QEH Working Paper Number 53

Econometrics of the Effects of Stock Market Development on Growth and Private Investment in Lower Income Countries

J Benson Durham*

Recent literature suggests that stock market liberalisation has positive effects on macroeconomic growth and private investment. However, econometric relations are largely dependent on the inclusion of higher income countries in such samples, which quite conceivably limits the relevance for lower income nations. Indeed, some evidence in this study indicates that stock market development has a more positive impact on growth for greater levels of per capita GDP. Similarly, lagged equity price appreciation seems to boost private investment growth, but only in rich countries. Curiously, neither financial nor legal development variables, which are more serviceably relevant than initial income, seem to be mitigating factors, but these data imply subdued enthusiasm regarding emerging equity market development.

October 2000

* Finance and Trade Policy Research Centre
Queen Elizabeth House
University of Oxford
Oxford OX1 3LA
UK

1. Introduction

Recent literature argues that lower income countries should liberalise their stock markets. This paper examines both the short- and long-term transmission mechanisms that support this component of capital account reform. The long-run view (Levine and Zervos, 1998a, 1998b) argues that reform advances overall stock market development, which in turn enhances macroeconomic growth. The short-run view suggests that reform produces a one-time increase in stock prices, which in turn boosts private investment given the (purported) decrease in the equity cost of capital (Henry, 2000a, 2000b).

This paper re-examines the final phases of both of these causal paths. First, considering the long-run, several factors recommend re-examining the empirical link between stock market development measures and macroeconomic growth. For example, previous studies that produce positive results only include data before 1994, notably before the 'Tequila crisis' and 'Asian flu', which afflicted lower income countries with comparatively advanced equity markets. But more germane to financial theory, previous econometric evidence includes higher income countries samples that produce positive relations, and a growing literature suggests that what determines expansion differs across national income levels. Therefore, this study tests whether the positive correlation is robust in samples of exclusively emerging markets. Simply, if the relation between stock markets and growth is confined to higher income countries, the long-run perspective on stock market liberalisation would seem less applicable to poorer countries.

Second, with respect to the final phase of the short-run mechanism, this paper tests how private investment responds to changes in stock market valuation in both higher and lower income markets. While most research on Tobin's q and related mechanisms focuses on developed markets, particularly the United States (Barro, 1990), there is a dearth of evidence on emerging markets, especially the lower income countries. Also, similar to the relation

between stock market development and growth, this study examines the notion that the association between valuation changes and investment is more pronounced in higher income cases. Besides the questionable relation between liberalisation and stock market prices (Durham, 2000b), if the elasticity between valuation and investment is less salient or even non-existent in lower income countries, the short-run mechanism would also seem less persuasive for developing areas.

Section 2 outlines previous literature and econometric results, and Section 3 explains the motivation for re-examining the apparent positive empirical links between stock market development and growth in the long-run and between equity valuation and private investment in the short-run. Section 4 presents the results regarding long run growth, and Section 5 presents the results for private investment. Section 6 concludes.

2. Previous Literature

Considerable literature addresses the general merits of open capital accounts, with respect to foreign direct investment (FDI), portfolio investment (FPI), and bank lending (FBL). Given the focus on stock market behaviour and the real economy, this paper more specifically addresses sanguine perspectives on equity FPI. In his general overview of proposals for reducing 'global financial instability', Rogoff (1999) recommends a substantial shift from debt to equity finance. Briefly, he argues that equity finance introduces risk sharing, via reductions in moral hazard with ownership, as well as more efficient resource allocation, via (share) price signalling. The benevolent perspectives on stock market liberalisation and development, to which the discussion now turns, are of course specific manifestations of this broad view.

2.1. The Long-run: The Effect of Stock Market Development on Growth

The first strand of literature focuses on (long-term) stock market development. Levine and Zervos (1998b) outline a benevolent mechanism from liberalisation through overall stock market development to the real economy. Briefly, they find that liberalisation tends to increase various measures of stock market development, including market capitalisation to GDP and liquidity (measured by the total valued traded to GDP or, alternatively, to total market capitalisation). Citing a separate inquiry (Levine and Zervos, 1998a), equity market development, in particular market liquidity, is in turn a robust determinant of macroeconomic growth using a sample of up to approximately 70 higher and lower income countries from 1976 to 1993. Therefore, this benevolent long-run indirect mechanism from reform to the real economy follows:

(1)

$$Liberalisation \Rightarrow \uparrow StockMarketDevelopment \Rightarrow \uparrow Growth .$$

Notably, samples that produce positive empirical relations between stock market development indicators and economic growth include developed countries. Even augmented analyses that include cases in which stock market activity is 'inconsequential' (Levine and Zervos, 1998a, p. 553) still use information from OECD countries to produce robust estimates. Therefore, (1) is not based on evidence from *exclusive* MIC or LIC samples, and Section 3 outlines the controversy surrounding this methodology in greater detail.

2.2. The Short-run: Reform, Valuation Changes, and Private Investment

The second issue focuses on short-term indirect dynamics. Briefly, Henry (2000a) documents temporary increases in private investment growth rates among a sample of 11 developing countries[1] that liberalised their stock markets during the 1977 to 1994 period. He

[1] These include Argentina, Brazil, Chile, Colombia, India, Korea, Malaysia, Mexico, the Philippines, Thailand, and Venezuela. He finds that in the first, second, and third years after liberalisation, 9, 10 and 8 of the 11 sample countries, respectively, had growth rates of private investment above their non-liberalisation medians. He reports that rates return to their pre-liberalisation by the fourth year after reform.

argues that stock market liberalisation in general lowers the cost of capital, *k*, and therefore increases aggregate stock prices in emerging markets.[2] Given the decrease in *k* and holding expected cash flows constant, some investment projects with negative net present values (NAVs) before liberalisation exhibit positive NPVs afterwards, which induces increased private investment.[3] Therefore, the short-run benevolent mechanism from flows through the stock market to the real economy follows:

(2)

$$Liberalisation \Rightarrow \downarrow k \Rightarrow \uparrow Aggregate\ \Pr ices \Rightarrow \uparrow \Pr ivateInvestment\ .$$

Some (Durham, 2000b) argue that the first link between reform and valuation is econometrically fragile. But this paper focuses on the final phase, which is critical, as Henry argues that 'the ultimate validity of this theory requires the existence of an intermediate empirical link from stock prices to investment' (p. 20). While previous literature (Barro, 1990) documents a positive relation between stock market returns and private investment, Henry documents a similarly 'strong correlation', particularly stock price appreciation associated with liberalisation.

2.3. A Caveat: Recent Developments in the Literature on External Finance

While the debate on stock market liberalisation focuses on cross-border (equity) flows, the transmission mechanisms in (1) and (2) also draw on a related literature on

---

[2] One can easily deduce the effect of decreased *k* on aggregate prices from the standard Gordon growth model of aggregate valuation, as in

$$P = \frac{D}{k - g}\ .$$

where *D* refers to dividends, *k* is the cost of capital (composed of the risk-free rate and the equity risk premium), and *g* is the expected growth rate of dividends. All else equal (most contentiously *g* in the case of liberalisation), a decrease in *k* produces an increase in *P*.

[3] The cost of equity capital is related to local market volatility (variance) in closed capital markets. In open markets, the cost of capital is related to the covariance with world market returns. Theory suggests that if the covariance is less than the (domestic) variance, then the cost of equity capital should decrease after liberalisation.

alternative forms of external finance, either domestic or international. A more thorough discussions of these perspectives can be found elsewhere (Levine and Zervos, 1998a; Levine, 2000; Beck and Levine, 2000). But a very brief outline of the differences between the 'bank-based', the (stock) 'market-based', the 'financial services', and the 'legal-based' views of financial development and macroeconomic growth are instructive at this juncture.

The bank-based view stresses the effectiveness with which banks provide external finance and fund new firms, particularly with respect to close, long-term relationships between creditors and debtors. The (stock) markets-based view both emphasises how equity markets fund new, innovative enterprises and the comparative advantages of markets with respect to banks. In particular, deep and liquid stock markets enable market participants to quickly acquire information regarding productive enterprises and to more effectively tie managerial compensation with performance (via acquisitions).

The financial services view suggests that both banks and markets arise to limit transaction and information costs, and the critical issue is the quality and availability of these financial services and not whether bank or markets provide them. Finally, the legal-based view argues that countries that establish and enforce legal codes that protect property rights will develop financial systems that facilitate external finance for existing and nascent firms.

The relevance of these general perspectives for this study is that a robust correlation between, say, stock market liquidity and growth supports *both* the market-based and financial services views. That is, one could more broadly restate (1) and suggest that stock market liberalisation increases growth through general financial system development, rather than exclusively espouse the market-based view. Importantly, while these distinct perspectives usefully characterise a burgeoning literature, such taxonomy should not unduly cloud the policy debate. Quite conceivably, perhaps transparent and efficient banks, stock markets, and

legal systems are *all* unproblematic and self-recommending. Indeed, the following analysis examines interaction terms that capture the contingent relations between these factors.

3. Motivation for Re-examining the relation between stock markets and growth

Questions remain regarding the applicability of previous evidence that stock market development promotes growth in lower income countries (Levine and Zervos, 1998a, 1998b) and that investment responds positively to equity price appreciation (Henry, 2000a, 2000b). Therefore, this issue address general notion that equity investment is a benevolent alternative (Rogoff, 1999). These issues concern temporal out-of-sample tests, conflicting evidence on growth across higher and lower income countries, and, perhaps most important, key differences between developed and emerging stock markets.

3.1. Temporal Out-of-sample Tests

A simple reason to re-examine the apparent correlation regards the recent experience of the mid- to late-1990s, including the Tequila Crisis and Asian flu. Notably, pervious evidence on long-run growth uses data through 1993 (Levine and Zervos, 1996, 1998a), and figures for studies on private investment (Henry 2000a, 2000b) end in 1994. Indeed, countries that experienced a crisis in general possessed greater levels of stock market development and indeed greater financial openness in general compared to other lower income countries. Countries that experienced crises during the 1990s generally had turnover ratios that were greater than the mean value (20.25 percent) for other emerging markets in 1989 – including Mexico (33.35 percent), Thailand (78.47 percent), Indonesia (38.65 percent), the Philippines (29.07 percent) and Malaysia (21.84 percent). Therefore, perhaps previous results are susceptible to temporal sample bias.

3.2. Sample Divisions across National Income

Perhaps the most general reason to examine this empirical question anew regards the widely observed phenomenon that growth regressions seem to explain considerable more variance in developed as opposed to lower income samples. For example, Grier and Tullock (1989) clearly find that models that exclusively consider lower income countries explain considerably less variance than regressions that include OECD countries.

Some argue that the growth process fundamentally differs across developed and less developed areas, and even sub-divisions of non-OECD countries produce distinct results. For example, Gerschenkron (1962) perhaps seminally argued that the rate of economic development should differ considerably across initial income. More recently, with respect to cross-border flows, most studies do not indicate that FDI has an unambiguously positive impact on growth. Rather, recipient countries must exhibit satisfactory 'absorptive capacity' with respect to initial GDP (Blomström et al., 1992) or human capital development (Borensztein et al., 1998). Beyond financial and monetary economics, some studies also suggest that the appropriate political and constitutional environment might differ with initial income. Perhaps germane to the legal-based view, Durham (1999) argues that the effectiveness of certain political regimes should differ with the initial level of development, and indeed, some data suggest that the effect of regime type differs in lower income countries. Therefore, given the general suspicion that growth determinants differ with initial income, that previous evidence includes information from the highest income cases raises questions.

3.3. Alternative Characteristics of Equity Markets across High and Low Income Countries

More specific to this particular research inquiry, another reason to question studies that use data from developed markets is that the framework for the 'banks versus markets'

debate derives largely from developed (OECD) country experience. Notably, prototypical 'bank based' systems refer to Germany and Japan, where as 'market based' systems refer to the United States and Great Britain (Levine and Zervos, 1998a; Levine, 2000). This literature contrasts considerably with, say, the debate between import substitution and export promotion industrialisation. However useful this literature on broad development strategies, the evidence and discussion directly refers to contemporary, or at least post-1945 development history. In contrast, the financial development literature addresses 'a century old policy debate' (Levine, 2000).

Fundamental issues related to market activity highlight this omission. For example, some literature suggests that developed and emerging stock markets differ with respect to both microstructure as well as asset pricing. In fact, Green et al. (2000) suggest that developed and emerging markets have different trading systems, as trading in higher income countries tend to be 'demand driven,' while lower income countries 'have adopted new trading systems in anticipation for growth (p. 46).

Also, the empirical literature on asset pricing suggests that different variables drive developed and emerging market performance, even though both developed and emerging markets show evidence of predictable and lepkurtostic returns as well as volatility clustering (Green et al., 2000). Very generally, beyond exclusive examination of price history, Harvey (1995) finds that local information is less likely to influence returns in developed markets, where global information is more relevant. Also, Durham (2000a) finds that stock market anomalies are generally more robust in emerging markets, which supports the view that bourses in developed markets are more efficient. This evidence implies that equity markets less effectively distribute information and signal productive enterprises in lower income countries. Therefore, one might conjecture that bourses in poorer countries simply exhibit fewer growth-enhancing characteristics, and therefore liberalisation should proceed

cautiously. But whatever the case, exclusive examination of emerging markets would seem to be a sensible and relatively cost-less econometric exercise.

4. Data and Econometric Results: Stock Market Development and Growth

Data on stock market development indicators are somewhat limited, as this study covers the 1981 to 1998 period.[4] The analyses include as many cases as possible and follow two conventions on which countries to include. The first is to include cases for which there is (non -zero) data on stock market development indicators.[5] The second, following Levine and Zervos (1998a) is to also include data on countries with 'inconsequential' or nascent stock markets, which are arguably particularly noteworthy, and assign zero to all indicators.[6]

Of course, stock market development and general financial activity are not the only determinants of economic expansion. Therefore, following Levine and Renelt (1992), this study controls for the four 'base' growth regressors, including initial per capita GDP, the investment ratio, population growth, and the male education rate. In addition, following

[4] The convention in the literature is to work with unbalanced panels, given the general dearth of data. Apparently, Levine and Zervos (1996) consider averaging periods of unequal length in their panel, as the averaging periods are 1976 to 1985 (10 years) and 1986 to 1993 (8 years). Alternatively, this study uses averaging periods of equal length. The regressions in Levine and Zervos (1998a) are pure cross-sectional designs that cover 1976 through 1993. In most cases, they measure stock market development indicators at the beginning of the sample (1976). But clearly, some of these data are only available after 1976 (including total value traded data for Japan, for example, which begins in 1980). In contrast, this study only uses data for the actual year observed.

[5] Cases include (with number of averaging period observations in parentheses) Greece (2), India (2), Indonesia (2), Israel (2), Italy (2), Jamaica (2), Japan (2), Jordan (2), Korea (2), Malaysia (2), Mexico (2), Netherlands (2), Norway (2), Pakistan (1), Peru (1), Philippines (2), Portugal (2), Singapore (2), South Africa (2), Spain (2), Sweden (2), Thailand (1), Trinidad and Tobago (1), Tunisia (1), United Kingdom (2), United States (2), Venezuela (2), and Zimbabwe (2). This produces 74 observations for the 9-year averaging panel regressions.

[6] Inclusion of 'inconsequential' stock markets following Levine and Zervos (1998a) extends the observations for the 9-year averaging panel to 117. These additional 43 observations include data on Bolivia (2), Botswana (2), Cameroon (2), Central African Republic (2), Congo (Democratic Republic) (2), Costa Rica (2), Dominican Republic (2), Ecuador (2), Ghana (2), Guyana (1), Haiti (1), Kenya (2), Lesotho (2), Malawi (2), Mauritius (2), Nicaragua (1), Niger (2), Paraguay (2), Rwanda (2), Senegal (2), Sri Lanka (1), Uruguay (2), Zambia (2), and Tunisia (1). Levine and Zervos (1998a) enter zero for all development indicators for 1976 for these cases. However, given the panel designs, this study uses non-zero data if available for any initial period.

Levine and Zervos (1998a), all regressions include domestic credit provided by the banking sector divided by GDP.[7]

4.1. The Complete Sample and Divisions across initial GDP per capita

The most straightforward way to examine whether developed markets drive the overall result is to divide the sample across levels of initial income. Considering resulting losses in degrees of freedom, which might singularly drive insignificant results, the analysis includes alternative panel designs with 6- and 3-year averaging periods in addition to the more conventional 9-year panel.

The long-run (9-year averaging period) data, which mostly closely resembles previous evidence on long-run effects, seem to indicate that inclusion of developed countries in the sample drives the overall correlation between stock market turnover and growth. More specifically, as Table 1 indicates, the long-run equations that include all possible cases indicate a positive correlation between liquidity and long-run growth. The equation that includes 'inconsequential' development cases (Regression 1.2) produces the more robust result, with a greater coefficient (0.031) and lower p value (0.007). In general, these results suggest that recent data that extend through 1998 do not vitiate previous findings (Levine and Zervos, 1996, 1998a).

Inclusion of only high-income countries, which reduces the sample to 37 observations, still produces a robust result safely within the 1 percent confidence interval (Regression 1.3), even given the considerable reduction in degrees of freedom. However, the two regressions without (Regression 1.4) and with (Regression 1.5) non-existent stock markets that include only lower income countries produce positive but statistically insignificant coefficients (p values = 0.704 and 0.169, respectively). Thus, these sample

[7] Data on stock market turnover come from either the World Bank's World Development Indicators (WDI) (2000) or the IFC's *Emerging Stock Markets Factbook*, various issues. Data on all 'base' control variables

divisions of long-run data, which conforms most closely to previous literature, imply that stock market development promotes expansion in developed, but not in lower income countries.

Again, given general data limitations regarding this empirical question, the analysis includes alternative panel averaging periods. Turning to the medium-run (6-year averaging period) regressions, the comprehensive samples covering high- and low-income countries indicate a positive impact, both including and excluding nascent stock markets (Regressions 2.1 and 2.2). However, the sample of exclusively developed cases (Regression 2.3) does not produce a statistically significant coefficient (p value = 0.165), however positive. Moreover, some data on lower income countries actually suggest that stock market development enhances growth in the medium-run, at least using the sample that includes nascent bourses (Regression 2.5). As a whole, unlike the 9-year averaging period, these medium-run regressions suggest that lower income countries possibly drive the overall result.

Finally, short-run (3-year averaging period) regressions seem to corroborate the perspective that stock market development is universally beneficial. All regressions (Regressions 3.1 through 3.5), the complete sample and every division thereof, produce a positive a statistically significant estimate for turnover. However, this averaging period is the least conventional, as market capitalisation changes might capture growth expectations over shorter future horizons, and 3-year periods might not sufficiently net out business cycle fluctuations.

4.2. Interaction with Initial GDP per capita and Country Risk

Division of the sample is ultimately somewhat arbitrary. Therefore, the remainder of the section examines whether there are more systematic ways to isolate the (contingent)

---

come from the WDI except male education rates, which come from Barro and Lee (2000).

relation between the effect of stock market development on growth and the initial level of income. One method to determine a precise relation is to include an additional term to capture the interaction between income and liquidity, as in

$$\text{Economic Growth} = \alpha + \beta_1 \text{LIQUIDITY} + \beta_2[\ln(\text{LIQUIDITY} \times \text{GDP}] + \beta_3 X + \mu \quad (3)$$

This form permits a number of possibilities. For example, if only $\beta_2 > 0$, then stock market development only has a significant effect on growth through its interaction with initial income. For a given level of stock market development, the effect is more benevolent for higher income cases. If $\beta_1 > 0$ and $\beta_2 > 0$, the liquidity has an unambiguously positive effect on growth, but the interaction term would still imply that stock markets have a more pronounced effect in higher income countries. Finally, if $\beta_1 < 0$ and $\beta_2 > 0$, then there is a 'threshold' of initial income below which stock market development is actually deleterious to growth.[8]

Turning to the results, Table 2 outlines regression results for (3) on the three alternative panel designs and averaging periods, and in general, the results are highly sensitive to whether the 'inconsequential' cases are included in the sample. In fact, regressions that include as many cases as possible – whether in the long-, medium-, or short-run (Regressions 4.2, 4.4, and 4.6) – all produce positive and statistically significant interaction terms between liquidity and initial income. These particular results imply that

[8] This expression implies a non-constant threshold that depends on the level of the initial flow, and the ratio of β_1 to β_2 indicates how quickly the requisite initial level of income increases for an increase in capital flow. The 'break-even' initial level of development follows

stock market development unambiguously enhances growth, but all things equal, the effect is more pronounced for higher income countries.

More specifically, the long-run data suggest that only the interaction term is significant within the 10 percent confidence interval for the sample that includes nascent cases (Regression 4.2). All relevant coefficients are positive but insignificant in the remaining long-run model (Regression 4.1). The medium-run data produce a similar result, as again, only the equation (Regression 4.4) that includes all possible cases produces a statistically significant positive estimate for the interaction term.

The short-run regression (Regression 4.5) that excludes the non-existent cases suggests that liquidity has a positive and significant effect on growth, while the interaction term is insignificant (but positive). Inclusion of all cases suggests that both liquidity and the interaction term are safely positive and significant (Regression 4.6).

While these results are noteworthy, initial national income could proxy for a number of disparate factors. In other words, what aspect of higher income economies seems to affect the salience of the effect of stock market development on growth? Table 2B examines (3) but substitutes the *Institutional Investor* country credit rating for per capita GDP. This measure captures investors' perception of general investment risk for a given country.

Indeed, some results suggest that the benevolent effect of stock market liquidity is contingent upon country risk. The coefficients for liquidity are positive in all six regressions, but none are statistically significant. In contrast, all equations (Regressions 5.2, 5.4, and 5.6)

$$\beta_1 FLOW + \beta_2[\ln(FLOW \times FD)] \geq 0$$

$$\ln(FD) \geq -\frac{\beta_1}{\beta_2} FLOW - \ln(FLOW)$$

$$FD \geq e^{-\frac{\beta_1}{\beta_2} FLOW - \ln(FLOW)}$$

$$FD \geq \frac{e^{-\frac{\beta_1}{\beta_2} FLOW}}{FLOW}$$

that include inconsequential cases produce positive and statistically significant estimates for the interaction term, but the remaining regressions produce insignificant estimates. These results imply that stock market development enhances growth more for cases with favourable credit ratings, which are notably less likely to be lower income countries.

4.3. Interaction with Legal Variables

Given that initial GDP and country credit ratings capture a variety of underlying variables, significant results do not have much applicability with respect to specific policy proscriptions. International financial institutions and development agencies can hardly suggest that lower income countries suddenly increase initial income or improve perceived credit risk.

Therefore, this section alternatively substitutes nine legal based variables in (3) to estimate β_2. These measures, while still somewhat crude, are nonetheless more serviceable compared to initial income and abstract country risk. These include indices for creditor legal codes; enforcement of such legal codes; accounting and company report standards; a composite measure of creditor, enforcement, and accounting standards; rule of law; expropriation risk; bureaucracy efficiency; business regulation; and property rights. Again, the analyses include six regressions for each variable, considering the sample and panel averaging period alternatives.[9]

These results summarised in Table 2C generally support the findings in the previous section, but β_1 and β_2 are significant in the majority of regressions. For example, among the 54 regressions that consider legal variables, only the nine-year model that excludes nascent stock markets produces a statistically significant result for liquidity (β_1). This model suggests

[9] These measures are from Levine (2000) and are unfortunately temporally inert averages over the 1982 to 1995 period.

that turnover actually has a negative effect on growth, at least within the 10 percent confidence interval (p value = 0.087).

Furthermore, with respect to β_2, nine of the 54 models produce statistically significant interaction terms with the expected positive sign within the 10 percent confidence interval. Four of the six models that include creditor produce significant results, as the 6- and 3-year averaging period models that exclude nascent equity markets produce insignificant estimates. Also, both 9-year panels that include the index for bureaucratic efficiency produce significant results, and the 9-year models that exclude nascent cases and include measures of the rule of law, expropriation risk, and enforcement are similarly robust. In general, these results do not support any particular 'competing' perspective among the four general views on finance and growth. Rather, a significant and positive interaction terms suggest that financial and legal development both enhance growth.

But conclusions should not run too far afield. For example, the 6-year model that excludes 'inconsequential cases' and includes the composite legal measure (the first principal components of creditor, enforcement, and accounting standards) curiously produces a negative interaction term. Also, 44 of the 54 models produce insignificant results for interaction terms, and these include every model that incorporates company reports and accounting standards, business regulation, and property rights.

Also, germane to the four perspectives on financial development and growth, some legal variables are highly significant determinants of growth. For example, 22 of the 54 regressions produce significant and positive estimates for the legal proxy. In fact, all six models for expropriation risk indicate a positive and significant effect, at least within the 10 percent confidence interval. Also, both enforcement of legal codes and the legal composite measures produce significant results for all 3- and 6-year averaging periods, but not for 9-year panels. The 3- and 9-year models that include the index of bureaucratic efficiency

produce significant results, but not the corresponding 6-year models. All models that include nascent stock markets and the property rights measures produce significant results using all three averaging periods, but none of the regressions that exclude inconsequential cases produce significant parameters. Finally, the index for accounting standards and company reports is only significant in the 3-year averaging model that includes nascent stock markets. The creditor, rule of law, and business regulation measures all produce insignificant results.

4.4. Alternative functional forms

Considering the results thus far, some data indicate that stock market development is more likely to positively affect growth in higher income cases, but the measures used to capture more specific aspects of 'developed' economies, which might more directly possible policy proscriptions, do not produce strong econometric relations. Perhaps, therefore, alternative functional forms of stock market development itself might produce more robust results.

Curiously, previous literature seems to exclusively evaluate whether there is a linear relation between stock market development and growth and does not consider alternative functional forms. Given some evidence of differences across initial per capita income levels, the relation between stock markets and growth is in fact non-linear. Possibilities include log-linear, exponential, and quadratic forms. A log-linear form (and positive coefficient) would indicate whether the benevolent effect of stock market development decreases for increased levels of turnover. An exponential form would suggest that there are increasing returns to stock market development, and the quadratic form would indicate an optimal level of development after which the financial system is perhaps 'unbalanced' (Beck and Levine, 2000).

Briefly, simple comparison of overall fit (adjusted R^2) should indicate if any particular function form best conforms to the data. For example, Table 3 suggests that the quadratic form for the limited sample fits the data best for long-run models, again perhaps the most relevant design (adjusted $R^2 = 0.3875$). The implied maximum level of turnover to GDP (approximately 61.31 percent) is within one standard deviation of the sample mean, but only the linear term is significant within the 10 percent confidence interval. Similarly, the quadratic form explain the most variance in the short-run models for the limited sample, but again, the quadratic term is insignificant (p value of 0.186).

The remaining tests indicate that either the linear or linear-log forms fit the data best, as each parameter is statistically significant. The linear form provides the best fits for both medium-run models, and the linear-log form has the greater adjusted R^2 value for the long- and short-run models for the expanded data sets that include 'inconsequential cases'.

5. Data and Econometric Results: Valuation and Private Investment Growth

The growth regression framework is Section 4 is the most straightforward research strategy to test whether stock markets have varying real effects depending on the initial level of national income, but further examination of how the real economy reacts to equity market prices across different development levels is also instructive. Put somewhat differently, in addition of course to examination of (short-run) transmission mechanism (2), if stock markets have varying effects on growth across income, perhaps the effects of market movements similarly have distinct effects related to development.

Researchers generally focus on either developed cases (Barro, 1990) or, less frequently, emerging markets (Henry 2000a, 2000b; Levine and Zervos, 1998b) regarding the effects of valuation changes on private investment growth. However, this simultaneously examines high and low income countries. Turning to data design, given limitations on World

Bank and IFC private investment data, the analyses cover data only 26 countries with annual observations. The two criteria for inclusion in the (unbalanced) panel regressions are as follows.[10] First, any year is included if there are observations from at least 10 countries, and, second, a country is included if there are at least 10 observations during the resulting period. Given these criteria, the panel samples cover 1981 through 1998. The 16 lower income countries include Argentina, Brazil, Chile, Colombia, India, Jordan, Korea, Malaysia, Mexico, Pakistan, the Philippines, South Africa, Thailand, Turkey, Venezuela, and Zimbabwe. The 10 developed countries include Australia, Canada, Greece, Japan, Netherlands, New Zealand, Norway, Sweden, United Kingdom, and the United States.[11]

Of course, stock market returns are not the only purported determinant of private investment in either higher or lower income countries. Unlike the literature on stock market development and growth, this key issue seems lost on studies of private investment and valuation in emerging markets. For example, Henry (2000b) presents several univariate models that only include either stock market liberalisation dates or stock market returns. Notably, he never includes both variables simultaneously, and, perhaps more important, he excludes other country-specific variables that the general literature advances.[12] Therefore, in addition to contemporaneous and (1-year) lagged valuation changes, every regression in this study includes lagged real per capita GDP growth rate, the lagged real growth rate in total private credit, lagged government spending, and lagged foreign exchange reserves to GDP.[13]

5.1. The Complete Sample and Divisions across initial GDP per capita

[10] While perhaps less desirable, this paper follows the convention in the literature of using unbalanced panel data sets.
[11] Data on stock prices come from the IFS for 16 of the 26 countries. Data from IFC cover 10 emerging markets, including Argentina, Brazil, Greece, Jordan, Korea, Malaysia, Mexico, Thailand, Turkey, and Zimbabwe.
[12] See Agénor and Montiel (1996) for a discussion of the empirical literature on private investment.
[13] Data con all variables ome from the World Bank's World Development Indicators (2000).

As Table 4 indicates, models that include all 26 cases suggest that contemporaneous valuation changes correlate positively with (real) private investment growth. The equations that exclude (Regression 6.1) and include (Regression 6.3) lagged stock price returns both suggest a positive and safely statistically significant relation. Both coefficients indicate that for each one percent level increase in contemporaneous price return, private investment growth increases by approximately 6.6 percent.

In contrast to previous studies, lagged valuation changes are not robust in the complete sample. The coefficients for regressions that both exclude (Regression 6.2) and include (Regression 6.3) contemporaneous return both produce positive but statistically insignificant parameter estimates. Alternative regressions that include contemporaneous values for real per capita GDP growth rates still indicate that concurrent valuation changes positively affect private investment growth,[14] but theses aggregate results still do not unequivocally support the Tobin's q related mechanism. That is, without proper instruments, one cannot be sure that private investment growth, valuation changes, and growth are not simultaneously determined.[15]

Division of the sample is telling. The regressions that only include the 10 higher income countries and alternatively control for both contemporaneous and lagged valuation changes (Regressions 7.2 and 7.3) produce positive and statistically significant coefficients for both variables. In fact, the parameter estimate for lagged stock market returns (0.104) is larger than that for contemporaneous valuation (0.067) in the more complete specification (Regression 7.3). Therefore, these data on developed markets generally support the hypothesis, even given considerably fewer degrees of freedom.

Notably, the regressions that exclusively consider lower income countries indicate that contemporaneous valuation changes, but importantly not lagged values, affect private

[14] These regressions that include the contemporaneous growth rate are available on request.

investment growth. Both estimates for lagged returns (Regressions 8.2 and 8.3) are positive and insignificant, but the parameters for current price appreciation (Regressions 8.1 and 8.3) are safely significant and positive. Therefore, the division of the sample suggests that valuation changes are generally more relevant for higher rather than lower income countries.

Moreover, the regressions seem to indicate that the determinants of private investment growth differ depending roughly on initial national income. For example, all three regressions for the developed country sample (Regressions 7.1 through 7.3) all indicate that the lagged growth rate is a significant determinant, but no other variable is robust within any standard confidence interval. On the other hand, models that exclusively examine emerging markets (Regressions 8.1 through 8.3) indicate that lagged real credit growth and lagged reserves to GDP help explain private investment growth, but the lagged growth rate is insignificant. In short, if the capital accumulation process differs fundamentally across higher and lower income countries, perhaps the findings on valuation changes is hardly surprising. In short, these results suggest cast doubt on the transmission mechanism from liberalisation to prices to benevolent real effects.

5.2. ***Interaction with Initial GDP per capita and Country Risk***

As similarly discussed in the context of stock market development and economic growth, division of the sample is somewhat imprecise. Therefore, this section attempts to identify whether there are more systematic schisms between lower and higher income countries that capture the relative salience of the transmission mechanism from valuation to private investment. Are there quantitatively measurable preconditions that increase the elasticity of private investment with respect to stock market behaviour?

Similar to (3), an interaction term might capture such a dynamic, as in

[15] The same is true of growth regressions that include contemporaneous (or mean) measures of the aggregate investment ratio.

(4)

Private Investment Growth = $\alpha + \beta_1 RETURNS + \beta_2[\ln(RETURNS \times GDP] + \beta_3 X + \mu$.

The first and simplest such factor is initial per capita GDP, which might more precisely capture any contingent relation between income and valuation effects. If $\beta_2 > 0$ (and $\beta_1 = 0$), then a given valuation change has a more pronounced effect the greater initial income.

Indeed, as Table 5 suggests, the interaction terms reinforce the findings in the previous section. That is, while the interaction term with contemporaneous returns is insignificant (from Regression 9.1), the model that includes lagged returns (Regression 9.2) produces a statistically significant and positive interaction term. Also, notably, the lagged valuation coefficient is insignificant (and actually negative). In general, this suggests that the effect of lagged returns on private investment is largely contingent on initial income.

Second, the link between valuation changes and private investment is conceivably more pronounced in countries that have more favourable country risk ratings, and the analysis includes regressions using *Institutional Investor*'s measures in (4). As Table 5 indicates, the results very broadly reflect those of GDP per capita. That is, the model that includes contemporaneous returns (Regression 10.1) does not produce a significant interaction term, but the regression that uses lagged values (Regression 10.2) suggests that the interaction between lagged returns and lagged country credit has a positive effect on private investment. Again, while the country risk proxies perhaps capture diverse concepts, this result broadly suggests that valuation changes affect private investment decisions more profoundly for cases in which investors generally have a higher degree of confidence.

5.3. Interactions with Financial Development

As Section 4 discusses, initial income and country risk ratings have little concrete applicable relevance, and therefore the remainder of this section examines other factors with

more concrete policy references. For example, one might expect the interaction between valuation and private investment to be more pronounced in a given country the larger and more efficient the financial sector, particularly of course with respect to the stock market. Simply, aggregate valuation changes in countries with large or more liquid markets would seem to have greater effects on private investment. Similar to the regressions that include initial GDP interaction and country risk, the remaining models in Table 5 (Regressions 11.1, through 13.2) examine stock market liquidity, stock market size, and aggregate 'financial activity'[16] (Levine, 2000; Beck and Levine, 2000), respectively, to estimate β_2.

In contrast to this hypothesis, none of these interaction terms, using either contemporaneous or lagged values, produces a positive interaction between valuation changes and the initial level of stock market or broader financial development. Similar to the previous section, contemporaneous return is positive and significant in the three specifications (Regressions 11.1, 12.1, and 13.1), irrespective of turnover, size, or financial activity. More curious, the interaction between lagged valuation and lagged financial activity suggests that price appreciation has a more negative impact on valuation the more developed the financial system (Regression 13.2), but the parameter is only significant within the 10 percent confidence interval.

5.4. Interactions with Legal Proxies

The remainder of Table 5 examines interaction terms with legal variables. Briefly, corporate managers quite conceivably link investment decisions to share prices more directly in cases with more developed and secure legal systems. But the legal proxies do not clearly support this perspective or consistently explain more variance than initial income or the broad country risk measure.

[16] 'Financial activity' is the log of the product of stock market turnover and private credit to GDP.

For example, seven of the interaction terms and legal proxies – the creditor codes, enforcement, legal composite, rule of law, expropriation risk, bureaucratic efficiency, and property rights – produce insignificant results. Moreover, the remaining two variables curiously produce insignificant results. The regression (Regression 16) that includes the measure of accounting and company report standards supports the hypothesis, as the interaction term is positive and statistically significant. However, the interaction term with the index of business regulation (Regression 21) produces a perverse and negative result, and the coefficient for the legal proxy itself is negative and significant, at least within the 10 percent confidence interval (p value = 0.097).

Therefore, all in all, these data on private investment strongly suggest that lagged valuation changes affect private investment in more developed areas. But, the econometric results cannot identify any specific factor associated with higher income, as neither financial nor legal variables seem to be contingent factors.

5.4. Does Stock Market Liberalisation Directly *Boost Private Investment?*

Again, recently published research suggest that stock market liberalisation boosts private investment, as liberalisation increases prices which in turn boosts private investment via the Tobin's q related mechanism in (2) (the reduction in the cost of equity capital). However, subsequent sensitivity analysis on the first stage of the transmission mechanism (Durham, 2000b) casts doubt on the relation. The apparent positive effect on valuation is highly sensitive to alternative dates for the critical liberalisation event, and the statistical relation is robust given time-series rather than pooled regressions. Also, extreme bound analysis of stock market returns in emerging markets indicates that the positive relation is not robust when the right hand side includes other variables that supposedly correlate with valuation. Moreover, with respect to the final phase of the transmission mechanism, the

results in this section do not indicate that past price appreciation leads to greater private investment in lower income countries.

These critical questions aside, previous research that suggests liberalisation effects private investment does not persuasively show that reform has a positive *direct* effect on the dependent variable. More specifically, published research (Henry 2000a, 2000b) does not include models that control for liberalisation and valuation simultaneously, nor do these results control for other factors in the general literature on private investment, including the variables used in previous sections.

Therefore, this section briefly examines the direct effect of liberalisation on private investment, using the contemporaneous value as well as the first and second lead values to examined lagged effects of reform, following previous literature (Henry, 2000b). All regressions summarised in Table 6 control for contemporaneous and lagged returns, lagged growth, lagged real credit growth, lagged government spending, and lagged reserves to GDP.

None of specifications, using any of the alternative liberalisation dates, produces a statistically significant and positive result in the sample of 16 lower income countries. The dating conventions used in Henry (2000a, 2000b) and Levine and Zervos (1998b) produce no significant estimates. Also, the results using dates from Bekaert and Harvey (1998) as well as Kim and Singal (1999) actually suggest that private investment growth decreases in the year following reform (Regressions 23.05 and 23.08, respectively). Therefore, besides the ambiguous effects of reform on prices and prices on investment, stock market liberalisation does not seem to have a *direct* benevolent effect on private investment growth.

Conclusions

This paper examines both long- and short-run hypotheses regarding the effects of stock market reform and development on macroeconomic indicators, particularly long run

growth and private investment, in lower income countries. In addition to the noteworthy experience of emerging markets from 1994 through 1998, there are several reasons to re-examine these hypotheses. Most generally, considerable research on a variety of variables that purport to explain macroeconomic performance suggests that results differ considerably across lower, middle, and higher income countries. More specific to this research question, some data also indicate the stock markets differ considerably in emerging and developed markets both with respect to 'microstructure' and return factors.

Indeed, the results in this paper seem to indicate that stock market behaviour has varying real effects depending on the initial level of income. With respect to growth and equity market development, the long-run model suggests that higher income countries drive the overall positive relation. Also, interaction terms with initial GDP and country credit ratings are largely positive and significant, and a few legal variables are also robust. The econometrics on private investment produces more lucid results. Lagged valuation changes clearly affect private investment decisions in higher but not lower income countries. Statistical interactions with initial GDP and country credit are significant, but curiously, neither financial development nor legal related variables seem to be key intervening factors.

Therefore, further research into what aspect of development, more specifically, mitigates the real effects of stock market behaviour would be instructive. Meanwhile, both long- and short-run transmission mechanisms from stock market liberalisation to desirable macroeconomic performance seem somewhat questionable in the context of lower income countries. There is very little evidence of detrimental effects, even extending the sample through 1998, but the positive impacts are not imminently clear.

Table 1: Stock Market Development (Liquidity) and Growth, Sample Divisions, 1981 to 1998

Regression (9 year averaging)	**1.1**		**1.2**		**1.3**		**1.4**		**1.5**	
Observations	74		117		37		37		80	
Countries	41		64		19		22		45	
R^2	0.444		0.396		0.758		0.509		0.392	
Sample Income	Total		Total		High		Low		Low	
'Inconsequential' Included?	No		Yes		No		No		Yes	
Estimation Method	OLS, Robust		OLS, Robust		OLS, Robust		OLS, Robust		OLS, Robust	
	β	p value	β	p value	β	p value	β	p value	β	p value
Lagged Turnover	*0.017*	*0.100*	*0.031*	*0.007*	*0.027*	*0.005*	*0.006*	*0.704*	*0.022*	*0.169*
Lagged Bank Credit	-0.006	0.236	-0.010	0.077	-0.012	0.001	0.003	0.685	-0.008	0.460
Initial GDP per capita	-0.673	0.090	0.132	0.758	-0.320	0.561	-1.586	0.008	-0.238	0.656
Investment Ratio	0.173	0.000	0.106	0.005	0.139	0.000	0.137	0.162	0.087	0.006
Population Growth	-0.873	0.002	-0.636	0.031	-0.193	0.271	-1.203	0.029	-0.642	0.196
Lagged Education Rate	0.196	0.293	0.139	0.483	-0.108	0.197	1.107	0.119	1.215	0.022
Dummy for 1981-1989	-0.190	0.637	-0.359	0.334	0.336	0.204	-0.018	0.981	-0.482	0.384
Intercept	4.424	0.156	-1.296	0.707	2.560	0.626	11.460	0.008	0.861	0.839

Regression (6 year averaging)	**2.1**		**2.2**		**2.3**		**2.4**		**2.5**	
Observations	128		188		59		69		129	
Countries	53		72		22		31		50	
R^2	0.418		0.367		0.322		0.489		0.371	
Sample Income	Total		Total		High		Low		Low	
'Inconsequential' Included?	No		Yes		No		No		Yes	
Estimation Method	GLS		GLS		GLS		GLS		GLS	
	β	p value	β	p value	β	p value	β	p value	β	p value
Lagged Turnover	*0.016*	*0.026*	*0.024*	*0.006*	*0.018*	*0.165*	*0.014*	*0.183*	*0.022*	*0.052*
Lagged Bank Credit	-0.001	0.900	-0.004	0.456	-0.006	0.172	0.004	0.645	-0.002	0.804
Initial GDP per capita	-0.918	0.005	-0.278	0.425	-1.160	0.178	-1.468	0.004	-0.539	0.266
Investment Ratio	0.189	0.000	0.128	0.000	0.121	0.001	0.212	0.000	0.118	0.000
Population Growth	-0.989	0.000	-0.708	0.007	-0.294	0.292	-1.097	0.006	-0.544	0.162
Lagged Education Rate	0.193	0.342	0.244	0.368	-0.020	0.917	0.270	0.613	0.996	0.084
Dummy for 1981-1986	-0.822	0.047	-0.958	0.016	-0.766	0.089	-0.871	0.234	-1.000	0.089
Dummy for 1987-1992	-0.209	0.582	-0.553	0.142	-0.358	0.374	-0.178	0.779	-0.672	0.215
Intercept	6.135	0.028	1.462	0.596	10.730	0.168	9.708	0.022	2.433	0.511

Table 1 (continued)

Regression (3 year averaging)	**3.1**		**3.2**		**3.3**		**3.4**		**3.5**	
Observations	270		394		121		149		273	
Countries	61		78		23		38		55	
R^2	0.325		0.251		0.419		0.337		0.260	
Sample Income	Total		Total		High		Low		Low	
'Inconsequential' Included?	No		Yes		No		No		Yes	
Estimation Method	GLS		GLS		GLS		GLS		GLS	
	β	p value	β	p value	β	p value	β	p value	β	p value
Lagged Turnover	*0.018*	*0.002*	*0.025*	*0.000*	*0.020*	*0.006*	*0.020*	*0.046*	*0.033*	*0.001*
Lagged Bank Credit	-0.005	0.227	-0.006	0.136	-0.012	0.003	0.000	0.962	-0.001	0.796
Initial GDP per capita	-0.955	0.001	0.049	0.858	-0.462	0.582	-1.566	0.001	-0.127	0.733
Investment Ratio	0.200	0.000	0.132	0.000	0.197	0.000	0.193	0.000	0.111	0.000
Population Growth	-1.048	0.000	-0.309	0.081	-1.007	0.000	-0.892	0.008	0.079	0.738
Lagged Education Rate	0.188	0.315	0.199	0.362	-0.121	0.540	0.352	0.412	0.868	0.040
Dummy for 1981-1983	-1.129	0.043	-1.889	0.001	-1.560	0.014	-0.963	0.298	-2.183	0.004
Dummy for 1984-1986	0.148	0.782	-0.196	0.722	0.071	0.906	0.003	0.997	-0.516	0.489
Dummy for 1987-1989	0.271	0.596	-0.412	0.446	0.461	0.432	-0.152	0.852	-0.959	0.191
Dummy for 1990-1992	-0.211	0.682	-1.039	0.054	-1.112	0.051	0.345	0.673	-1.070	0.140
Dummy for 1993-1995	0.460	0.336	-0.018	0.972	0.434	0.439	0.528	0.470	-0.198	0.778
Intercept	6.229	0.013	-1.735	0.410	3.623	0.634	10.271	0.008	-1.666	0.546

Table 2A: GDP per capita Interaction Terms, 1981 to 1998

Regression	**4.1**		**4.2**		**4.3**		**4.4**		**4.5**		**4.6**	
Observations	74		117		128		188		270		394	
Cases	41		64		53		72		61		78	
Averaging Period	9 years		9 years		6 years		6 years		3 years		3 years	
R^2	0.447		0.416		0.408		0.381		0.326		0.262	
Sample Income	Total		Total		Total		Total		Total		Total	
'Inconsequential' Included?	No		Yes		No		Yes		No		Yes	
Estimation Method	OLS, Robust		OLS, Robust		GLS		GLS		GLS		GLS	
	β	p value	β	p value	β	p value	β	p value	β	p value	β	p value
Lagged Turnover	*0.008*	*0.675*	*0.016*	*0.108*	*0.018*	*0.128*	*0.015*	*0.117*	*0.015*	*0.055*	*0.017*	*0.022*
Lagged Turnover GDP interaction	*0.194*	*0.569*	*0.109*	*0.072*	*-0.055*	*0.816*	*0.121*	*0.044*	*0.085*	*0.610*	*0.117*	*0.017*
Lagged Bank Credit	-0.006	0.230	-0.011	0.044	0.000	0.920	-0.004	0.384	-0.005	0.220	-0.006	0.126
Initial GDP per capita	-0.920	0.168	-0.149	0.721	-0.837	0.072	-0.640	0.101	-1.063	0.004	-0.312	0.315
Investment Ratio	0.175	0.000	0.107	0.003	0.188	0.000	0.127	0.000	0.201	0.000	0.130	0.000
Population Growth	-0.902	0.003	-0.618	0.035	-0.980	0.000	-0.697	0.007	-1.049	0.000	-0.314	0.073
Lagged Education Rate	0.213	0.266	0.155	0.435	0.189	0.352	0.245	0.356	0.187	0.319	0.190	0.381
Dummy for 1981-1989	-0.182	0.654	-0.383	0.303								
Dummy for 1981-1986					-0.816	0.050	-0.880	0.027				
Dummy for 1987-1992					-0.217	0.572	-0.513	0.172				
Dummy for 1981-1983									-1.140	0.041	-1.801	0.001
Dummy for 1984-1986									0.151	0.777	-0.112	0.838
Dummy for 1987-1989									0.275	0.591	-0.379	0.481
Dummy for 1990-1992									-0.232	0.654	-0.991	0.065
Dummy for 1993-1995									0.453	0.344	-0.026	0.960
Intercept	4.517	0.157	0.430	0.897	6.021	0.032	3.633	0.215	6.288	0.012	0.469	0.837

Table 2B: Country Credit Ratings Interaction Terms, 1981 to 1998

Regression	**5.1**		**5.2**		**5.3**		**5.4**		**5.5**		**5.6**	
Observations	74		117		127		187		269		393	
Cases	41		64		52		72		61		78	
Averaging Period	9 years		9 years		6 years		6 years		3 years		3 years	
R^2	0.448		0.419		0.419		0.318		0.329		0.264	
Sample Income	Total		Total		Total		Total		Total		Total	
'Inconsequential' Included?	No		Yes		No		Yes		No		Yes	
Estimation Method	OLS, Robust		OLS, Robust		GLS		GLS		GLS		GLS	
	β	p value	β	p value	β	p value	β	p value	β	p value	β	p value
Lagged Turnover	*0.007*	*0.633*	*0.011*	*0.316*	*0.013*	*0.247*	*0.012*	*0.252*	*0.011*	*0.172*	*0.013*	*0.102*
Lagged Turnover Country Credit interaction	*0.189*	*0.450*	*0.204*	*0.051*	*0.065*	*0.750*	*0.201*	*0.059*	*0.204*	*0.241*	*0.224*	*0.008*
Lagged Bank Credit	-0.005	0.235	-0.011	0.043	0.000	0.984	-0.004	0.360	-0.006	0.172	-0.006	0.108
Initial GDP per capita	-0.795	0.076	-0.147	0.723	-1.000	0.007	-0.591	0.124	-1.074	0.001	-0.310	0.309
Investment Ratio	0.174	0.000	0.106	0.003	0.189	0.000	0.127	0.000	0.199	0.000	0.130	0.000
Population Growth	-0.891	0.002	-0.617	0.035	-1.006	0.000	-0.698	0.007	-1.039	0.000	-0.310	0.078
Lagged Education Rate	0.207	0.277	0.158	0.429	0.199	0.338	0.235	0.375	0.174	0.354	0.175	0.418
Dummy for 1981-1989	-0.258	0.501	-0.432	0.252								
Dummy for 1981-1986					-0.826	0.056	-0.942	0.019				
Dummy for 1987-1992					-0.180	0.640	-0.520	0.171				
Dummy for 1981-1983									-1.203	0.032	-1.838	0.001
Dummy for 1984-1986									0.149	0.781	-0.112	0.838
Dummy for 1987-1989									0.298	0.561	-0.361	0.503
Dummy for 1990-1992									-0.232	0.653	-0.984	0.067
Dummy for 1993-1995									0.508	0.290	0.020	0.970
Intercept	4.449	0.157	0.437	0.895	6.443	0.024	3.368	0.247	6.199	0.013	0.465	0.837

Table 2C: Legal Indicators Interaction Terms, 1981 to 1998

	Lagged Turnover		Interaction		Legal Indicator				Averaging	
Legal Index:	β_1	p value	β_2	p value	β_3	p value	R^2	Obs.	Period	
Creditor	-0.009	0.457	0.537	0.021	-0.093	0.659	0.541	59	9	No
Creditor	-0.012	0.293	0.606	0.001	-0.179	0.317	0.556	66	9	Yes
Creditor	0.003	0.732	0.373	0.140	0.120	0.691	0.478	95	6	No
Creditor	0.001	0.887	0.420	0.049	0.042	0.866	0.487	104	6	Yes
Creditor	0.003	0.735	0.327	0.179	0.130	0.655	0.375	196	3	No
Creditor	0.001	0.924	0.384	0.061	0.052	0.828	0.374	213	3	Yes
Enforce	-0.013	0.314	0.561	0.052	0.397	0.170	0.525	61	9	No
Enforce	-0.001	0.931	0.237	0.177	0.280	0.151	0.501	68	9	Yes
Enforce	0.009	0.562	0.130	0.695	0.521	0.018	0.479	98	6	No
Enforce	0.010	0.396	0.033	0.852	0.388	0.056	0.468	107	6	Yes
Enforce	0.006	0.550	0.241	0.388	0.513	0.012	0.369	202	3	No
Enforce	0.009	0.261	0.070	0.643	0.398	0.026	0.358	219	3	Yes
Account	-0.013	0.354	0.440	0.179	0.004	0.867	0.453	58	9	No
Account	0.005	0.707	-0.027	0.916	0.016	0.507	0.420	60	9	Yes
Account	0.014	0.415	-0.201	0.624	0.035	0.147	0.447	91	6	No
Account	0.015	0.225	-0.255	0.229	0.036	0.112	0.443	94	6	Yes
Account	0.008	0.457	-0.006	0.985	0.029	0.163	0.366	186	3	No
Account	0.012	0.151	-0.195	0.281	0.033	0.099	0.355	192	3	Yes
Legal Composite	0.007	0.456	-0.099	0.661	0.724	0.127	0.456	56	9	No
Legal Composite	0.004	0.703	-0.057	0.791	0.588	0.160	0.427	58	9	Yes
Legal Composite	0.015	0.117	-0.468	0.075	1.416	0.001	0.488	88	6	No
Legal Composite	0.010	0.281	-0.412	0.132	1.218	0.005	0.459	91	6	Yes
Legal Composite	0.010	0.143	-0.242	0.310	1.185	0.003	0.402	180	3	No
Legal Composite	0.008	0.277	-0.204	0.410	1.033	0.009	0.380	186	3	Yes

Table 2C (continued)

	Lagged Turnover		Interaction		Legal Indicator				Averaging	
Legal Index:	β_1	p value	β_2	p value	β_3	p value	R^2	Obs.	Period	
Rule of Law	-0.015	0.309	0.583	0.065	0.103	0.571	0.493	61	9	No
Rule of Law	-0.003	0.815	0.255	0.156	0.056	0.616	0.481	68	9	Yes
Rule of Law	0.006	0.708	0.184	0.588	0.234	0.167	0.459	98	6	No
Rule of Law	0.008	0.542	0.073	0.699	0.145	0.310	0.453	107	6	Yes
Rule of Law	0.005	0.612	0.261	0.349	0.211	0.159	0.354	202	3	No
Rule of Law	0.008	0.360	0.099	0.532	0.141	0.257	0.347	219	3	Yes
Expropriation Risk	-0.021	0.087	0.509	0.057	0.713	0.070	0.572	61	9	No
Expropriation Risk	-0.005	0.664	0.173	0.304	0.592	0.064	0.536	68	9	Yes
Expropriation Risk	0.009	0.558	-0.007	0.983	0.844	0.001	0.502	98	6	No
Expropriation Risk	0.011	0.353	-0.066	0.695	0.715	0.006	0.491	107	6	Yes
Expropriation Risk	0.006	0.541	0.103	0.711	0.877	0.001	0.385	202	3	No
Expropriation Risk	0.010	0.230	-0.039	0.790	0.765	0.001	0.374	219	3	Yes
Bureaucracy Efficiency	-0.014	0.218	0.574	0.047	0.230	0.073	0.520	61	9	No
Bureaucracy Efficiency	-0.009	0.414	0.438	0.047	0.253	0.044	0.518	62	9	Yes
Bureaucracy Efficiency	0.008	0.644	0.148	0.677	0.224	0.177	0.452	97	6	No
Bureaucracy Efficiency	0.012	0.440	0.022	0.943	0.246	0.138	0.454	98	6	Yes
Bureaucracy Efficiency	0.005	0.609	0.287	0.319	0.286	0.050	0.357	199	3	No
Bureaucracy Efficiency	0.009	0.374	0.152	0.541	0.313	0.030	0.356	201	3	Yes
Business Regulation	0.014	0.497	0.049	0.895	0.222	0.496	0.294	65	9	No
Business Regulation	0.004	0.761	0.268	0.206	0.272	0.445	0.344	88	9	Yes
Business Regulation	0.016	0.291	-0.019	0.944	0.289	0.437	0.362	108	6	No
Business Regulation	0.006	0.709	0.175	0.437	0.540	0.189	0.379	140	6	Yes
Business Regulation	0.012	0.226	0.108	0.636	0.277	0.351	0.285	223	3	No
Business Regulation	0.005	0.624	0.197	0.260	0.474	0.162	0.330	290	3	Yes
Property Rights	0.015	0.469	0.011	0.976	0.433	0.135	0.308	65	9	No
Property Rights	0.005	0.716	0.206	0.321	0.607	0.024	0.369	88	9	Yes
Property Rights	0.019	0.230	-0.086	0.762	0.468	0.242	0.370	108	6	No
Property Rights	0.008	0.609	0.118	0.574	0.711	0.050	0.400	140	6	Yes
Property Rights	0.012	0.213	0.075	0.749	0.286	0.367	0.285	223	3	No
Property Rights	0.006	0.546	0.134	0.418	0.616	0.041	0.338	290	3	Yes

Table 3: Alternative Functional Forms, Liquidity and Growth, 1981-1998

Averaging Period	'Inconsequential' Included?	Functional Form:	R^2	β_1	p value	β_2	p value	Max Turnover
9 year	No	Linear	0.3848	0.017	0.084			
9 year	No	Linear-Log	0.3862	0.315	0.077			
9 year	No	Third Degree	0.3595	7.29E-07	0.609			
9 year	No	Second Degree	0.3678	1.36E-04	0.287			
9 year	*No*	*Quadratic*	*0.3875*	*-3.35E-04*	*0.256*	*0.041*	*0.078*	*61.307*
6 year	*No*	*Linear*	*0.3790*	*0.016*	*0.022*			
6 year	No	Linear-Log	0.3664	0.238	0.095			
6 year	No	Third Degree	0.3653	7.39E-07	0.108			
6 year	No	Second Degree	0.3732	1.27E-04	0.042			
6 year	No	Quadratic	0.3737	-6.09E-06	0.966	0.017	0.295	1379.951
3 year	No	Linear	0.2962	0.018	0.002			
3 year	No	Linear-Log	0.2896	0.373	0.009			
3 year	No	Third Degree	0.2768	3.62E-07	0.138			
3 year	No	Second Degree	0.2833	8.83E-05	0.032			
3 year	*No*	*Quadratic*	*0.2982*	*-1.22E-04*	*0.186*	*0.034*	*0.011*	*139.849*
9 year	Yes	Linear	0.3568	0.031	0.009			
9 year	*Yes*	*Linear-Log*	*0.3735*	*0.484*	*0.002*			
9 year	Yes	Third Degree	0.3255	2.15E-06	0.234			
9 year	Yes	Second Degree	0.3351	2.78E-04	0.082			
9 year	Yes	Quadratic	0.3597	-4.24E-04	0.221	0.059	0.023	69.308
6 year	*Yes*	*Linear*	*0.3414*	*0.027*	*0.001*			
6 year	Yes	Linear-Log	0.3349	0.422	0.002			
6 year	Yes	Third Degree	0.3277	1.44E-06	0.007			
6 year	Yes	Second Degree	0.3353	2.22E-04	0.002			
6 year	Yes	Quadratic	0.3378	3.31E-05	0.839	0.024	0.195	-355.415
3 year	Yes	Linear	0.2297	0.025	0.000			
3 year	*Yes*	*Linear-Log*	*0.2315*	*0.507*	*0.000*			
3 year	Yes	Third Degree	0.2097	5.64E-07	0.056			
3 year	Yes	Second Degree	0.2166	1.31E-04	0.008			
3 year	Yes	Quadratic	0.2313	-1.45E-04	0.178	0.043	0.004	149.448

Table 4: Private Investment Regressions (GLS), 1981-1998, Sample Divisions

Regression	**6.1**		**6.2**		**6.3**	
Observations	403		404		400	
Cases	26		26		26	
R^2	0.339		0.304		0.341	
Sample Income	Total		Total		Total	
	β	p value	β	p value	β	p value
Real Return	*0.066*	*0.000*			*0.066*	*0.000*
Lagged Real Return			*0.015*	*0.302*	*0.019*	*0.199*
Lagged Growth Rate	0.005	0.031	0.004	0.109	0.005	0.029
Lagged Real Credit Growth Rate	0.289	0.000	0.301	0.000	0.281	0.000
Lagged Government Spending	0.000	0.840	-0.001	0.604	0.000	0.946
Lagged Reserves to GDP	0.004	0.002	0.004	0.002	0.004	0.002
Intercept	-0.095	0.108	-0.104	0.083	-0.097	0.100

Regression	**7.1**		**7.2**		**7.3**	
Observations	147		149		147	
Cases	10		10		10	
R^2	0.429		0.450		0.476	
Sample Income	High		High		High	
	β	p value	β	p value	β	p value
Real Return	*0.050*	*0.122*			*0.067*	*0.036*
Lagged Real Return			*0.095*	*0.003*	*0.104*	*0.001*
Lagged Growth Rate	0.015	0.000	0.015	0.000	0.016	0.000
Lagged Real Credit Growth Rate	0.024	0.683	0.042	0.467	0.052	0.363
Lagged Government Spending	0.001	0.632	0.001	0.691	0.001	0.543
Lagged Reserves to GDP	0.000	0.830	0.000	0.999	0.000	0.793
Intercept	0.051	0.502	0.003	0.966	0.016	0.834

Table 4 (continued)

Regression	**8.1**		**8.2**		**8.3**	
Observations	256		255		253	
Cases	16		16		16	
R^2	0.364		0.336		0.363	
Sample Income	Low		Low		Low	
	β	p value	β	p value	β	p value
Real Return	*0.058*	*0.002*			*0.058*	*0.002*
Lagged Real Return			*0.003*	*0.889*	*0.008*	*0.674*
Lagged Growth Rate	0.002	0.517	0.000	0.873	0.002	0.501
Lagged Real Credit Growth Rate	0.357	0.000	0.383	0.000	0.352	0.000
Lagged Government Spending	-0.002	0.623	-0.005	0.336	-0.002	0.704
Lagged Reserves to GDP	0.005	0.009	0.005	0.012	0.005	0.009
Intercept	-0.067	0.429	-0.054	0.537	-0.073	0.400

Table 5: Private Investment Regressions: Interaction Terms, 1981-1998
(GDP per capita and Country Credit)

Regression	**9.1**		**9.2**		**10.1**		**10.2**	
Observations	401		404		403		404	
Cases	26		26		26		26	
R^2	0.342		0.325		0.339		0.312	
Sample Income	Total		Total		Total		Total	
	β	p value	β	p value	β	p value	β	p value
Real Return	*0.062*	*0.000*			*0.065*	*0.000*		
Lagged Real Return			*-0.015*	*0.343*			*-0.004*	*0.812*
Valuation × GDP	*0.001*	*0.662*						
Lagged Valuation × GDP			*0.011*	*0.000*				
Valuation × Country Credit					*0.001*	*0.869*		
Lagged Valuation × Country Credit							*0.016*	*0.038*
Real GDP per capita	0.000	0.773						
Lagged Real GDP per capita			0.000	0.059				
Country Credit					0.000	0.674		
Lagged Country Credit							-0.001	0.171
Lagged Growth Rate	0.005	0.046	0.003	0.157	0.005	0.036	0.004	0.127
Lagged Real Credit Growth Rate	0.285	0.000	0.275	0.000	0.284	0.000	0.294	0.000
Lagged Government Spending	-0.001	0.758	0.000	0.878	0.000	0.859	-0.001	0.704
Lagged Reserves to GDP	0.004	0.002	0.003	0.033	0.004	0.002	0.004	0.010
Intercept	-0.054	0.406	-0.099	0.150	-0.111	0.109	-0.072	0.334

Table 5 (continued)
Financial Development Indicators: Turnover, Market Capitalisation, Financial Activity

Regression	**11.1**		**11.2**		**12.1**		**12.2**		**13.1**		**13.2**	
Observations	396		394		399		398		393		396	
Cases	26		26		26		26		26		26	
R^2	0.343		0.311		0.342		0.316		0.353		0.326	
Sample Income	Total		Total		Total		Total		Total		Total	
	β	p value	β	p value	β	p value	β	p value	β	p value	β	p value
Real Return	*0.074*	*0.000*			*0.065*	*0.000*			*0.065*	*0.000*		
Lagged Real Return			*0.012*	*0.461*			*0.001*	*0.927*			*0.017*	*0.263*
Valuation × Turnover	*-0.009*	*0.279*										
Lagged Valuation × Turnover			*0.000*	*0.955*								
Valuation × Market Size					*0.002*	*0.805*						
Lagged Valuation × Market Size							*0.012*	*0.136*				
Valuation× Financial Activity									*-0.008*	*0.401*		
Lagged Valuation × Financial Activity											*-0.019*	*0.053*
Turnover	0.000	0.560										
Lagged Turnover			0.000	0.556								
Market Size					0.000	0.489						
Lagged Market Size							0.000	0.318				
Financial Activity									-0.009	0.138		
Lagged Financial Activity											-0.015	0.018
Lagged Growth Rate	0.005	0.035	0.004	0.130	0.005	0.033	0.004	0.086	0.005	0.035	0.005	0.033
Lagged Real Credit Growth Rate	0.289	0.000	0.310	0.000	0.292	0.000	0.287	0.000	0.307	0.000	0.299	0.000
Lagged Government Spending	-0.001	0.708	-0.002	0.475	-0.001	0.707	-0.002	0.478	0.000	0.848	-0.001	0.704
Lagged Reserves to GDP	0.004	0.002	0.004	0.002	0.005	0.001	0.005	0.003	0.004	0.001	0.005	0.001
Intercept	-0.095	0.134	-0.112	0.087	-0.089	0.133	-0.108	0.085	-0.046	0.490	-0.030	0.658

Table 5 (continued)
(Legal Proxies: Creditor, Enforcement, Accounting Standards, Legal Composite)

Regression	**14**		**15**		**16**		**17**	
Observations	363		379		348		332	
Cases	23		24		22		21	
R^2	0.389		0.356		0.408		0.430	
Sample Income								
	β	p value	β	p value	β	p value	β	p value
Lagged Real Return	0.017	0.230	0.022	0.139	-0.008	0.619	0.005	0.730
Lagged Valuation×Creditor	-0.013	0.251						
Creditor	-0.013	0.292						
Lagged Valuation×Enforce			-0.006	0.503				
Enforce			-0.005	0.506				
Lagged Valuation×Account					0.019	0.009		
Account					0.001	0.528		
Lagged Valuation×Legal Composite							-0.009	0.198
Legal Composite							-0.023	0.475
Lagged Growth Rate	0.007	0.004	0.007	0.004	0.009	0.000	0.012	0.000
Lagged Real Credit Growth Rate	0.342	0.000	0.303	0.000	0.313	0.000	0.275	0.000
Lagged Government Spending	0.001	0.653	0.001	0.766	-0.003	0.353	0.003	0.461
Lagged Reserves to GDP	0.003	0.034	0.004	0.002	0.004	0.002	0.003	0.136
Intercept	-0.156	0.017	-0.103	0.151	-0.189	0.059	-0.215	0.019

Table 5 (continued)
(Legal Proxies: Rule of Law, Expropriation Risk, Bureaucratic Efficiency, Business Regulation, Property Rights)

Regression	**18**		**19**		**20**		**21**		**22**	
Observations	379		379		379		379		379	
Cases	24		24		24		24		24	
R^2	0.358		0.355		0.355		0.366		0.358	
Sample Income										
	β	p value	β	p value	β	p value	β	p value	β	p value
Lagged Real Return	0.023	0.123	0.021	0.161	0.021	0.160	0.022	0.134	0.022	0.127
Lagged Valuation×Rule of Law	-0.009	0.343								
Rule of Law	-0.006	0.297								
Lagged Valuation×Expropiration Risk			-0.004	0.709						
Expropriation Risk			-0.004	0.681						
Lagged Valuation×Bureuacratic Efficiency					-0.005	0.598				
Bureaucratic Efficiency					0.003	0.571				
Lagged Valuation×Business Regulation							-0.018	0.041		
Business Regulation							-0.025	0.097		
Lagged Valuation×Property Rights									-0.014	0.132
Property Rights									0.002	0.904
Lagged Growth Rate	0.007	0.003	0.007	0.004	0.007	0.004	0.007	0.004	0.007	0.004
Lagged Real Credit Growth Rate	0.299	0.000	0.304	0.000	0.299	0.000	0.299	0.000	0.297	0.000
Lagged Government Spending	0.001	0.663	0.000	0.857	0.000	0.968	0.000	0.959	0.000	0.935
Lagged Reserves to GDP	0.004	0.001	0.004	0.002	0.004	0.002	0.005	0.001	0.004	0.002
Intercept	-0.109	0.092	-0.101	0.251	-0.141	0.035	-0.050	0.524	-0.137	0.115

Table 6: Stock Market Liberalisation and Private Investment Growth[17]

Regression	Liberalisation Proxy	β	p value	R^2	Obs.
23.01	Liberalisation (Henry, 2000)	-0.108	0.129	0.369	253
23.02	Post Liberalisation (1 year) (Henry, 2000)	-0.092	0.189	0.388	240
23.03	Post Liberalisation (2 year) (Henry, 2000)	0.080	0.245	0.418	225
23.04	Liberalisation (Bekaert and Harvey, 1998)	-0.028	0.669	0.363	253
23.05	Post Liberalisation (1 year) (Bekaert and Harvey, 1998)	-0.149	0.010	0.402	240
23.06	Post Liberalisation (2 year) (Bekaert and Harvey, 1998)	0.007	0.904	0.414	225
23.07	Liberalisation (Kim and Singal, 1999)	-0.047	0.511	0.364	253
23.08	Post Liberalisation (1 year) (Kim and Singal, 1999)	-0.148	0.029	0.397	240
23.09	Post Liberalisation (2 year) (Kim and Singal, 1999)	0.008	0.898	0.414	225
23.10	Liberalisation (Levine and Zervos, 1998b)	0.015	0.814	0.363	253
23.11	Post Liberalisation (1 year) (Levine and Zervos, 1998b)	-0.072	0.289	0.387	240
23.12	Post Liberalisation (2 year) (Levine and Zervos, 1998b)	-0.091	0.190	0.419	225

[17] All regressions include the contemporaneous and lagged valuation changes as well as standard control variables.

References

Agénor, Pierre-Richard and Peter Montiel (1996), *Development Macroeconomics,* Princeton: Princeton University Press.

Barro, Robert J. (1990), "The Stock Market and Investment," *Review of Financial Studies*, Vol. 3, pp. 115-131.

Beck. T. and R. Levine (2000), "New Firm Formation and Industry Growth: Does Having a Market- or Bank-Based System Matter?" (May).

Bekaert, G. (1995), "Market Integration and Investment Barriers in Emerging Equity Markets," *World Bank Economic Review*, Vol. 9 No. 1, pp. 75-107.

Bekaert G. and C. Harvey (1998), "Capital Flows and the Behaviour of Emerging Market Equity Returns," NBER Working Paper Series No. 6669.

Bekaert G. and C. Harvey (2000), "Foreign Speculators and Emerging Equity Markets," *Journal of Finance* (April).

Blomström, M., R. E. Lipsey, and M. Zejan (1992), "What Explains Developing Country Growth," NBER Working Paper Series No. 4132.

Borensztein, E., J. De-Gregorio, Lee, J. W., (1998), "How Does Foreign Direct Investment Affect Economic Growth?," *Journal of International Economics*, Vol. 45 No. 1 (June), pp. 115-35.

Durham, J. B. (1999), "Economic Growth and Political Regimes," *Journal of Economic Growth*, Vol. 4 No. 1, pp. 81-111.

Durham, J. B. (2000a), "Which Anomalies are Robust in Emerging and Developed Markets?" *Emerging Markets Quarterly*, (Fall), pp. 50-67.

Durham, J. B. (2000b), "Emerging Stock Market Liberalisation, Total Returns, and Real Effects", Queen Elizabeth House Working Paper, Oxford University.

Edwards, S. (1995), "Why Are Savings Rates So Different Across Countries? An International Comparative Analysis," NBER Working Paper Series No. 5097.

FitzGerald, E.V.K (1999a), "Policy Issues in Market Based and Non Market Based Measures to Control the Volatility of Portfolio Investment," Queen Elizabeth House Working Paper No. 26, University of Oxford.

FitzGerald, E.V.K (1999b), "Short-Term Capital Flows, The Real Economy and Income Distribution in Developing Countries," Queen Elizabeth House Working Paper No. 8, University of Oxford.

Gerschenkron, Alexander (1962), *Economic Backwardness in Historical Perspective: A Book of Essays*, Harvard University Press.

Green, Christopher, Victor Murinde, Rose Ngugi (2000), "Key Microstructure and Policy Issues for Emerging Stock Markets: What Have We Learned?" Finance and Development Research Programme Working Paper.

Grier, K. and G. Tullock (1989), "An Empirical Analysis of Cross-National Economic Growth, 1951-1980," *Journal of Monetary Economics*, Vol. 24 No. 2 (September), pp. 259-76.

Harvey, Campbell (1995), "Predictable Risk and Returns in Emerging Markets," Review of Financial Studies, Vol. 8 No. 3, pp. 773-816.

Henry, P. H. (2000a), "Do Stock Market Liberalisations Cause Investment Booms?" *Journal of Financial Economics*.

Henry, P. H. (2000b), "Stock Market Liberalisation, Economic Reform, and Emerging Market Equity Prices," *Journal of Finance*, (April).

Knight, M. (1998), "Developing Countries and the Globalisation of Financial Markets," *World Development*, Vol. 26 No. 7, pp. 1185-1200.

Kormendi, R. and P. Meguire (1985), "Macroeconomic Determinants of Growth: Cross-Country Evidence," *Journal of Monetary Economics*, Vol. 16 No. 2 (September), pp. 141-63.

Levine, R., and D. Renelt (1992) "A Sensitivity Analysis Of Cross-Country Growth Regressions," *American Economic Review*, Vol. 82, pp. 942-63.

Levine. R. and S. Zervos (1998a), "Stock Markets, Banks, and Economic Growth," *American Economic Review*, Vol. 88 No. 3 (June), pp. 537-558.

Levine. R. and S. Zervos (1998b), "Global Capital Liberalisation and Stock Market Development," *World Development*, Vol. 26 No. 7, pp. 1169-1183.

Rogoff, K. (1999), "International Institutions for Reducing Global Financial Instability," *Journal of Economic Perspectives*, Vol. 13 No. 4 (Fall), pp. 21-42.

Sala-i-Martin, X. (1997a), "I Just Ran Two Million Regressions," *American Economic Review*, Vol. 87 (January), pp. 178-183.

Sala-i-Martin, X. (1997b), "I Just Ran Four Million Regressions," NBER Working Papers Series 6252.

Sandmo, A. (1970), "The Effect of Uncertainty on Saving Decisions," *Review of Economic Studies*, pp. 353-360.

Tesar, L. L. and I. M. Werner (1995), "U.S. Equity Investment in Emerging Market Stocks," *World Bank Economic Review*, Vol. 9 No. 1, pp. 109-129.