagged) in order to allow for normal cyclical and trend patterns in dividends. The results for the G-7+ bring out the dynamics and long run relationship between GDP and real dividends (where the ratio of dividends to GDP proxies the payout ratio). The current difference of GDP has a coefficient of well over one, suggesting that the cyclical "beta" of dividends is high (they rise more than GDP in booms and fall more in recessions). The lagged levels terms do not suggest long run homogeneity with GDP, suggesting a trend in the payout ratio. As regards the institutional investment terms, the share of foreign institutions has a significant coefficient both in the difference and the level terms. This suggests that pressure from foreign institutions for higher real dividend distributions may have played an active role across the G-7+. Meanwhile the difference of domestic institutions term is negative. Looking at the results for the Anglo Saxon and CEJ, the dynamic effects of GDP growth are consistent across the panel, as is the significance of the lagged dividend (partial adjustment) term. However, lagged GDP is only significant in CEJ, where long run homogeneity with real dividends does seem to hold. The results for institutional shares are quite different. In the Anglo Saxon countries, the significant positive effect comes from the lagged level of the domestic institutions and foreign institutions ratios. This implies that institutional pressure is effective in raising real dividends. In the CEJ countries, only the lagged domestic share is positive, suggesting foreign institutions do not exert strong influence.

The next issue concerns capital accumulation (Table 6). Do institutions exercise restraint on investment, given the risk that it may become unprofitable? On the right hand side, we have lagged investment, the lagged capital stock and lagged GDP, as well as current and lagged differences of real GDP and a lagged real interest rate as real economy variables. This gives a standard Jorgensen flexible accelerator model (Ashworth and Davis 2001), where the long run ratio of interest is that between investment and GDP. The conventional terms bear usual signs and magnitudes, although it is interesting to note that the accelerator terms (GDP growth) are much stronger in the CEJ than the Anglo Saxon countries. This could link to the point that in a relationship banking system, investment is freer to respond to growth with readily available debt finance. Lagged accumulation is negative, as is conventional in an error correction equation where the dependent variable is a first difference. In terms of the share of institutional holdings, the G-7+ results are insignificant. In Continental Europe and Japan, the level of life and pension holdings has a positive effect. However, in the Anglo Saxon ones, the significant institutional share terms (difference of domestic and level of foreign) are negative. The implication is that institutional investors exert a strong and consistent negative influence on accumulation in those countries.

The third estimate is for Total Factor Productivity (Table 7). Do institutions help to generate higher productivity via corporate governance pressure on firms to maximise profits, efficiency and competitiveness? In this case we simply estimate a distributed lag with GDP together with a partial adjustment term. Note that TFP growth is estimated as $100(\Delta \ln Y - \alpha \Delta \ln L - (1-\alpha)\Delta \ln K)$, where Y is real GDP, L is employment and K the real capital stock. α is set to 2/3, which is approximately labour's income share. The level is the accumulation of this variable. The terms in growth of GDP are significant, suggesting that there is a cyclical pattern to this variable. Lagged TFP is also significant. For institutional shares, in this case, there are again no significant difference terms. The levels terms show a positive effect from domestic institutions, and a negative effect from foreign ones. This suggests that TFP may be stimulated by domestic institutions' activity and corporate governance pressure, while foreign investors' holdings link to lower TFP growth. For Anglo Saxon countries, this result again holds, albeit with the coefficient on domestic institutions being only significant at the 90% level. In CEJ, both institutions' share is significant with domestic positive and foreign negative. In CEJ, the difference terms in the institutional share also come through with the same signs as for the levels.

The fourth estimate is for the growth of research and development capital (Table 8). Although institutions may restrain overall investment, is it the case that institutional shareholding provides a favourable environment for research? Note that this reflects indirectly on the "short termist" hypothesis which would suggest a negative effect on R and D from impatient institutional investors. The specification is similar to the investment function in Table 6, with the dependent variable being the second difference of the R and D capital stock. We thus have level and lagged real interest rates, growth rates of GDP, and lagged investment, the capital stock and GDP in levels. For the G-7 there are negative signs on lagged investment and capital, while lagged GDP has a positive sign, suggesting R and D grows with output. The cyclical pattern differs from fixed investment, with a negative lagged GDP growth effect and from lagged R and D investment growth. The signs (albeit not always significance) are repeated in the subgroups.

Meanwhile at the G-7 level there are offsetting effects of institutional holdings, with a rise in the domestic institutional share accompanying rising R and D investment, while a rise in foreign holdings and the level of the domestic share tend to reduce it. There is less ambiguity at the Anglo Saxon level where the boost from rising domestic shares is the only significant effect. In CEJ, there are no significant effects. It can be suggested that this evidence tells against "short termism" in R and D from institutional holdings.

Table 9 looks at the link of institutional shares to equity price volatility. Do institutional shareholdings boost or reduce volatility in the short or long term? Since volatility is an I(0) variable we present the dependent variable as a level, while lagged dependent variables were insignificant and omitted. (With

higher frequency data we could have used a GARCH formulation but this is not feasible with an annual dataset.) We include cyclical variables and bond yields to capture possible macroeconomic effects on volatility. It appears that volatility is higher with a low real interest rate (perhaps reflecting the 1970s experience) as well as when GDP declines after rising in the previous period, as at the turning point of the cycle. Institutional investor effects are found only in differences in the G-7 and Anglo Saxon countries suggesting it is a shift in sectoral holdings of shares that promotes volatility rather than institutional holdings per se. On the other hand in CEJ there is evidence that the level of domestic institutional holdings that accompanies higher volatility.

Table 10 summarises the results outlined above. We would argue that this work is consistent with a disciplining role of institutions in the Anglo Saxon countries, particularly life insurers and pension funds. They exert restraint of investment, and lead to a boost to dividends and to TFP, while they are favourable to R and D. In the Anglo Saxon countries there is only a short term effect of domestic institutional holdings on volatility while in the bank dominated countries it may be more persistent. The trend for corporate use of equity to rise, for equity shares of institutions to increase, and for traditional corporate governance structures to break down in CEJ, suggests these results could hold there in the future.

Admittedly, the econometric approach is subject to shortcomings. It is clear that the ownership cannot exceed 100%, as is implied by treating the institutional share as I(1), although similar issues arise in consumption and investment functions where trends are often detected in variables such as real interest rates, Tobin's Q, and uncertainty. Ideally, a more sophisticated estimation procedure such as Philips Modified estimators should be used. Further work could address these issues, and also include estimation after 1980 (to assess the effect of the turbulent 1970s on the results), use of patents, takeovers, and profit mark-up as possible dependent variables.

7 Econometric work 2 – institutional investors and economic growth

In this final section we provide some tentative evidence regarding the impact of institutional investment on growth using simple regressions in the tradition of Levine and Zervos (1998). We employ a dataset of 17 OECD countries only[24]. This partly reflects data availability from the OECD Institutional Investors database but also on the basis that mainly among countries in the later stages of financial development will institutional investors become an important component of the financial system. Hence we may discern the contribution to growth and productivity better by excluding lower income countries still at the bank dominated stage. We emphasise that the results should be seen as suggestive rather than conclusive, and a possible basis for further work.

[24] The countries are Australia, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Ireland, Italy, Finland, France, Japan, Netherlands, Norway, Sweden, the UK and the US

We undertook a set of regressions with growth as the dependent variable. We do not control for the standard "Levine" variables of initial income, years of schooling etc. as these are broadly common to OECD countries, as is population growth. The OECD database generally covers 1980-2000. Hence there is scope for regressions over 5-year periods. One issue to bear in mind is that since institutional investors hold a significant proportion of equity, their significance can relate partly to the forward looking nature of equity markets in anticipating growth.

The results are given in Table 11. The results do not favour a strong impact of institutional investor size on overall economic growth, since the coefficients for the ratio to GDP and for the ratio to financial assets (equity plus loans) are not significant, albeit positive. The effect of institutions may be better characterised as contributing to specific aspects of economic performance as set out in the section above than growth per se. Some other results are significant. We find that the turnover ratio is frequently significant and positive, as in Levine and Zervos (1998), while the bank loan ratio tends to have a negative sign. This last is intriguing, and it suggests that a large banking sector may become a liability in a highly advanced country, possibly since it creates macroeconomic volatility (e.g. in commercial property cycles) and is weak at financing innovation. Given the small number of countries and simple estimation techniques, these suggestions must be accepted with caution at present.

Conclusions

In this paper we have surveyed the work undertaken on the development of institutional investors on economic performance, and undertaken some econometric work to see if positive effects on economic performance and growth are detectable at a macro level. We reviewed the existing literature on finance and growth and found little direct reference to institutions. On the other hand, there is quite a rich literature suggesting that institutional growth – notably after pension reform – may have quantitative or qualitative effects on capital markets detectable at a macroeconomic level, which improve performance of the functions of the financial system. They may also impact on the real economy directly, notably the corporate sector. Consistent with this last point, econometrically, we find that in the G-7, the share of institutional investors in total equities does have a restraining effect on investment, while boosting dividend yields R and D, and total factor productivity – and in some cases, equity price volatility. On the other hand, using a broader panel, no effect can be detected of the institutional investment/GDP ratio on economic growth.

Table 1: Portfolio distributions of selected funded pension systems

	Bonds	o/w Public	o/w Private	Shares	Property	Loans and mortgages	Short term assets	Foreign assets
Chile (1994)	45	39	6	33	2	13	6	1
Singapore (1996)	70	70	0	0	0	0	28	0
Malaysia (1996)	55	34	21	16	1	0	30	0
Switzerland (1994)	28	-	-	14	16	41	2	0
Australia (1995)	15	13	2	41	9	0	20	14
UK (1996)	14	n/a	n/a	78	5	0	4	27
Netherlands (1996)	63	n/a	n/a	26	8	n/a	3	23

Source: Davis (1998) Note: the Singaporean fund holds undisclosed assets in foreign markets to back the bonds and deposits held by members

Table 2: Characteristics of selected funded pension systems

	Real returns 1970-95	less average earnings	less global portfolio	Assets (% of GDP)	Coverage
Chile	13.0 (9.5) (1980-95 only)	+9.8	+4.1	39% (1995)	99% members; 58% contribute
Singapore	1.3 (2.0)	-5.6	-3.8	56% (1996)	90% members, 67% contribute
Malaysia	3.0 (3.9)	-1.4	-3.7	47% (1996)	86% members, 50% contribute
Switzerland	1.7 (7.5)	+0.2	-2.0	73% (1994)	90%
Australia	1.8 (11.4)	+0.8	-4.3	56% (1996)	92%
Nether-lands	4.6 (6.0)	+3.2	-0.2	85% (1996)	89%
UK	5.9 (12.8)	+3.1	0.0	76% (1996)	75%

Source: Davis (1998)

Table 3: Indicators of financial development

Percent of GDP	Stock market capitalisation	Stock market turnover	Listed companies (no.)	Bank credit
Chile	149	22	284	63
Singapore	174	71	212	61
Malaysia	255	88	529	129
Switzerland	141	101	233	183
Australia	69	28	1178	83
Netherlands	90	63	387	118
UK	127	92	2078	125

Source: IFC Emerging Markets Factbook

Table 4: Developments in the Chilean financial sector

Percent of GDP	1980	1986	1992
Fixed income instruments	0.2	26	60
Stock market capitalisation	30	24	88
Corporate bonds	0.2	0.4	5
Mutual funds	3	1	2
Foreign capital country funds	0	0	3
Insurance company reserves	n/a	3	7
Pension funds	0	13	32

Source: EBRD (1996)

Table 5: Results of panel estimation for log-difference of real dividends

	G-7+	Anglo-Saxon	CEJ
DEQLPS	-0.132 (0.075)*	-0.046 (0.124)	1.04 (0.71)
DEQFRS	0.457 (0.229)**	0.032 (0.43)	0.06 (0.43)
EQLPS(-1)	0.038 (0.04)	0.173 (0.064)**	0.606 (0.34)*
EQFRS(-1)	0.43 (0.093)**	0.359 (0.144)**	0.035 (0.41)
DLGDP	1.55 (0.098)**	1.55 (0.11)**	2.21 (0.54)**
DLGDP(-1)	0.72 (0.095)**	0.616 (0.108)**	1.96 (0.56)**
LRDIV(-1)	-0.199 (0.028)**	-0.163 (0.036)**	-0.27 (0.058)**
LGDP(-1)	0.062 (0.019)**	-0.021 (0.023)	0.197 (0.047)**
R-bar-2	0.414	0.49	0.37
SE	0.127	0.082)	0.154
Observations	216	112	108

GLS, Fixed effects, cross-section weights, White heteroskedasticity consistent standard errors in parentheses, ** indicates significance at 5% level and * at 10%. Source: Davis (2002) Key: G-7+ indicates results for Australia, Canada, France, Germany, Italy, Japan, UK and US; Anglo-Saxon indicates results for Australia, Canada, UK and US; CEJ (Continental Europe and Japan) indicates results for France, Germany, Italy and Japan; LRDIV, log of real dividends, LGDP, log of real gross domestic product , EQLPS, share of equity held by life and pension funds; EQFRS, share of equity held by foreign shareholders; LTFP log of total factor productivity, LREQP, log of real equity price, ROE real return on equity, RLR real long term interest rate (long rate less current CPI inflation); VOL, standard deviation of real equity price (equity index deflated by CPI), LKS, log of real capital stock, EQMFS share of equity held by mutual funds, LI log of real fixed investment. “D” indicates first difference operator.

Table 6: Results of panel estimation for log-difference of real fixed investment

	G-7+	Anglo-Saxon	CEJ
DEQLPS	-0.21 (0.21)	-0.23 (0.1)**	-0.088 (0.3)
DEQFRS	00076 (0.11)	0.019 (0.23)	0.09 (0.075)
DEQMFS			
EQLPS(-1)	0.006 (0.08)	0.008 (0.046)	0.37 (0.17)**
EQFRS(-1)	0.016 (0.072)	-0.135 (0.08)**	0.06 (0.082)
EQMFS(-1)			
DLGDP	1.19 (0.17)**	0.05 (0.12)	1.78 (0.19)**
DLGDP(-1)	0.17 (0.15)	-0.66 (0.21)**	0.48 (0.16)**
LKS(-1)	0.023 (0.007)**	0.09 (0.013)**	0.01 (0.006)*
LI (-1)	-0.22 (0.032)**	-0.43 (0.053)**	-0.18(0.03)**
LGDP (-1)	0.3 (0.043)**	0.54 (0.08)**	0.22 (0.04)**
RLR(-1)	-0.003 (0.001)**	-0.0018 (0.0011)	0.00018 (0.0017)
R-bar-2	0.32	0.63	0.59
SE	0.046	0.052	0.04
Observations	216	112	108

Source: Davis (2002). Key: See Table 5.

Table 7: Results of panel estimation for log-difference of total factor productivity

	G-7+	Anglo-Saxon	CEJ
DEQLPS	0.003 (0.017)	-0.037 (0.02)*	0.119 (0.048)**
DEQFRS	-0.04 (0.027)	0.043 (0.08)	-0.062 (0.027)**
EQLPS(-1)	0.034 (0.007)**	0.025 (0.0086)**	0.153 (0.042)**
EQFRS(-1)	-0.054 (0.014)**	-0.045 (0.017)**	-0.044 (0.027)*
DGDP	0.61 (0.027)**	0.537 (0.034)**	0.697 (0.043)**
DGDP(-1)	-0.17 (0.022)**	-0.153 (0.037)**	-0.184 (0.024)**
LTFP(-1)	-0.071 (0.0085)**	-0.132 (0.04)**	-0.0396 (0.012)**
LGDP(-1)	0.025 (0.0049)**	0.049 (0.013)**	0.009 (0.008)
R-bar-2	0.802	0.7	0.892
SE	0.009	0.009	0.0096
Observations	216	112	108

Source: Davis (2002). Key: See Table 5.

Table 8: Results of panel estimation for log-second-difference of research and development capital

	G-7+	Anglo-Saxon	CEJ
DEQLPS	0.018 (0.009)**	0.03 (0.009)**	-0.014 (0.03)
DEQFRS	-0.025 (0.012)**	-0.028 (0.02)	-0.0078 (0.016)
EQLPS(-1)	-0.0056 (0.003)*	-5.38E-05 (0.004)	-0.0033 (0.023)
EQFRS(-1)	-0.0075 (0.005)	-0.0038 (0.006)	-0.011 (0.014)
DDLRDK(-1)	0.26 (0.06)**	0.19 (0.11)*	0.24 (0.08)**
LGDP(-1)	0.021 (0.003)**	0.018 (0.004)**	0.03 (0.006)**
DLRDK(-1)	-0.21 (0.025)**	-0.16 (0.034)**	-0.25 (0.04)**
LRDK(-1)	-0.017 (0.002)**	-0.017 (0.005)**	-0.022 (0.004)**
RLR(-1)	0.00025 (0.0001)**	0.00024 (0.0001)	0.00039 (0.0002)*
DLGDP	-0.0036 (0.008)	0.0074 (0.009)	-0.022 (0.017)
DLGDP(-1)	-0.023 (0.01)**	-0.026 (0.011)**	-0.016 (0.02)
R-bar-2	0.47	0.25	0.53
SE	0.0043	0.0036	0.005
Observations	216	112	108

Key: See Table 5.

Table 9: Results of panel estimation for equity price volatility

	G-7+	Anglo-Saxon	CEJ
DEQLPS	0.53 (0.18)**	0.47 (0.2)**	0.57 (0.49)
DEQFRS	-0.1 (0.19)	0.21 (0.3)	-0.27 (0.24)
EQLPS(-1)	-0.008 (0.08)	-0.09 (0.1)	0.41 (0.13)**
EQFRS(-1)	-0.072 (0.074)	-0.004 (0.08)	-0.08 (0.13)
RLR	-0.005 (0.002)**	-0.005 (0.002)**	-0.003 (0.002)
RLR(-1)	0.002 (0.001)	0.003 (0.002)*	0.0006 (0.002)
DLGDP	-0.124 (0.158)	-0.33 (0.21)	0.21 (0.2)
DLGDP(-1)	0.36 (0.17)**	0.3 (0.25)	0.42 (0.2)**
R-bar-2	0.16	0.22	0.09
SE	0.043	0.04	0.044
Observations	216	112	108

Key: See Table 5. VOL; standard deviation of monthly real share price changes

Table 10: Summary of results for institutional shares of equity

Equation	Difference of log real dividends	Difference of log TFP	Difference of fixed investment	Second difference of R&D capital	Real share price volatility
G-7+					
DEQLPS	Negative			Positive	Positive
DEQFRS	Positive			Negative	
EQLPS(-1)		Positive		Negative	
EQFRS(-1)	Positive	Negative			
Anglo Saxon					
DEQLPS		Negative	Negative	Positive	Positive
DEQFRS					
EQLPS(-1)	Positive	Positive			
EQFRS(-1)	Positive	Negative	Negative		
CEJ					
DEQLPS		Positive			
DEQFRS		Negative			
EQLPS(-1)	Positive	Positive	Positive		Positive
EQFRS(-1)		Negative			

Key: See Table 5.

Table 11: Results of growth estimation for OECD countries (1980-2000 five year period averages)

GLS, no weighting, White heteroskedasticity consistent standard errors, ** indicates significance at 5% level and * at 10%.

Equation	1	2	3	4	5
Constant	0.033**	0.033**	0.032**	0.033**	0.03**
Bank lending/GDP	-0.0093	-0.01*	-0.016*	-0.018**	-0.01**
Stock market turnover		0.0056	0.006*	0.006	0.007*
Institutional assets/GDP			0.0053	-0.007	
Equity market capitalisation/GDP				0.023**	
Share of institutions in financial assets					0.004
R-bar squared	0.016	0.023	0.006	0.013	0.031
SE	0.014	0.014	0.012	0.011	0.012
Observations	68	65	59	59	59

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