

# Capital markets and capital allocation: Implications for economies in transition\*

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## Abstract

Recent work showing that a sounder financial system is associated with faster economic growth has important implications for transition economies. Stock prices in developed economies move in highly firm-specific ways that convey information about changes in firms' marginal value of investment. This information facilitates the rapid flow of capital to its highest value uses. In contrast, stock prices in low-income countries tend to move up and down *en masse*, and thus are of scant use for microeconomic capital allocation. Some transition economy markets are coming to resemble those of developed economies, others those of low-income countries. Stock return asynchronicity is highly correlated with the strength of private property rights in general and public shareholders' rights in particular. Other recent work suggests that small entrenched elites in low-income countries preserve their sweeping control over the corporate sectors of their economies by using political influence to undermine the financial system and deprive entrants of capital. The lack of cross-sectional independence in some transition economies' stock returns may be a warning of such *economic entrenchment*. Sound property rights, solid shareholder rights, stock market transparency, and capital account openness appear to check this, and thus contribute to efficient capital allocation and economic growth.

JEL classifications: O16, P2, F21.

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## 1. Introduction

Transition economies are the most important experiment in contemporary economics. Since China's journey away from Maoism and India's abandonment of Nehruvian socialism now qualify them as honorary transition economies, the welfare of nearly half of the world's population depends on its success. But these pivotal transitions also provide a magnificent chance for economists to understand better how all economies work.

Individual stock prices move quite independently of each other in most high income countries, but in low income countries they tend to rise and fall *en masse*. Regressions show that highly synchronous individual stock returns correlate with slow growth in per capita gross domestic product (GDP) and growth in total factor productivity. These results are consistent with other work suggesting that highly synchronous returns lead to relatively inefficient microeconomic capital allocation, what Tobin (1982) calls a functionally inefficient stock market.

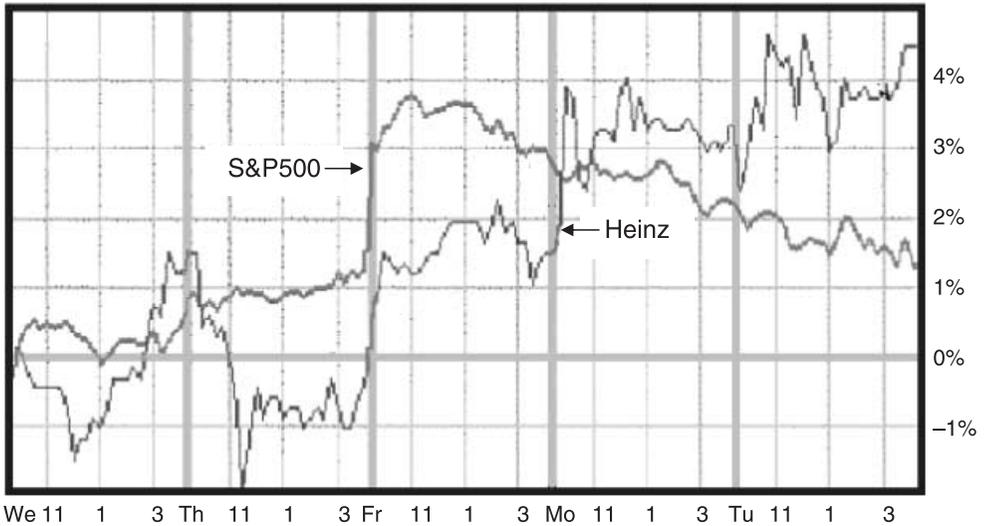
Unfortunately, the stock markets of some transition economies resemble those of low income countries, in that stock prices seem to incorporate little information about individual firms. This calls into question the social value of stock markets in these countries and suggests that reforms to augment their performance should be a priority. Fortunately, we have an increasingly clear sense of what those reforms involve: better general property rights protection, better specific protection of investors' property rights, corporate transparency, simplified corporate ownership structures, and capital account openness.

## 2. The functional form of the efficient markets hypothesis

Tobin (1982) argues that much discussion regarding stock market efficiency misses the point. Finance economists distinguish *weak*, *strong* and *semi-strong* forms of the efficient markets hypothesis according to whether or not portfolio managers can 'beat the market' using extant information about prices and volumes, all existing information, or all existing publicly available information. While these definitions may be of concern to financial managers, Tobin suggests that whether or not the stock market allocates capital to its highest value uses is of more general interest. He therefore proposes the *functional form of the efficient markets* hypothesis as holding if stock prices allocate capital economically efficiently. This definition need be only loosely related to the more traditional ones.

Functional efficiency is important because, as Hayek (1945) argues, rapid growth requires that inputs, most notably capital, be allocated to produce the most valuable outputs. As conditions change and new information arrives, the values of different uses for capital and other resources change. In correctly predicting the demise of central planning, Hayek (1945) argues that, as the scale of economic activity grows, markets perform increasingly more functionally efficiently than

**Figure 1. Stock price movements**  
**H. J. Heinz stock and the S&P 500 index over the five trading days leading up to**  
**Tuesday, Dec. 7 1999**



Source: Wall Street Journal electronic edition.

bureaucracies, to use Tobin's terms. A simple example comparing a more functionally efficient stock market, the United States, with a more functionally inefficient one, mainland China, illustrates this importance.

Figure 1 compares the Standard and Poor's (S&P) 500 index with the stock price of Heinz, a ketchup company, during the five trading days prior to December 7th 1999. On December 3rd, Heinz rises, but in step with the S&P 500. Consequently, this is not a signal of superior management. But on December 6th Heinz rises again and the S&P 500 does not. This jump *does* reflect favourably on Heinz management. Closer investigation reveals that Heinz's restructuring plan, Operation Excel, generated a better than expected earnings announcement that day.<sup>1</sup>

This illustrates a functionally efficient market. Firm-specific changes in Heinz's prices show that investors distinguish good firms from bad. This lets the market channel capital to good firms and away from problem firms, for a higher stock price Heinz gets more money for any new shares it issues. This transparency also affects managers, for a falling share price means they must adjust their strategy or risk a takeover by a raider who thinks he can do better.

<sup>1</sup> See analysis in the *Wall Street Journal*, December 7th 1999.

Many emerging stock markets do not seem to work this way. On July 31st 2001, the *Wall Street Journal* reported on a near bankrupt Chinese company, Zhengzhou Baiwen. Its debts were almost double its assets, and its creditors were pressing for liquidation, but its stock was surging effervescently. The *Wall Street Journal* reported that, 'investors continue to be mostly in the dark about the company, whose shares finished Friday at 76 cents, up 31 percent from a month ago and up 56 percent from a year ago. Securities regulators say that with a dozen listed companies teetering on the edge of bankruptcy, news of Baiwen's woes could lead to a selling binge, undermining the government's plan to bail out its money-losing state sector by listing even more of it on domestic stock markets. . . . [The authorities] have imposed a news blackout on Baiwen in the Chinese press, even as the company's stock surges and its market capitalization approaches \$140 million.'

Baiwen, along with other insolvent companies, benefited from a general run-up in Chinese stocks, which many observers suspect was 'primed' by state officials. The Chinese market failed to distinguish good stocks from bad. Baiwen, though bankrupt, was actually in a position to obtain new funds by issuing additional high priced stock. Firm-specific information was not reflected in stock prices. In this setting, the equity market is (hopefully) only a sideshow in capital allocation.

Such stories, and they are not rare, raise concerns about the functional efficiency of stock markets in transition economies. If the prices of different stocks rise and fall independently, as in the United States, the stock market distinguishes changes in the value of capital in one firm or industry from changes in its value elsewhere, at least potentially. But if the prices of different stocks rise and fall in tandem, as in China, the stock market can only signal changes in the aggregate value of capital. And recent work in behavioural finance suggests that even this may overstate some stock markets' capabilities, for market-wide fluctuations may often reflect investor sentiment – what Keynes called *animal spirits* – more than macroeconomic information. Thus, the cross-sectional independence of individual stock returns is a useful indicator of the potential functional efficiency of a stock market.

### 3. A paucity of firm-specific information in emerging stock markets

If stock prices reflect firm level information, as with Heinz, companies' stock returns should not always move 'in synch'. Morck, Yeung and Yu (2000) decompose the variation in individual equity returns across countries to create a synchronicity index for each country. They first regress the 1995 biweekly returns of each stock in the country on contemporaneous domestic and world market returns. That is, they estimate

$$r_{i,j,t} = \alpha_i + \beta_{1,i} r_{m,j,t} + \beta_{2,i} [r_{US,t} + e_{j,t}] + \varepsilon_{i,j,t} \quad (1)$$

with  $r_{i,j,t}$  the total return of stock  $i$  in country  $j$  during period  $t$ ;  $r_{m,j,t}$  the domestic total market return calculated using all stocks *except* stock  $i$ ; and  $r_{US,j,t}$  the US total

market return, converted to local currency using an exchange rate adjustment factor  $e_{i,j,t}$  as a proxy for the world return. For each stock, this yields an  $R^2$  – the fraction of that stock’s return variation that is correlated with the market returns. The average of these for all firms in the country, weighted by the total variation of each stock’s return, is a *returns synchronicity index*

$$R_j^2 = \frac{\sum_{i \in j} R_{i,j}^2 \times SST_{i,j}}{\sum_{i \in j} SST_{i,j}} \tag{2}$$

A value of  $R_j^2$  near one means individual stocks in country  $j$  move mainly with market returns; a value near zero means they move more independently.

### 3.1 The phenomenon

Figure 2 shows that stocks in rich countries move quite independently, while those in emerging and transition economies fluctuate *en masse*. The correlation between *per capita* GDP and synchronicity is  $-0.36$ , and is statistically significant at a 0.001 confidence level.<sup>2</sup>

A market with fewer stocks should exhibit greater synchronicity because each stock is a larger fraction of the market. This is clearly not driving our results. First, developed countries like New Zealand, Ireland, and Denmark have fewer listed stocks than many developing countries, like China and Malaysia, yet they exhibit much lower synchronicity. Second, the market return used to calculate each stock’s  $R^2$  excludes the stock in question.

A few exceptions are notable. Japan, Spain and Italy all have synchronicity similar to low-income economies. These are economies in which general property rights are well protected, but public shareholders’ property rights are not. We return to this point below.

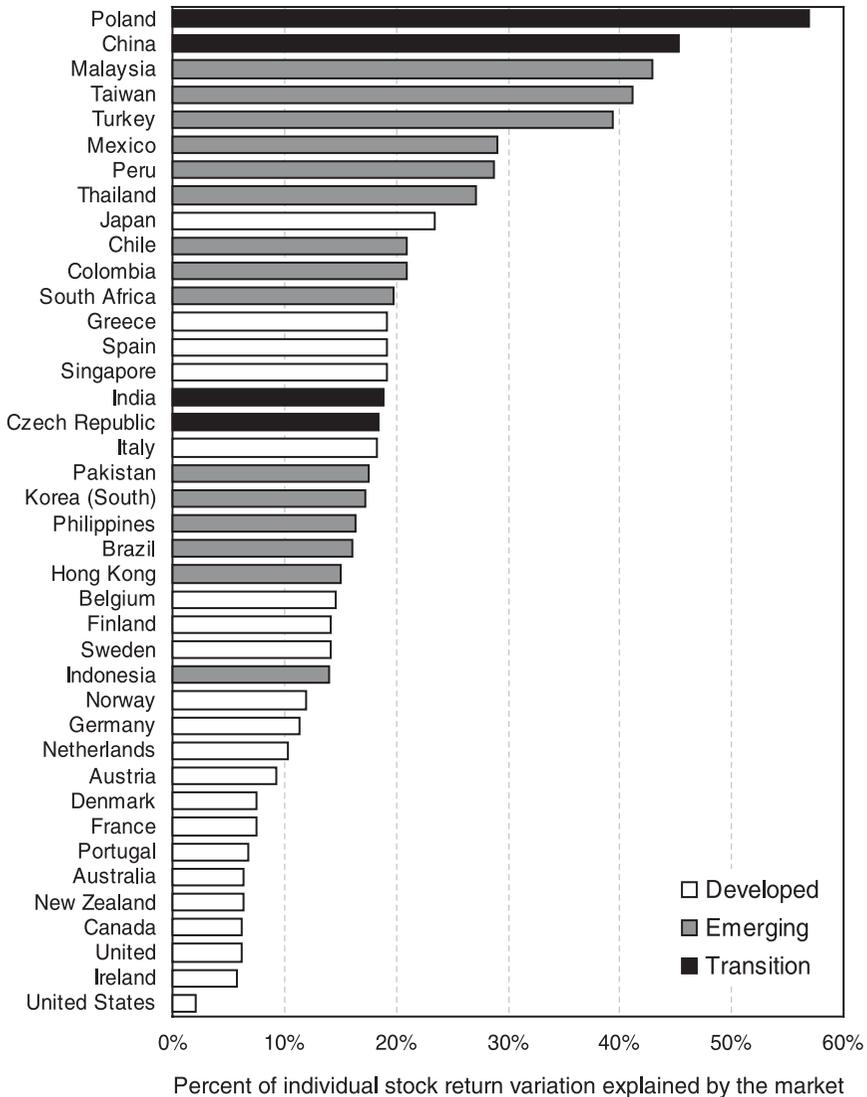
### 3.2 Dismissing a list of obvious explanations

The general correlation between return synchronicity and development could reflect a systematic difference between the structures of developed and developing economies. Any factor that causes the fundamental values of firms in lower income economies to move more synchronously than those of firms in higher income countries is a candidate. For example, less developed economies might have less stable

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<sup>2</sup> Morck *et al.* (2000) examine other synchronicity measures. They count how many stocks move in the same direction in an average week,  $f_j = \frac{1}{T} \sum_t \max[\eta_{jt}^{up}, \eta_{jt}^{down}] / (\eta_{jt}^{up} + \eta_{jt}^{down})$ , in country  $j$  during week  $t$ , with  $\eta_{jt}^{up}$  and  $\eta_{jt}^{down}$  the number of stocks moving up and down, respectively. They average the squared simple pair-wise correlations,  $\frac{1}{n(n-1)} \sum_{i=1}^n \sum_{k \neq i} \rho_{ik}^2$  of the returns of all possible pairings of 30 randomly chosen stocks in each country. All these indices and that described here behave very similarly. To save space, we focus on that in (2).

**Figure 2. Stock return synchronicity in various countries**  
 Stock price synchronicity measured by the average percent of total biweekly firm-level return variation in 1995 explained by local and US value-weighted market indexes. Stock returns and indexes include dividend payments, and are obtained from DataStream



macroeconomic policies, less diversified economies, more dependence on a few large firms, or more geographically concentrated economic activity that is more vulnerable to local 'Acts of God'. Any of these factors might cause firms in poorer countries to have more synchronous fundamental values.

Morck, Yeung, and Yu (2000) construct proxies for all these. They also directly estimate the synchronicity of firms' cash flows (constructed analogously to the returns synchronicity index  $R_j^2$ ) to capture fundamentals' synchronicity directly. To permit OLS regressions, they logistically transform their synchronicity thus

$$\varnothing_j = \log\left(\frac{R_j^2}{1 - R_j^2}\right). \quad (3)$$

Regressions of  $\varnothing_j$  on *per capita* GDP and all these controls, plus the log of the number of listings still show synchronicity highly significantly negatively correlated with *per capita* GDP. These results withstand a battery of robustness checks.<sup>3</sup> A structural explanation seems unlikely, and another approach is required.

### 3.3 The surprising importance of economic institutions

The Heinz example illustrates how information changes share prices. Finance theory posits that risk arbitrageurs spend resources uncovering proprietary information and then earn an acceptable return using this information to trade against less informed investors. Grossman and Stiglitz (1980), Shleifer and Vishny (1997), and many others argue that this capitalizes information into share prices. Roll (1988) suggests that firm-specific return variation is largely due to such trading, while market related variation is more plausibly due to public announcements. Returns might therefore be less synchronous where and when informed arbitrageurs are more active.

Might a dearth of informed arbitrage underlie the highly synchronous returns in emerging and transition markets? Why might informed arbitrage be less economically viable in these countries? Since the main differences between these and developed economies are institutions, this seems like a good starting point.

First, politics affects firms, and political factors may be more important and harder to predict in emerging and transition economies. Politicians can directly influence a company's earnings by open legislation, licensing requirements, repudiating commitments, and manipulating government projects, fees and taxes. The politically connected can confiscate corporate earnings with the help of their

<sup>3</sup> The robustness checks include: dropping outliers, using data from other years (1993 and 1994), excluding countries with contemporaneous macroeconomic crises (first Mexico and then all of Latin America) from their sample, using alternative proxies for country-wide and macroeconomic instability (variance in GDP growth, variance in inflation, etc.) and adding other variables such as a dummy capturing dependence on natural resources extraction.

government friends. Outsiders would find it hard to reliably gauge future earnings, and insiders have better ways to make money than risk arbitrage. Even if outsiders could predict corporate earnings, their property rights to those earnings are uncertain. Higher earnings might disappear into the pockets of the politically connected. For these reasons, firm-specific arbitrage is relatively unattractive where governments fail to honour private property rights, and informed trading is correspondingly thin.

If weak property rights discourage informed risk arbitrage, the proportion of uninformed players rises. De Long *et al.* (1989, 1990) argue that uninformed traders respond to *sentiment*, irrational optimism or pessimism as in Keynesian animal spirits, and that their waves of buying and selling induce market-wide price fluctuations unrelated to fundamentals. Governments might even foment such waves, as with the Chinese company Baiwen. De Long *et al.* propose that this added systematic risk can drive informed traders out, leaving the market to *noise traders*. If insufficient property rights' protection also discourages informed arbitrage, this could also let noise traders dominate the market. The synchronicity in emerging and transition economies might then reflect waves of uninformed sentiment.

Second, even were investors protected from the state, they might remain at the mercy of powerful corporate insiders. This might again render informed arbitrage uneconomical. La Porta *et al.* (1998) show that public shareholder rights are indeed poorly protected in many countries that otherwise generally protect private property rights well. Potential arbitrageurs would see little point in gathering and processing information to estimate firm-specific fundamentals if any surplus is siphoned off by insiders. Again, stocks would fluctuate mainly due to public announcements of macroeconomic information or noise trader sentiment.

Morck, Yeung, and Yu (2000) regress  $\emptyset_j$  on *per capita* GDP, the structural control variables listed above, the log of the number of listings, and variables that measure property rights protection in general and public shareholders' property rights in particular. To gauge the former, they use a *good government index* – the sum of indexes measuring (i) government corruption; (ii) the risk of the government expropriating private property; and (iii) the risk of the government repudiating contracts – all from La Porta *et al.* (1998). The good government index ranges from zero to thirty, with low values indicating weak property rights.<sup>4</sup>

<sup>4</sup> La Porta *et al.* (1998) describe these three indexes as follows: The 'corruption index' is an assessment of corruption in government by the International Country Risk Guide (ICR). Low scores of this index indicate that 'high government officials are likely to demand special payments' and that 'illegal payments are generally expected throughout lower levels of government' in the form of 'bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans.' The 'risk of expropriation index' is the ICR's assessment of the risk of 'outright confiscation' or 'forced nationalization.' The 'repudiation of contracts by government index' is ICR's assessment of the risk of a 'modification in a contract taking the form of a repudiation, postponement, or scaling down' due to 'budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities.' All three ICR indexes are averages of the monthly indexes for April and October from 1982 to 1995. The good government index tends to be quite high for developed countries and quite low for emerging economies.

To measure public shareholders' rights against corporate insiders, they use a scorecard of legal rights compiled by La Porta *et al.* (1998). This *public shareholder rights index* ranges from zero to six according to whether or not shareholders (i) can vote by mail, (ii) are barred from selling stock a few days prior to a shareholder meeting, (iii) can use cumulative voting for directors, (iv) have legal standing to sue directors or to force the company to buy back their shares, (v) have preemptive rights to new issues, and (vi) call extraordinary shareholder meetings relatively easily. Higher scores indicate a greater number of legal rights for public shareholders.<sup>5</sup>

Morck, Yeung and Yu (2000) find that both the good government and public shareholder rights indexes are negatively and significantly correlated with both  $R_i^2$  and  $\emptyset_j$ .<sup>6</sup> More importantly, including the good government index in their regressions explaining  $\emptyset_j$  renders *per capita* GDP insignificant! Figure 3 illustrates the relationship between  $R_i^2$  and the good government index. High synchronicity is clearly related to weak private property rights. The reasoning above suggests that  $\emptyset_j$  might measure the 'murkiness' of stock markets.

### 3.4 Noise trading in emerging and transition markets

The synchronicity measure  $R_i^2$  is the fraction of variation in the typical individual stock related to market factors. A simple variance decomposition lets us examine market-related and firm-specific variation separately. Let  $\sigma_{m,i,j}^2$  be variation in firm  $i$  returns explained by market factors and  $\sigma_{\epsilon,i,j}^2$  be firm-specific variation.

We can rewrite  $R_j^2 = \left( \sum_{i \in j} SST_{i,j} \right)^{-1} \sum_{i \in j} R_{i,j}^2 \cdot SST_{i,j}$  in terms of  $\sigma_{m,i,j}^2$  and  $\sigma_{\epsilon,i,j}^2$  to get

$\left[ \sum_{i \in j} (\sigma_{m,i,j}^2 + \sigma_{\epsilon,i,j}^2) \right]^{-1} \sum_{i \in j} \frac{\sigma_{m,i,j}^2}{(\sigma_{m,i,j}^2 + \sigma_{\epsilon,i,j}^2)} (\sigma_{m,i,j}^2 + \sigma_{\epsilon,i,j}^2)$ . Substituting this into (3) yields

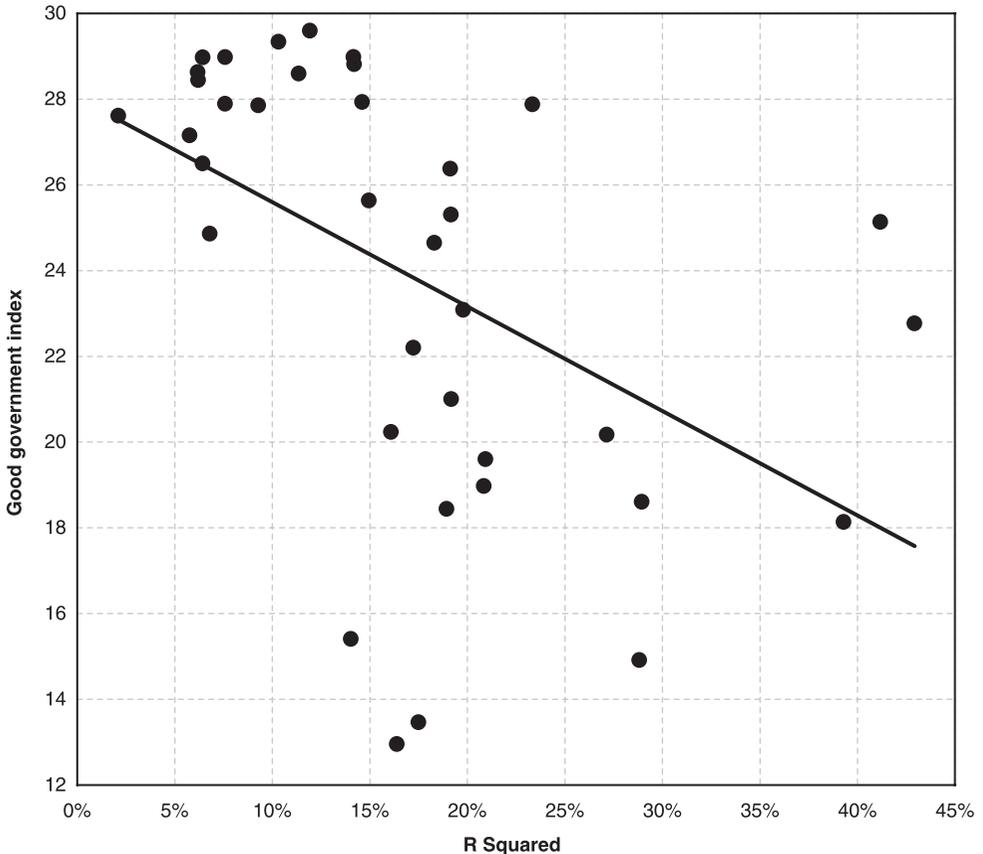
$$\emptyset_j = \log \left( \frac{\sigma_{m,j}^2}{\sigma_{\epsilon,jj}^2} \right) = \log(\sigma_{m,j}^2) - \log(\sigma_{\epsilon,jj}^2), \tag{4}$$

where the average variation in country  $j$  individual stock returns explained by market factors is  $\sigma_{m,j}^2 = \frac{1}{n} \sum_{i \in j} \sigma_{m,i,j}^2$  and the average firm-specific variation in country  $j$  individual stock returns is  $\sigma_{\epsilon,j}^2 = \frac{1}{n} \sum_{i \in j} \sigma_{\epsilon,i,j}^2$ .

<sup>5</sup> La Porta *et al.* (1998) emphasize that, for such rights to provide effective protection, a country must have functional political and legal systems. It is therefore plausible that the anti-director rights index might be most relevant in countries with good government, where the rule of law prevails. La Porta *et al.* (1998) show that many countries, including some with strong property rights protection in general, poorly protect the property rights of public investors. This finding suggests that there might be enough variation in anti-director rights within our developed country subsample for statistical tests.

<sup>6</sup> And with the other synchronicity indices described in footnote 2.

**Figure 3. Stock return synchronicity and good government index**  
 The Good Government Index plotted against stock return synchronicity measured by the average fraction of individual biweekly returns variation explained by market indices. Each observation is for one country. Data are for 1995. The downward sloping line captures the regression of 'good government' on 'R-squared'.



The decomposition (4) indicates that high synchronicity might be due to either a high  $\sigma_{m,j}^2$  or a low  $\sigma_{\varepsilon,j}^2$  – or both. A high  $\sigma_{m,j}^2$  might reflect volatile macroeconomic fundamentals or extensive noise trading in the sense of De Long *et al.* (1990). A low  $\sigma_{\varepsilon,j}^2$  might reflect little capitalization of the private information that Roll (1988) connects to firm-specific variation.

Morck, Yeung, and Yu (2000) find synchronicity highly positively associated with  $\sigma_{m,j}^2$  and less strongly positively associated with  $\sigma_{\varepsilon,j}^2$ . They find  $\sigma_{m,j}^2$  higher in countries with lower good government indexes, but  $\sigma_{\varepsilon,j}^2$  unrelated to good government. This suggests greater market related variation. Since the negative relationship

between  $\sigma_{m,j}^2$  and general property rights is not expunged by controlling for log *per capita* income, the structural control variables, the log of listings, or systematic fundamentals variation, the hypothesis that this effect arises from noise trading of the sort described by De Long *et al.* (1989, 1990) cannot be rejected. In other words, the high synchronicity in countries with weak general private property rights might indicate a lack of informed arbitrage or extensive noise trading – or both. The two might interact, in that exuberant noise traders might drive informed arbitrageurs out of the local stock market.

### 3.5 A threshold effect for general protection of property rights

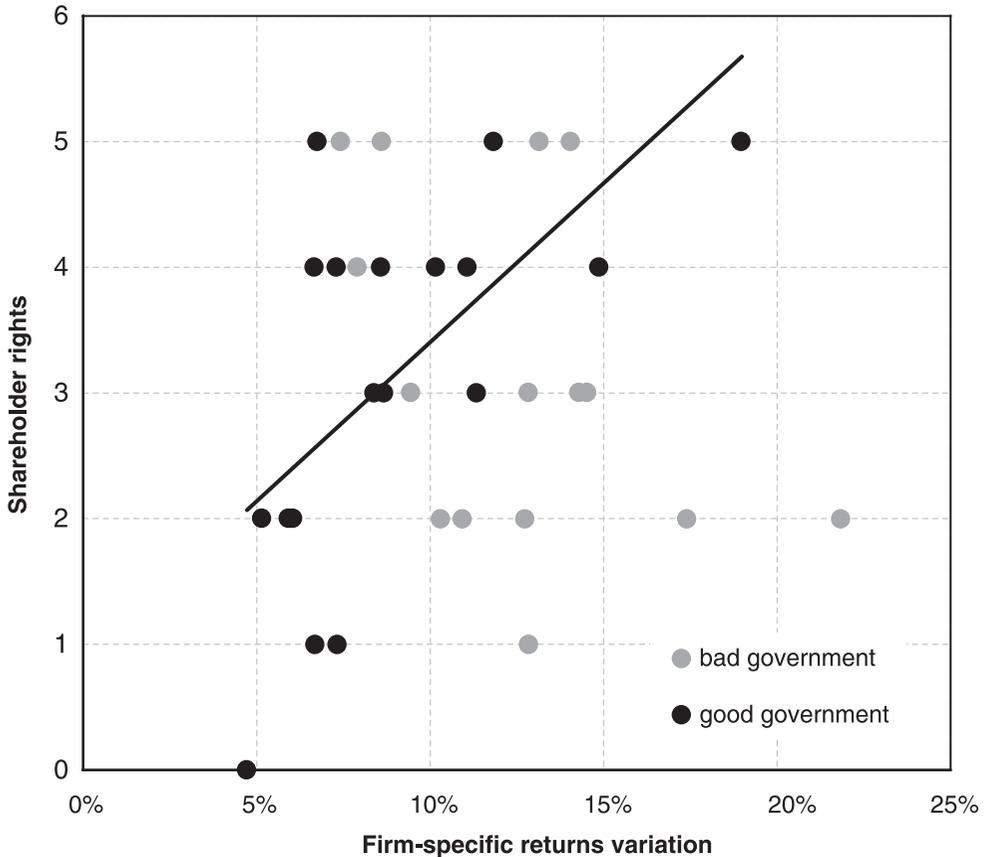
Closer inspection of Figure 3 lets us partition countries by general property rights protection. The chart shows that the negative relationship between the good government index and synchronicity reflects a cluster of strong property rights countries with low returns synchronicity and a more diffuse cluster of weak property rights countries with high returns synchronicity. No statistically significant relationship is detectable within each cluster. Hence, Morck *et al.* (2000) describe a threshold effect. Once property rights are sufficiently strong, synchronicity is reduced – changes in the strength of property rights above or below that threshold are not associated with changes in synchronicity.

One interpretation of this is that property rights must pass a certain threshold to induce informed investors to enter the market in large numbers; and that noise traders dominate the market in the absence of informed traders, and induce a high degree of synchronicity in share prices, as De Long *et al.* (1989, 1990) predict.

### 3.6 Shareholder rights only matter if property rights in general are secure

The threshold effect suggests a *very important second look* at the shareholder rights index. Recall the argument that, in an environment when government protects private property rights in general, but fails to protect outside investors from abuse by corporate insiders, risk arbitrageurs might conduct informed plays based on information about economy-wide factors, but not on firm-specific information. Stock returns synchronicity could then be due to a dearth of firm-specific information, reflected in a low  $\sigma_{\varepsilon,j}^2$ . In addition, shareholder rights might be dead letters if the government fails to honour private property in general. Consequently, *de facto* shareholder rights may only exist in countries that grant such rights *de jure* and that also honour private property in general. Thus, shareholder rights should be positively correlated with firm-specific returns variation,  $\sigma_{\varepsilon,j}^2$ , only in such countries. Figure 4 shows this to be so, and regressions controlling for structural factors, fundamentals variation, market size, and *per capita* GDP confirm the robust statistical significance of this relationship.

Figure 4. Shareholder rights and the decomposition of returns variation Average firm-specific stock return variation,  $\sigma_{\varepsilon,j}^2$ , plotted against the number of legal rights protecting shareholders in each country. Each observation is for one country. Data are for 1995. The upward sloping line captures the regression of 'Shareholder rights' on 'firm-specific returns variation' using only data from countries whose 'good government' index is above median.



### 3.7 Firm-specific returns variation and the intensity of informed arbitrage

The view that higher levels of firm-specific stock price variations are associated with more intensive informed risk arbitrage, first enunciated by French and Roll (1986) and Roll (1988), is consistent with other work.

Beny (2000) finds that a country's stock returns are less synchronous where insider trading is more restricted. A plausible reason is that less severe insider

trading restrictions deter informed risk arbitrage by outsiders and so permit noise traders to set prices. Fox *et al.* (2003) show that, in the US, an important strengthening of disclosure requirements raised firm-specific return volatility – mainly by raising firm-specific variation,  $\sigma_{\varepsilon,j}^2$ . In December 1980 the US Securities and Exchange Commission (SEC) began requiring every issuer's filings to contain a section entitled *Management's Discussion and Analysis*. This so-called MD&A Rule required managers to disclose any material information suggesting that the issuer's most recent results were 'not necessarily indicative of future results'. Fox *et al.* (2003) identify firms whose financial results are most ambiguous, and which therefore are most likely to be a mixture of firms with no news or with bad news to hide. They find that the strengthening of disclosure requirements caused the mixed group to exhibit a significant increase in firm-specific return variation, but had no similar effect on other stocks.

Chang, Khanna, and Palepu (2000) report that better protection of property rights and a Common Law legal system raise the number of analysts per listed stock. One interpretation of this result is that stronger private property rights promote interest in informed trading, and thus induce more investment in information gathering and processing. We find that the synchronicity index  $R_i^2$  (Equation 2) from Morck *et al.* (2000) and the number of analysts per listed stock from Chang, Khanna, and Palepu (2000) are statistically significantly negatively correlated ( $\rho = -0.27$ , p-value = 0.10).<sup>7</sup>

In the accounting literature, Collins, Kothari and Rayburn (1987), Collins and Kothari (1989), and others measure what they dub the 'information content of stock returns' by regressing current returns on future earnings changes. Where current returns better predict future earnings changes, they conclude that stock returns contain more information. Durnev *et al.* (2003) show that, using US data from 1983 to 1995, the returns of stocks that exhibit greater firm-specific returns variation relative to total variation are better predictors of future earning changes.

Most recently, Jin and Myers (2004) present a formal model that links stock return synchronicity to murky stock markets. They find a strong positive and significant relationship between the  $R^2$  expression from Equation (2) and measures of murkiness, using stock returns from all major stock markets from 1990 to 2001.

### 3.8 *The institutions of information laden stock prices*

The literature survey above distils into the hypothesis that stock returns are more synchronous in emerging economies than in developed economies because of institutional deficiencies, not because of limited economic development *per se* – as measured, say, by *per capita* GDP. The key institutional deficiency seems to be

<sup>7</sup> The correlation between the number of analysts per listed stock and  $f_i$  in footnote 2 is  $-0.366$  (p-value = 0.26).

deficient legal protection of private property rights in general, of public shareholders' property rights *vis-à-vis* corporate insiders in particular.

Our interpretation of these findings is that weak institutions deter informed risk arbitrage, which is primarily responsible for inducing firm-specific variation in rich country stocks. The high synchronicity in emerging market stock returns is due to a high level of market-wide return variation that seems unrelated to market-wide fundamentals variation. We therefore cannot reject a predominant role for noise traders in those markets. Among countries that protect property rights in general, a greater number of legal rights accorded outside shareholders is associated with greater firm-specific variation in returns. This is consistent with the view that public shareholder property rights, in an economy that generally honours private property, encourage informed trading.

If our interpretation of these findings is correct, stock markets in emerging economies may be less useful as processors of economic information than stock markets in advanced economies. A companion inference is that asynchronous stock returns may be indicative of informed stock prices. Of course, we cannot at this stage definitively preclude other possible interpretations.

### 3.9 Synchronous returns and the quality of capital allocation

If higher firm-specific stock returns variation is indeed associated with more active informed arbitrageurs and/or less active noise traders, it might also raise the quality of corporate investment decisions. First, informed stock prices convey information about market participants' perceptions to managers, and better-informed managers should be able to make better capital budgeting decisions. That is, informed stock prices serve as a useful feedback mechanism. For example, a sharp price drop alerts managers to shareholders' concerns about contemporaneously announced decisions. Second, more informed stock prices make the company more transparent to investors in general. This allows for better monitoring, which restrains self-serving or inept managerial behaviour, either of which can distort capital budgeting decisions. Higher quality capital investment decisions throughout an economy should, in turn, sustain a higher overall economic growth rate, all else being equal. Likewise, more informed stock prices should permit more reliable valuations of companies, and thus a more vigorous market for corporate control. The result is again more disciplined managerial behaviour and thus better resources allocations.

Wurgler (2000) devises a direct measure of the quality of capital allocation. His starting point is that higher quality capital allocation implies larger investments in industries that are growing rapidly relative to declining industries. His measure is thus an elasticity of capital expenditure with respect to value added,

$$\ln \frac{I_{i,c,t}}{I_{i,c,t-1}} = \alpha_c + \eta_c \ln \frac{V_{i,c,t}}{V_{i,c,t-1}} + \varepsilon_{i,c,t} \quad (5)$$

where  $I$  is gross fixed capital formation,  $V$  is value added (sales minus cost of intermediate goods), and  $i$ ,  $c$ , and  $t$  are subscripts for manufacturing industry, country, and time, respectively.

Using a dataset spanning 28 manufacturing industries across 65 countries over 33 years, Wurgler (2000) finds a significant negative relationship between the quality of capital allocation and stock returns synchronicity, as defined in  $f_j$  in footnote 2. He also finds low quality capital allocation to be associated with state ownership and poor minority investor rights. These institutional factors parallel those proposed by Morck *et al.* (2000) as responsible for stock return synchronicity. When all of these factors are included in the same regression, the synchronicity measure remains consistently statistically significant while the other two do not. These results are consistent with the view that informed arbitrage, as revealed by asynchronous stock returns, is a primary factor underlying high quality capital allocation.

Durnev *et al.* (2003) measure shareholders' perceptions of the quality of capital budgeting using marginal Tobin's  $q$  ratios. Using US industry data, they find that shareholders view the quality of capital allocation as closer to optimal in industries whose firms exhibit less synchronous stock returns. They are unable to relate these results to differences in fundamentals' synchronicity and they also control for a list of potentially confounding factors including diversification, size, competition structure (e.g., Herfindahl index), liquidity, leverage, and past investment in intangibles (e.g., R&D and advertising spending). In addition, Durnev *et al.* (2000) show that in the US industries with greater firm-specific stock return variation tend to utilize more external finance to support capital expenditure. Presumably, this reflects relaxed liquidity constraints and consequently a higher quality of capital investment.

In summary, these results are consistent with the view that the quality of capital allocation is higher where stock returns are less synchronous. Again, other interpretations of these findings may well be possible, and further research is clearly needed.

### ***3.10 Banks as substitutes for a dysfunctional stock market?***

We have hitherto focused on the stock market as an information processing and capital allocation device. But in many countries, stock markets are thought to have only secondary roles in these regards, with financial institutions, primarily banks, having dominant roles. Can a country's banking system substitute for a poorly functioning stock market?

Our argument here is that the overarching concern is institutional integrity. Just as weak private property rights protection is associated with dysfunctional stock markets, it also keeps banks from allocating capital efficiently.

First, a government that fails to honour private property rights in general might well fail to honour bank depositors' property rights. This could occur, for

example, if political pressure induces banks to divert capital to politically connected borrowers. Indeed, the banking system might easily become a mechanism for collecting and distributing political rents at the expense of the population in general.

Second, weak private property rights might tempt bankers to advance their own interests at the expense of their depositors. Banks in family corporate groups might, for example, divert capital towards uncreditworthy enterprises in the same group.<sup>8</sup> Or, bankers might simply appropriate their depositors' wealth to benefit corporations in which they have vested interests.<sup>9</sup> In short, it is easy to imagine a banking system functioning poorly in a country where property rights protection is lacking. It seems plausible that banks in such countries might direct their depositors' savings into uneconomical ventures connected with political or bank insiders.

La Porta *et al.* (2000) show that government ownership of banks is common around the world, especially in countries with weak private property rights, extensive government intervention in the economy, and ill-developed financial systems. They present empirical evidence supporting the view that state control of finance through banks politicizes resources allocation to generate both votes and bribes for office holders. Consequently, higher government ownership of banks appears to impede the development of a country's financial system, retarding economic growth, and productivity growth in particular.

The variable they use is the extent of government ownership of the ten largest banks in 1995. Their most conservative measure, which we borrow, is the asset-weighted fraction of top ten banks in which the government voting stake is at least ninety percent.<sup>10</sup>

Stock returns are significantly more synchronous in countries whose banking systems are more state controlled. The correlation coefficient of state control over banks with our synchronicity measure  $\emptyset$ , from Equation (3) is 0.42 with a p-value 0.001. State control over banks is also highly negatively correlated with both the good government index ( $\rho = -0.59$ , p-value = 0.0001) and the shareholder rights index ( $\rho = -0.34$ , p-value = 0.04).<sup>11</sup> Our interpretation of these correlations is that a dysfunctional banking system tends to coincide with a dysfunctional stock market, and that both occur in countries with ill-protected private property rights in general and weak public shareholder rights in particular.

A range of empirical evidence supports this interpretation that 'institutional integrity' is the key to economic prosperity. Levine (2002) compares economic growth in bank-based and market-based financial systems. He finds that the bank versus market-based dichotomy is relatively unimportant compared to general measures of institutional integrity, such as the extent to which the legal code

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<sup>8</sup> La Porta *et al.* (2003) convincingly show that is the case in Mexico.

<sup>9</sup> Morck and Nakamura (1999) argue that this occurred in Japan in the 1980s.

<sup>10</sup> See La Porta *et al.* (2000), Table 2, last column.

<sup>11</sup> The correlation coefficient with the logistically transformed 't' in footnote 2 is 0.47 with a p-value 0.005.

protects shareholders and creditors, and the general efficiency with which laws are enforced.<sup>12</sup>

A useful literature examines whether banks (relationships) and financial markets are complements or substitutes in the provision of financing, and relates different financing sources to different stages of economic development, with banks dominating earlier on.<sup>13</sup> Our emphasis on institutional integrity is fully consistent with the literature. In the absence of institutional integrity, capital markets tend to be dysfunctional. However, whilst institutional integrity is developing, relationship-based financing might play an important role in development.<sup>14</sup> Also, the growth stemming from relationship-based financing might accelerate the development in institutional integrity by helping create a middle class that demands it. This, in turn, facilitates the development of market-based financing, which then further speeds development.

#### 4. Stock return asynchronicity and economic growth

In this section, we take these issues a step further. A more economically efficient allocation of capital ought to be evident in faster economic growth, all else equal. We therefore estimate cross-country regressions to see if economies with less synchronous stock returns do indeed grow faster. We find that they do.

##### 4.1 Data, dependent variables, and synchronicity measure

Our sample includes observations of fifty six countries from 1990 to 2000. We use two measures of annual growth: growth in real *per capita* GDP, denoted  $\Delta GDP$ , and growth in productivity, denoted  $\Delta PROD$ . Overall, we have a panel containing 454 country-year observations.

Following King and Levine (1994) and Beck, Loayza, and Levine (2000), we define real *per capita* productivity growth as  $\Delta GDP$  less 0.3 times the growth rate in real *per capita* physical capital stock. Taking the capital stock as zero for every country in our sample in 1960, we calculate the physical capital stock of each recursively using the equation of motion  $K_{i,t} = K_{i,t-1} + I_{i,t} - \delta K_{i,t-1}$ , where  $K$  denotes capital stock,  $I$  investment, and  $\delta$  depreciation rate. We assume  $\delta$  to be seven

<sup>12</sup> Levine's results highlight the importance of the 'law and finance' view of institutions, articulated by La Porta *et al.* (1997, 1998, 1999, 2000), which holds that a sound institutional system is one that protects property rights and enforces contracts; and reinforce the 'financial service' view that sound institutions bridge imperfections in contracts, markets, and intermediaries to connect finance users and finance providers. That is, a sound institutional environment allocates capital efficiently.

<sup>13</sup> See Levine (2002).

<sup>14</sup> By emerging institutional integrity, we mean the beginning stage of institutional reforms, e.g., when the government just begins to retreat from directing allocations of financing and begins to respect private property rights.

percent and take  $I_{j,t}$  from the Penn World Tables 6.1.<sup>15</sup> The growth measures,  $\Delta GDP$  and  $\Delta PROD$ , are constructed annually for 1991 through 2000.

We obtain the stock price synchronicity measure,  $\emptyset_{j,t}$  for 1990 through 1999 using Equation (4) and the procedure of Morck, Yeung, Yu (2000). Our data are from CRSP for the US and *DataStream* for other countries. To avoid probable data errors in *DataStream*, we drop return observations greater than 100 percent and less than -90 percent. We use weekly stock returns to generate annual country level observations for  $\emptyset_{j,t}$ . We exclude those country-year observations for which  $\emptyset_{j,t}$  is computed using ten or fewer stocks. When we use  $\Delta PROD$  as a dependent variable, we further drop countries whose share of investment in GDP is missing for any of the years from 1960 through 2000 in the Penn World Tables 6.1.

## 4.2 Independent variables

To estimate the relation between growth measures and stock price synchronicity, we regress  $\Delta GDP$ , and then  $\Delta PROD$ , on  $\emptyset_{j,t}$  and control variables. We follow the usual practice of controlling for initial real *per capita* GDP, denoted  $GDPI$ , and market size, denoted  $LN$ , which we measure as the natural log of the number of stocks used to construct the stock price synchronicity measure. To control for macroeconomic instability we include inflation,  $INFL$ , the logarithm of one plus inflation rate, and government size,  $GOV$ , the logarithm of the share of government expenditure in GDP. We use the logarithm of exports plus imports as shares of GDP to capture the openness of the economy, and call this variable  $OPEN$ .

Stock synchronicity,  $\emptyset_{j,t}$ , could be an inverse proxy for capital market development, for Morck, Yeung and Yu (2000) demonstrate a significant negative correlation between the number of listed firms and stock synchronicity. King and Levine (1993, 1994), Levine and Zervos (1998), Levine (1997, 2002), and others link financial development to growth. It is therefore of interest to see if any correlation of  $\emptyset_{j,t}$  with growth survives the inclusion of additional control variables that reflect the level of financial development.

In addition, stock return synchronicity may correlate with growth because it proxies for institutional integrity, or it could matter *per se*. Durnev *et al.* (2004) find that corporate investment decisions tend to be more firm-value-enhancing in US industries where individual stock returns are more asynchronous. As noted above, Durnev *et al.* (2000) show that in the US industries with greater stock return asynchronicity utilize more external financing in supporting capital expenditure. Since all US industries presumably share the same institutional environment, these results are unlikely to be due to varying degrees of institutional integrity. However, information costs vary across industries, and this could induce cross-industry

<sup>15</sup> It is customary to begin the recursive formula from 1950, the first year the World Penn Tables 6.1 has data available. Since the rest of the data are from the 2002 Worldbank World Development Indicators dataset, and coverage starts from 1960, we choose 1960 as the beginning period.

variation in the extent of informed risk arbitrage. Likewise, Durnev *et al.* (2003) report a positive relationship across US industries between firm-specific returns variation and the ability of returns to predict future earnings. These results, taken together, suggest that return asynchronicity captures the firm-specific information content of stock price movements, and that this might have an independent positive effect on the quality of capital expenditure decisions. We therefore examine whether higher stock return asynchronicity *per se* is related to growth after controlling for capital market development and institutional integrity.

We include in our regressions controls for various dimensions of financial development and institutional integrity. We use market capitalization, *MCAP*, the logarithm of the value of all listed shares over GDP, and bank credit, *CREDIT*, the logarithm of the value of credit to the private sector by deposit money banks and other financial institutions extended over GDP, to gauge stock market and banking system development, respectively.<sup>16</sup> An array of plausible candidates presents itself as potential measures of institutional integrity. Given that we have a panel, we require a measure that varies over time. One suitable candidate is the quality of a country's legal environment, denoted *LAW*, as measured by the *rule of law index* in the International Country Risk Guide. Many of the variables introduced by La Porta *et al.* (1998) and commonly used elsewhere in the literature, like government corruption and tendency to expropriate and to repudiate contracts, do not have the same time series variation. We expect the variables we use to be correlated with stock return synchronicity. Their inclusion allows us to check whether synchronicity *per se* has an independent effect on growth.

Finally, we include *EDUC*, the logarithm of public expenditure on education over GDP to control the stock of human capital.

Table 1 provides details about the data sources and construction of our variables.

### 4.3 Regression model specification

To control for countries' unobserved characteristics and business cycle effects, we estimate the relation between growth measures and stock price synchronicity incorporating country-fixed effects and year-random effects. The validity of time-random effects is justified by a Breusch and Pagan (1980) test, which rejects the null hypothesis that the regression error terms are uncorrelated across countries.

To mitigate endogeneity problems, all independent variables enter our regressions with one-year lags.

Multicollinearity is a concern. For example, 'Rule of Law' is highly correlated with the market capitalization variables, and with return synchronicity. Although return synchronicity is only weakly correlated with *stock market capitalization/GDP* and *bank deposits/GDP*, it is highly correlated with *log initial per capita GDP*,

<sup>16</sup>  $\Delta GDP$ ,  $GDPI$ ,  $INFL$ ,  $GOV$ ,  $OPEN$ ,  $MCAP$ , and  $CREDIT$  are constructed using World Bank's 2002 World Development Indicators data.

**Table 1. Definitions of main variables used in GDP growth and productivity growth regressions**

*The sample consists of 53 countries. We drop country-year observations if the stock price synchronicity measure is based on fewer than 11 firms. The final sample includes the following countries: Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, Ecuador, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Kenya, Korea (South), Luxembourg, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Venezuela, and Zimbabwe.*

| Variable  |               | Definition and source  |
|---|---------------|--|
| <b>Panel A: GDP and productivity growth variables</b> |               |  |
| GDP growth  | $\Delta GDP$  | Growth rate in real Gross Domestic Product per capita, constructed annually from 1991 through 2000. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.   |
| Productivity growth                                   | $\Delta PROD$ | Growth rate in real Gross Domestic Product per capita – 0.3*real per capita growth rate in fixed capital stock, constructed annually from 1991 through 2000. The fixed capital stock is calculated using a recursive formula described in the text. <i>Source:</i> World Bank's 2002 World Development Indicators dataset and Penn World Tables 6.1. |
| <b>Panel B. Stock returns synchronicity measure</b>   |               |  |
| Stock price synchronicity                             | $Y$           | Logarithmic transformation of stock price synchronicity measured by the average percent of total weekly firm-level return variation explained by local and US value-weighted market indexes, constructed annually from 1990 through 1999. <i>Source:</i> DataStream and CRSP.  |
| <b>Panel C. Control variables</b>                     |               |  |
| Market size   | $LN$          | Log of the number of stocks used to calculate the stock price synchronicity measure.   |
| Initial GDP   | $GDP_I$       | Log of real per capita GDP, constructed annually from 1990 through 1999. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.  |
| Government size                                       | $GOV$         | Log of the share of government expenditure in GDP, constructed annually from 1990 through 1999. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.   |

**Table 1 (cont). Definitions of main variables used in GDP growth and productivity growth regressions**

| Variable              |               | Definition and source  |
|-----------------------|---------------|--|
| Trade openness        | <i>OPEN</i>   | Log of trade share in GDP, constructed annually from 1990 through 1999. It is defined as the sum of exports and imports as a share of GDP. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.                      |
| Inflation             | <i>INFL</i>   | Log of one plus inflation rate where the inflation rate is defined as the log difference of Consumer Price Index, constructed annually from 1990 through 1999. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.  |
| Market capitalization | <i>MCAP</i>   | Log of the value of all listed shares over GDP, constructed annually from 1990 through 1999. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.  |
| Bank credit           | <i>CREDIT</i> | Log of the value of credit by deposit money banks and other financial institutions to the private sector over GDP, constructed annually from 1990 through 1999. <i>Source:</i> World Bank's 2002 World Development Indicators dataset. |
| Rule of law           | <i>LAW</i>    | Measure of law and order tradition of a country, annual from 1990 through 1999. This variable ranges from 1 (weak law and order tradition) to 6 (strong law and order tradition). <i>Source:</i> International Country Risk Guide.     |
| Educational expenses  | <i>EDUC</i>   | Log of public expenditure on education over GDP, constructed annually from 1990 through 1999. <i>Source:</i> World Bank's 2002 World Development Indicators dataset.   |

*government expenditure share, and inflation.* To mitigate multicollinearity problems, we enter our variables in blocks, as we make clear in the next subsection. We then focus on whether or not return synchronicity,  $\varnothing_{j,t}$ , obtains a consistent regression coefficient across these specifications.

#### 4.4 Results

Regressions using stock return synchronicity,  $\hat{\phi}_{j,t}$ , to explain  $\Delta GDP$  (growth in per capita GDP) and  $\Delta PROD$  (productivity growth) are reported in Tables 2 and 3, respectively. Regressions 2.1 and 3.1 control for the *log of initial real per capita GDP* and the *log of the number of stocks used to estimate  $\hat{\phi}_{j,t}$* . Regressions 2.2 and 3.2 also control for *inflation*, *government expenditure/GDP*, and *trade openness*. Regressions 2.3, and 3.3 further include the *log of the value of all listed shares/GDP*, the *log of the value of credit by deposit money banks and other financial institutions to the private sector/GDP*, and the *rule of law* index. Finally, *Education* (EDUC) is further added to regression 2.4 and 3.4. Widely available measures of human capital development, such as average years of education for the adult workforce, show little time-series variation, and their effects are thus captured in our country fixed effects. Since current education spending is likely to affect economic growth only as better educated workers enter the labour force, this variable is also highly problematic. Nonetheless, we include it in some specifications for completeness.

In all these regressions, whether explaining *real per capita GDP growth* or *total factor productivity growth*, stock return synchronicity consistently attracts a negative and significant coefficient. These results are consistent with our hypothesis that asynchronous returns signify informed stock pricing, which raises the quality of capital allocation decisions and hence spurs economic growth. Including the education variable reduces the significance of synchronicity, but still leaves its coefficients significant at the 10 percent level. We interpret synchronicity as indicative of the intensity of informed risk arbitrage, and this might well be related to a country's education level. Of course there are multitudinous reasons why education levels *per se* ought to be related to growth. Hence, it is a pure speculation that stock return synchronicity proxies for some aspect of education not captured by more standard measures.<sup>17</sup>

#### 4.5 Robustness

We subject our results to various robustness checks.

First, standard residual diagnostic techniques demonstrate that our results are not due to outliers.

Another concern is that our results may be driven by countries that experience financial crisis, such as East Asian countries. Many Asian countries experienced deep financial crises in the data period (e.g., in 1997 and 1998). Figure 2 shows that these countries' individual stock returns also exhibit high synchronicity. We therefore re-run our regressions dropping these countries in these two

<sup>17</sup> EDUC is available only for roughly 53 percent of our original sample. Data are not available for every country every year.

**Table 2. Relationship between economic growth and logarithmic transformation of stock price synchronicity**

*This table reports the results of country fixed effect time random effects regressions of GDP growth on a logarithmic transformation of stock price synchronicity and control variables. Numbers in parentheses are probability levels at which the null hypothesis of a zero coefficient is correct. Coefficients significant at 10 percent or better (2-tailed test) are in bold. We drop country-year observations if the stock price synchronicity measure is based on fewer than 11 firms. Refer to Table 1 for variables definitions.*

| Specification                                |               | 2.1                      | 2.2                     | 2.3                     | 2.4                     |
|--|---------------|--------------------------|-------------------------|-------------------------|-------------------------|
| Dependent variable                           |               | GDP growth, $\Delta GDP$ |                         |                         |                         |
| Stock price synchronicity                    | <i>Y</i>      | <b>-0.009</b><br>(0.00)  | <b>-0.012</b><br>(0.00) | <b>-0.010</b><br>(0.00) | <b>-0.006</b><br>(0.07) |
| Market size                                  | <i>LN</i>     | <b>0.016</b><br>(0.01)   | <b>0.016</b><br>(0.01)  | -0.006<br>(0.47)        | 0.001<br>(0.89)         |
| Initial GDP                                  | <i>GDPI</i>   | <b>-0.159</b><br>(0.00)  | <b>-0.220</b><br>(0.00) | <b>-0.229</b><br>(0.00) | <b>-0.230</b><br>(0.00) |
| Inflation                                    | <i>INFL</i>   | -                        | 0.021<br>(0.39)         | 0.001<br>(0.98)         | -0.011<br>(0.70)        |
| Trade openness                               | <i>OPEN</i>   | -                        | <b>0.081</b><br>(0.00)  | <b>0.052</b><br>(0.00)  | <b>0.088</b><br>(0.00)  |
| Government size                              | <i>GOV</i>    | -                        | <b>0.039</b><br>(0.09)  | <b>0.041</b><br>(0.05)  | 0.018<br>(0.59)         |
| Bank credit                                  | <i>CREDIT</i> | -                        | -                       | <b>-0.033</b><br>(0.00) | <b>-0.038</b><br>(0.00) |
| Market capitalization                        | <i>MCAP</i>   | -                        | -                       | <b>0.035</b><br>(0.00)  | <b>0.026</b><br>(0.00)  |
| Rule of law                                  | <i>LAW</i>    | -                        | -                       | 0.003<br>(0.22)         | 0.003<br>(0.18)         |
| Educational expenses                         | <i>EDUC</i>   | -                        | -                       | -                       | -0.017<br>(0.25)        |
| Regression R <sup>2</sup>                    |               | 0.331                    | 0.392                   | 0.538                   | 0.628                   |
| Wald test statistics of overall significance |               | <b>197.46</b><br>(0.00)  | <b>497.76</b><br>(0.00) | <b>368.46</b><br>(0.00) | <b>616.75</b><br>(0.00) |
| Number of country-year observations          |               | 454                      | 440                     | 368                     | 241                     |

**Table 3. Relationship between productivity growth and logarithmic transformation of stock price synchronicity**

*This table reports the results of country fixed effects time random effects regressions of productivity growth on a logarithmic transformation of stock price synchronicity and control variables. Numbers in parentheses are probability levels at which the null hypothesis of a zero coefficient is correct. Coefficients significant at 10 percent or better (2-tailed test) are in bold. We drop country-year observations if the stock price synchronicity measure is based on fewer than 11 firms. We exclude countries whose share of investment in GDP is missing for any of the years from 1960 through 2000 in Penn World Tables 6.1. Refer to Table 1 for variables definitions.*

| Specification                                |               | 3.1                                | 3.2                     | 3.3                     | 3.4                     |
|--|---------------|------------------------------------|-------------------------|-------------------------|-------------------------|
| Dependent variable                           |               | Productivity growth, $\Delta PROD$ |                         |                         |                         |
| Stock price synchronicity                    | <i>Y</i>      | <b>-0.010</b><br>(0.00)            | <b>-0.013</b><br>(0.00) | <b>-0.008</b><br>(0.00) | <b>-0.005</b><br>(0.07) |
| Market size                                  | <i>LN</i>     | <b>0.014</b><br>(0.03)             | <b>0.019</b><br>(0.00)  | -0.006<br>(0.39)        | -0.008<br>(0.33)        |
| Initial GDP                                  | <i>GDPI</i>   | <b>-0.145</b><br>(0.00)            | <b>-0.213</b><br>(0.00) | <b>-0.198</b><br>(0.00) | <b>-0.208</b><br>(0.00) |
| Inflation                                    | <i>INFL</i>   | -                                  | -0.003<br>(0.92)        | 0.007<br>(0.76)         | -0.009<br>(0.72)        |
| Trade openness                               | <i>OPEN</i>   | -                                  | <b>0.083</b><br>(0.00)  | <b>0.060</b><br>(0.00)  | <b>0.100</b><br>(0.00)  |
| Government size                              | <i>GOV</i>    | -                                  | <b>0.043</b><br>(0.04)  | <b>0.057</b><br>(0.00)  | 0.021<br>(0.44)         |
| Bank credit                                  | <i>CREDIT</i> | -                                  | -                       | <b>-0.032</b><br>(0.00) | <b>-0.037</b><br>(0.00) |
| Market capitalization                        | <i>MCAP</i>   | -                                  | -                       | <b>0.032</b><br>(0.00)  | <b>0.025</b><br>(0.00)  |
| Rule of law                                  | <i>LAW</i>    | -                                  | -                       | 0.002<br>(0.35)         | 0.003<br>(0.23)         |
| Educational expenses                         | <i>EDUC</i>   | -                                  | -                       | -                       | 0.003<br>(0.81)         |
| Regression R <sup>2</sup>                    |               | 0.257                              | 0.343                   | 0.514                   | 0.623                   |
| Wald test statistics of overall significance |               | <b>123.52</b><br>(0.00)            | <b>178.49</b><br>(0.00) | <b>451.08</b><br>(0.00) | <b>298.60</b><br>(0.00) |
| Number of country-year observations          |               | 407                                | 393                     | 348                     | 230                     |

years. The Brazilian Real crisis in 1998, the Mexican Peso crisis in 1995, and the Russian debt crisis at the end of the nineties all inspire similar doubts. We again re-ran our regressions without the Latin American countries in 1995 and 1998 and also without Russia. All of these regressions, and dropping all the crisis observations simultaneously, deliver results similar to those reported in Tables 2 and 3.<sup>18</sup>

Another concern is that our observation might be driven by the US, which exhibits highly asynchronous stock returns and experienced unusually strong economic growth through the 1990s. Dropping the US from our regressions does not qualitatively change our results.

We therefore conclude that our results are not driven by specific countries.

Another issue is possible reverse causality. High growth could stem from fast paced creative destruction, which induces the demise of many existing firms and the growth of many upstarts. This line of thinking builds on asynchronous firm-level fundamentals; for example, asynchronous firm-level returns on assets. That is, high future growth could arise from asynchronous future firm-level fundamentals, which in turn are reflected in asynchronous current stock returns. While this may well underlie part of our results, Morck, Yeung and Yu (2000) show that the relationship between economic development and stock return synchronicity persists after controlling for synchronicity in firm-level fundamentals. Unfortunately, we cannot estimate fundamentals synchronicity year-by-year, as accounting data are only available at annual, or at best quarterly, frequencies. Thus, this alternative explanation cannot be ruled out. Nonetheless, the policy implications that would arise from this explanation of our findings broadly parallels that arising from the view that stock return asynchronicity reflects more informed stock prices. Indeed, the two explanations may well be complementary, with more informed stock prices allowing more focused financing of innovation, and with innovations, especially in information technology, lowering information costs for prospective arbitrageurs.

#### *4.6 Relevance for transition economies*

The results discussed in the previous section pertain to a broad cross-section of countries. Their applicability to economies in transition can only be inferred. We lack sufficient data to re-run our regressions using only transition economies. However, we can re-run our regressions, partitioning the data into high and low income economies. It turns out that our results persist in each group. Indeed, the

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<sup>18</sup> Specifically, the stock price synchronicity measure,  $Y$ , remains significant at least at the ten percent level across all specification in Tables 2 and 3, except for specification 3.4. In that case the significance is eleven percent (when we drop all Asian countries in all years) due to, perhaps, a smaller sample size.

significance level of stock return synchronicity is slightly higher in the low income country sample.<sup>19</sup>

To explore the relevance of this line of research to transition economies, we must turn to case studies. Figure 5 plots the firm-specific variation, systematic variation, and  $R^2$  of the average stock in each transition economy for which data are available. These graphs display bimonthly stock return synchronicity measures from 1995 through 2002. Except that they are based on biweekly total returns from DataStream, the procedure for constructing them is identical to that described in the text in connection with Figure 2.

Panel A shows that China's  $R^2$  remains high – in the 60 to 70 percent range, though slightly lower in the last year or so. The  $R^2$  of Czech stocks, shown in Panel B, falls to around ten percent by 1996 – a level not much greater than that in many developed economies – but then trends upward again, almost doubling by the end of the data. Nonetheless, the Czech data consistently show both greater firm-specific variation and lower systematic variation than the Chinese data. In both Poland and Hungary, firm specific variation is generally higher after 1998 than before. Stocks in Poland have sharply declining  $R^2$ s, with a major fall evident after the 1998 ruble crisis. Romanian stocks have somewhat increasing  $R^2$ , though a dip is evident in the final year of data. Firm-specific variation falls over the sample period in Romania. Russian stocks continue to have very high  $R^2$ s, though not quite as high as Chinese stocks.

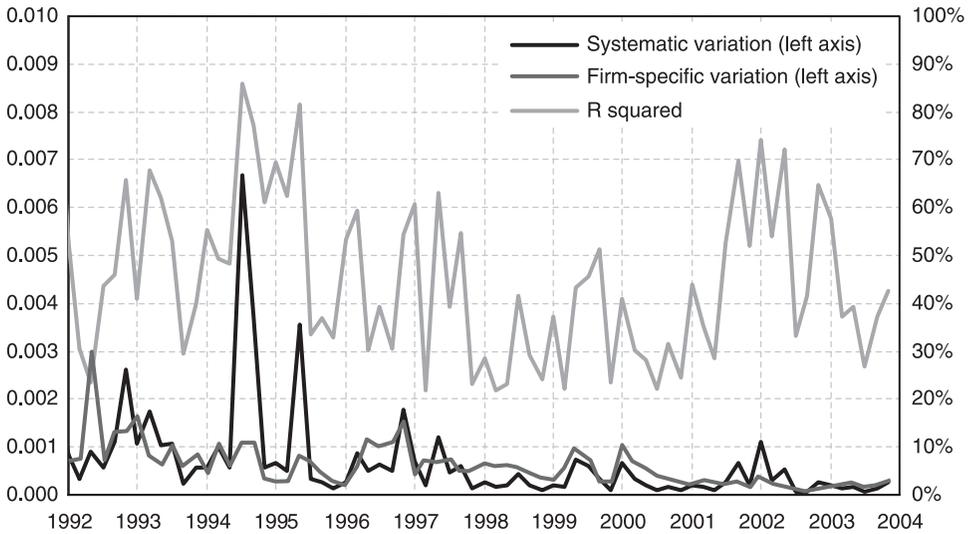
One interesting comparison in Figure 5 contrasts Poland with the Czech Republic. Li *et al.* (2004) report that stock return synchronicity in Poland declines significantly more than in the Czech Republic in the late 1990s, as both opened their economies in preparation for accession to the European Union. Although Poland's average  $R^2$  is much higher than its Czech counterpart earlier in the decade, simple convergence cannot be a complete explanation. Polish and the Czech stocks' firm-specific variation,  $\sigma_\varepsilon^2$  from (4), are quite similar in 1995, the Polish  $\sigma_\varepsilon^2$  rose dramatically by the end of the decade, while that of Czech stocks changed little. Also, while Polish systematic return variation,  $\sigma_m^2$  in (4) was almost ten times higher than its Czech counterpart in 1995, it fell to only slightly more than one-eighth of its former value by the end of the decade. Again, the Czech counterpart changed little.

Glaeser *et al.* (2001) show that Poland and the Czech Republic followed very different trajectories in their property rights protection. While both countries' judicial systems remained ill developed, strict Polish regulatory enforcement contrasted starkly with the hands-off regulation inspired by the libertarian philosophy

<sup>19</sup> Note that excluding all low income countries in our sample will automatically exclude all countries in all regions that experienced financial crises. Thence, the results based on the partitioned sample further confirm that our results are not due to financial crises which generate high stock return synchronicity and yet low economic growth.

Figure 5. Changing returns synchronicity in transition economies

**Panel A. China**



**Panel B. Czech Republic**

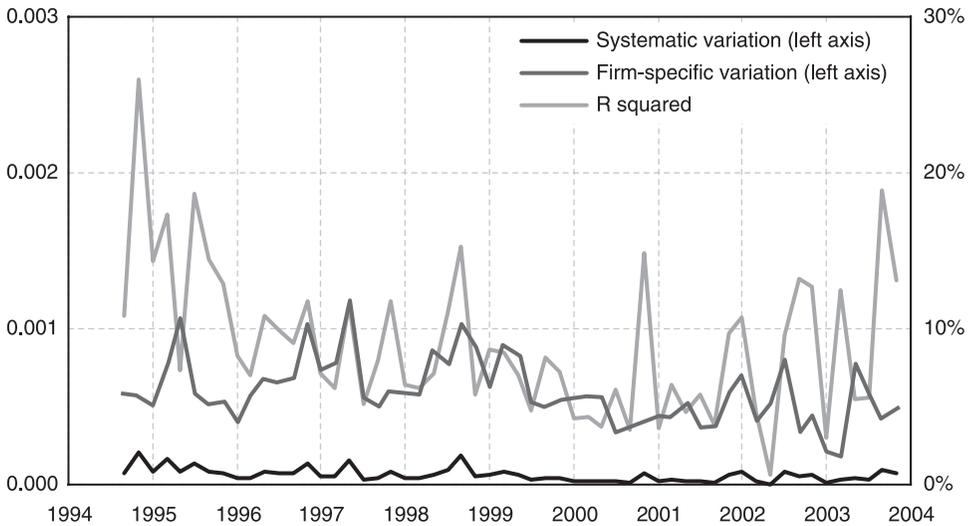
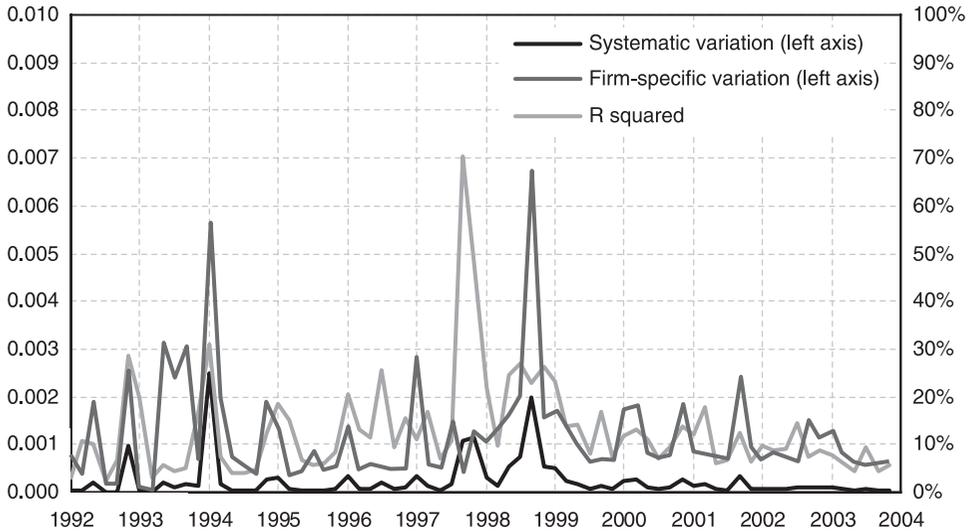


Figure 5 (cont). Changing returns synchronicity in transition economies

Panel C. Hungary



Panel D. Poland

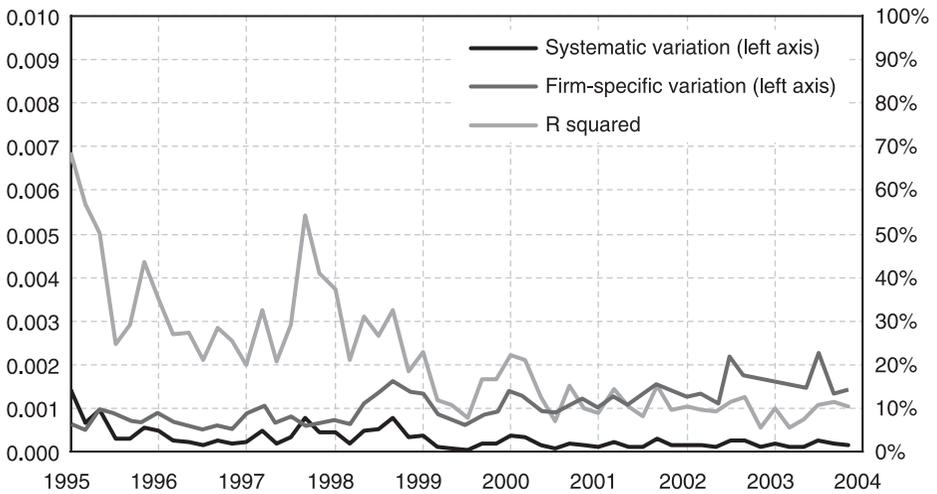
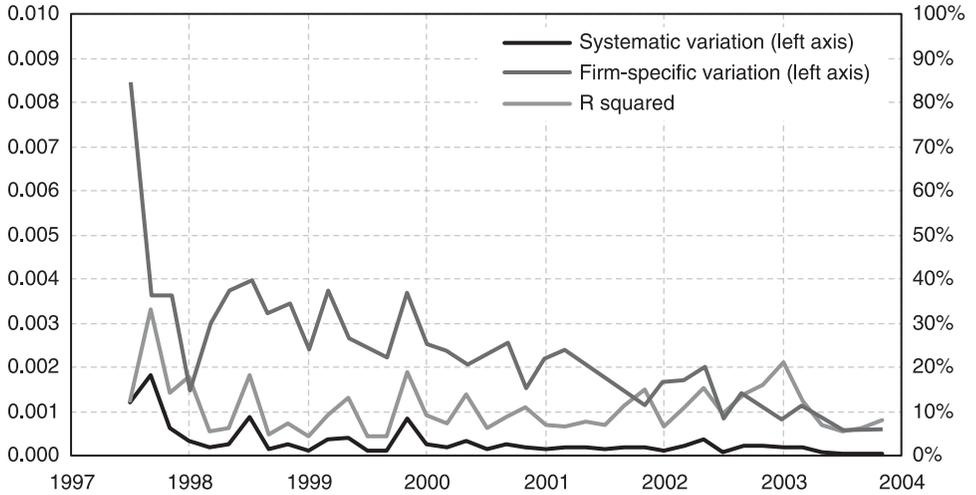
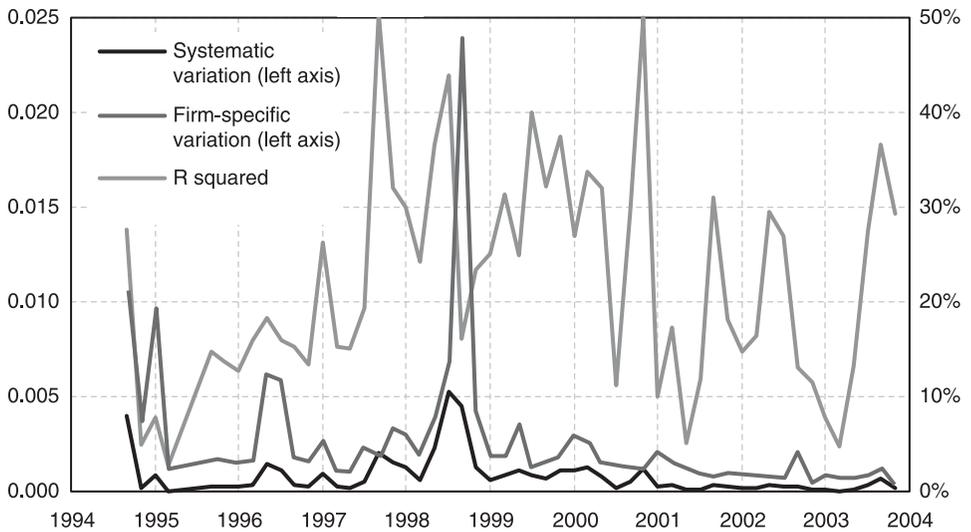


Figure 5 (cont). Changing returns synchronicity in transition economies

**Panel E. Romania**



**Panel F. Russia**



of the Czech government. Glaeser *et al.* (2001) argue that this ideologically driven philosophy undermined earlier Czech reforms. Certainly, the patterns in Figure 5 are consistent with Poland's stock market becoming more functionally efficient, while that in the Czech Republic remained murky. Also consistent with this hypothesis, *per capita* GDP in Poland grew faster than in the Czech Republic during the 1990s.

Another interesting contrast is Russian and Chinese stocks versus all the other transition economies. In the Czech Republic, Hungary, Poland, and Romania,  $R^2$ s end up below 20 percent by the early 2000s. In contrast, Russian and Chinese stocks continue to exhibit much higher  $R^2$ s – in the 30 and 60 percent ranges, respectively. This suggests that reforms in China and Russia have been least effective at creating functionally efficient stock markets.

#### 4.7 Caveats

We view our results only as suggestive that greater stock return asynchronicity *per se*, which may well reflect a higher information content in stock returns, allocates capital more efficiently and thereby induces higher growth. Several strong *caveats* are clearly in order.

First, the reported result is based on only ten years' data. It is difficult to extend our panel backward in time because reliable stock return data in most countries are not readily available, and all transition economies lacked stock exchanges prior to the 1990s. The period we study, 1990 to 2000, included several important financial crises. Whether our results generalize to more 'normal' periods, if such things exist, is thus unclear. Financial crises are associated with periods of high return synchronicity and low growth. While our results are intact in regressions excluding countries directly affected by major crises, we nonetheless await replication of our results using longer panels where possible.

Second, we cannot fully rule out a missing variable problem. For example, institutional features not represented in our regressions might drive both returns synchronicity and growth. Because we include country fixed effects in our regressions, time invariant institutional features cannot be candidates. However, there could still be some slow-changing institutional features that are not well correlated with our time-varying financial development and institutional integrity variables that affect both synchronicity and growth. The pace of creative destruction, as mentioned above, is one such potential latent variable. There clearly might be others. We welcome further investigation along these lines.

### 5. Transition to what?

Subject to these important caveats, the results discussed above tentatively suggest the following:

- i. An institutional environment that protects private property rights may be an important precursor to economic growth. In part, this is because property rights' protection in general, and shareholder rights in particular, promote informed arbitrage in stocks, and thus lead to more efficient stock markets. However, more asynchronous stock returns seem associated with faster growth above and beyond any effect associated with institutional factors.
- ii. All else equal, more asynchronous stock returns are associated with more private information being incorporated into stock prices by informed arbitrageurs, and thus with more efficient stock markets. Informationally more efficient stock prices presumably induce more efficient capital allocation. Consistent with this, more asynchronous stock returns are associated with higher quality capital investment decisions, measured either as the response of investment to growth in value-added or as shareholders' assessment of corporate capital budgeting decisions. This renders the observed association of more asynchronous stock returns with faster economic growth and faster productivity growth, even after controlling for financial development and institutional integrity, unsurprising. Information rich capital markets allocating capital efficiently is what Tobin (1982) characterized as the *functional efficiency of the stock market*.
- iii. Banks do not, in general, substitute effectively for functionally efficient equity markets in economies where protection for property rights is generally poor.
- iv. Russia and China, among all transition economies with substantial stock markets, have been least successful at fostering functionally efficient stock markets. The Polish market became markedly less murky after 1998, while that in the Czech Republic became somewhat murkier.

Transition economies are abandoning communist command economy policies. The stated goal of economic transition is the replacement of those command economies with market economies. The results discussed above suggest that better protecting private property rights in general and public shareholders rights against corporate insiders in particular, ought to allow more accurate stock pricing. This, in turn, should allow higher quality capital allocation and hence faster growth.

Why might some transition economies be doing a better job at this than others? One possibility is that the politicians supervizing Russian and Chinese reforms are simply less competent than those supervizing Czech, Hungarian, Polish, and Romanian reforms. However, we doubt this. We feel it might be more useful to ask how the constraints governing the reform processes in different countries might lead to differing degrees of functional efficiency in transition economy stock markets.

### ***5.1 Economic entrenchment***

The development of sound property rights, and thus of functionally efficient capital markets, entails the reallocation of some present and future economic gains and losses across individuals and economic groups. For example, sounder public

investor property rights amount to limiting the economic power and freedom of established corporate insiders – essentially a redistribution of wealth from corporate insiders to public investors. The former could be expected to object. Generally, groups facing gains and losses try to influence government decisions and actions. A government is composed of politicians and civil servants – human beings who, like any others, maximize their own utility subject to constraints, which in this case reflect the interests and influence of their political constituents. Russian reforms placed a tiny oligarchic elite in control of its large corporate sector. Chinese reforms continue to leave most large firms *de facto* controlled by state ministries. Perhaps Russian and Chinese reformers must contend with more powerful vested interests benefiting from murky capital markets.

The transition economies' paths to a market economy with functionally efficient capital markets guiding resource allocation in the Hayekian sense are far from safe. The research above suggests that many developing economies have long failed to provide effective protection of private property rights and functionally efficient capital markets. Morck, Wolfenzon and Yeung (2004) argue that capital markets are ill informed and dysfunctional in economies in which wealthy, entrenched elites control broad swathes of the corporate sectors. They conjecture that this *economic entrenchment* often impedes economic growth because the elite disproportionately influence policies to protect their interests at the expense of the broader economy. In particular, under a range of plausible circumstances, this influence causes politicians to avoid establishing solid private property rights for outside investors and thus impedes the development of a functionally efficient capital market. What entrenchment traps await transition economies as they struggle to erect market institutions?

## 5.2 Political entrepreneurs

The new elites entrusted with governance of the corporate sectors of transition economies may not be gifted entrepreneurs in the usual sense. Rather, they may be especially adept *political rent seekers* – uniquely talented at manipulating the political process to their advantage. Murphy *et al.* (1991, 1993) suggest that talented rent-seekers are often poor entrepreneurs. They also suggest that experience improves ability in both rent-seeking and genuine entrepreneurship. Thus, elites with both a natural inclination and accumulated experience in political rent-seeking may have little interest in or aptitude for genuine entrepreneurship. Murphy *et al.* (1991, 1993) argue that entrusting corporate governance to such elites is especially harmful to growth.

In Russia, mass privatization led to the creation of a small elite of oligarchs who were especially adept at influencing politicians and bureaucrats. These skills may not always carry over into corporate governance, and new entrants might threaten the oligarchs' corporate empires. A murky stock market presumably makes it harder for such entrants to raise capital, and thus protects the entrenched oligarchs.

In China, the state continues to control uneconomical enterprises after having listed minorities of their shares in a partial privatization programme. Again, the bureaucrats and apparatchiks who control these firms may prefer to limit the entry of embarrassingly better run competitors, and may see a murky stock market as a good way to do this. In contrast, the elites running businesses in the other transition economies may be less entrenched, more entrepreneurial, or less politically connected.

Morck, Stangeland and Yeung (2000), Johnson and Mitton (2002), Rajan and Zingales (2003), and others suggest that elites especially adept at political rent-seeking might fear competition from genuine entrepreneurs, and might use their ability to influence government policies to erect entry barriers to protect their positions. As King and Levine (1993) note, most entrepreneurs need financing, so murky stock markets that make raising capital difficult are a substantial entry barrier.

Might the murky stock markets in Russia and China be deliberate policy objectives? Or are they just the result of malign or benign neglect?

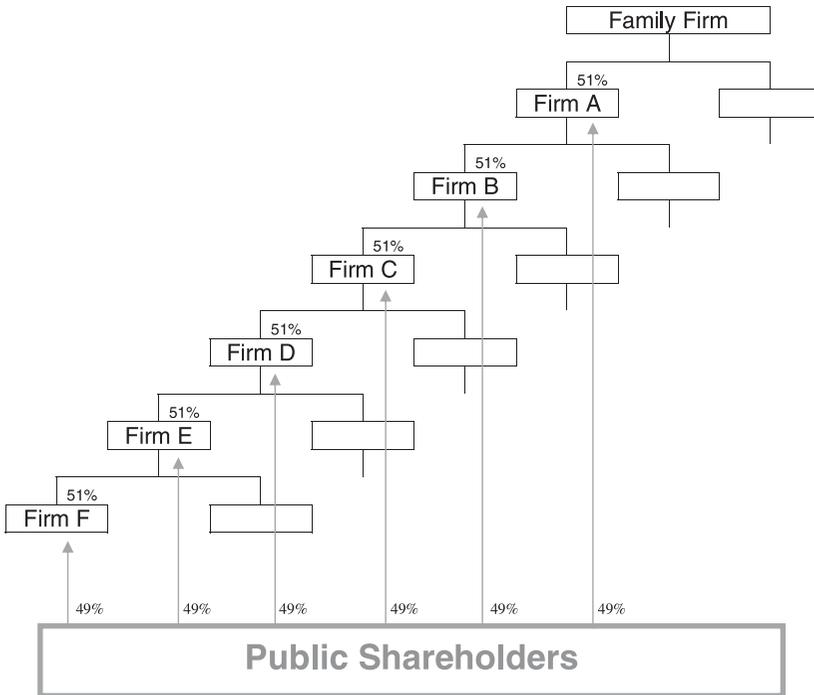
### 5.3 *Pyramidal corporate groups*

In the US and UK, widely held listed firms typify the large corporate sector. La Porta *et al.* (1999) report that most large corporations outside the US and UK are organized into groups through networks of intercorporate equity holdings. These groups are generally pyramidal, as illustrated in Figure 6, with public shareholders providing substantial equity capital throughout, but with a wealthy family controlling firms that control firms that control firms, and so on.

Pyramidal groups are problematic from a corporate governance perspective for several reasons. First, the controlling family's financial interests in the firms in the lower tiers of their pyramids are often indirect and tenuous. Berle and Means (1932) argue that this can lead the controlling owner of a pyramid firm to divert its resources to generate private benefits, much as Jensen and Meckling (1976) argue occurs in widely held firms. Second, by virtue of its indirect holdings through other companies, the wealthy family typically commands a functional majority of the votes at the shareholders' meeting of each firm in the group. This means the wealthy family is entrenched in the sense of Morck *et al.* (1988) and Stulz (1988) – it cannot be dislodged from control by hostile takeovers, proxy challenges, or the like even if the quality of its governance deteriorates. Finally, the controlling family might engage in tunneling – the transfer of profits from companies it controls indirectly to companies it owns. Morck *et al.* (2000), Johnson *et al.* (2000) and others argue that such *tunneling* is akin to the *income shifting* multinationals use to avoid taxes, but with the objective of keeping money away from public investors rather than tax collectors.

Pyramids might figure in the regressions in the previous section in two ways. First, pyramids can magnify firm-level corporate governance problems into macro-economic problems because they concentrate governance of large swathes of a

Figure 6. A stylized diagram of a typical corporate control pyramid



country's corporate sector in the hands of a few wealthy families. For example, Claessens, Djankov and Lang (2000, p. 109) conclude 'that a relatively small number of families effectively control most East Asian Economies.'<sup>20</sup> Similarly, Faccio and Lang (2002) report that very wealthy families control 43.9 percent of the corporate sectors of five Western European countries – Italy, France, Germany, Spain and the United Kingdom.<sup>21</sup> If a country's pyramidal groups are well run, the whole economy might prosper; if they are ill run, the whole economy might suffer. If pyramidal groups in transition economies tend to fall into the hands of adept political rent-seekers, with little genuine entrepreneurial ability, retarded growth

<sup>20</sup> Claessens, Djankov and Lang (2000) show that, in 1996, the top fifteen families controlled corporate assets equal to 84.2 percent of GDP in Hong Kong, 76.2 percent in Malaysia, 48.3 percent in Singapore, 46.7 percent in the Philippines, and 39.3 percent in Thailand. They also show that the largest family controls 17.1 percent of market capitalization in the Philippines, 16.6 percent in Indonesia, 11.4 percent in South Korea.

<sup>21</sup> Faccio and Lang (2002) show that the largest family controls 10.4 percent of total market capitalization in Italy, 5.9 percent in France, 5.4 percent in Germany, 1.7 percent in Spain, and 1.1 percent in the United Kingdom. For the ten largest families, the corresponding figures are 29.1 percent in France, 21.3 percent in Germany, 20.2 percent in Italy, 10.9 percent in Spain and 4.9 percent in the United Kingdom.

might ensue. Also, Morck, Stangeland and Yeung (2000) speculate that such highly concentrated control over countries' corporate sectors might create market power in both the goods and the capital markets.

Second, Morck, Yeung and Yu (2000) argue that pyramids might smooth out intercorporate differences in earnings across groups if controlling owners disproportionately tunnel away abnormal spikes in corporate earnings. Jin and Myers (2004) present a more complete analysis of this hypothesis and evidence consistent with it.

The combination of these two effects might lead to high  $R^2$  and slow economic growth in countries dominated by pyramids. Further work is needed to test this possibility. The importance of pyramidal groups in transition economies, though substantial and growing, is poorly understood at present.

#### *5.4 Problems in ascertaining the direction of transition*

Corporate groups and non-market capital allocation may well be preferable under many circumstances. In particular, a correlation between entrusting corporate governance to a handful of wealthy old families and slow growth or dysfunctional financial markets might equally well reflect causation in either direction.

Khanna (2000) argues that business groups, including family controlled pyramids, form internal markets for financial and human capital, products, and factors of production that substitute for inadequate external markets in developing economies. Corporate groups might emerge as a natural consequence in transition economies that are slow to develop well functioning markets – including goods and factor markets as well as capital markets. In particular, transition economies might be unable to render pyramidal groups uneconomical and financial markets functional until all of these other markets function well too.

Burkart, Panunzi and Shleifer (2003) argue that inherited family control of corporations is a response to an environment that defines property rights poorly; they note that '*[w]hen the protection of minority shareholders is the weakest, the agency problems are too severe to allow for separation of ownership and management. The founding family must stay on and run the firm; they can only afford to cede control to a professional manager if they make him a member of the family. The lack of such separation, and the prevalence of family firms, is evidence of financial underdevelopment.*' Highly concentrated corporate control in transition economies might persist because financial markets function poorly. This need not indicate that controlling owners prefer the *status quo*. They also may simply see no way to change it.

Finally, Roe (2003) notes that many high income economies whose corporate sectors consist largely of family control pyramids also grant organized labour strong legal rights to economic rents that firms generate. He proposes that strong shareholders, like wealthy families, are better able than diffuse shareholders to retain some of these rents. Transition economies that lock in strong labour rights early on may find ill developed financial markets and highly concentrated corporate control an unintended consequence of this agenda.

### 5.5 Choosing initial conditions

However, even if dysfunctional financial markets and highly concentrated corporate control result naturally from conditions prevailing in many transition economies, this ought not to imply that policy-makers should acquiesce to these features. Much work suggests that institutional arrangements deep in countries' economic histories still crucially affect their modern institutions – for good or ill.

Sokoloff and Engerman (2000) and Engerman and Sokoloff (1997) argue that investment opportunities in colonial economies determined initial distributions of economic power, and that these locked in institutions that still constrain post-colonial economies. Where initial economic activities evened the distribution of economic power, as in the yeoman farm economies of colonial North America, the subsequent development of institutions favoured growth. But, where initial activities concentrated economic power, as in the plantation and mining economies of the Caribbean and Latin America, initial elites built institutions that locked it in their power. Acemoglu, Johnson, and Robinson (2001, 2002) argue that British settlers demanded institutions that enforced the rule of law and encouraged investment. Consequently, only British colonies inimical to settlement developed into exploitative states. They find that settler mortality rates affected settlement; which affected early institutions, which persisted.

This line of research suggests that transition economies should be leery of institutions that might fit current conditions, but that retard long-term growth. Once in place, institutions are hard to change. In particular, institutions that derive from a highly inegalitarian distribution of economic power, and that serve to preserve that distribution of power, are of concern. Morck, Wolfenzon and Yeung (2004) call a self-sustaining equilibrium of this sort *economic entrenchment*, and link it to a variety of institutional deficiencies and economic woes.

### 5.6 Economic entrenchment in transition economies

All transition economies have legacies of central planning and extensive bureaucratic involvement in the economy that ingrained traditions of using 'connections' to control quotas, capital allocation, access to hard currency, and the like. In many transition economies, a few entrepreneurs have grown rich fast, in some cases because of prior positions and connections.

There are signs that they are working to protect their riches. Filatotchev, Bleaney and Wright (1999) document Russian managers' efforts to entrench their control over their companies. Cull, Matesova and Shirley (2002) describe how control pyramids developed in the Czech Republic. These skewed initial wealth distributions and strong connections between the business elite and politicians echo the prerequisites to economic entrenchment described above.

The prospect of cutting off competitors and locking in the *status quo* must be enticing for these new business elites. Some symptoms of economic entrenchment

are already visible – a 2003 scandal involving a Shanghai property developer revealed that insiders enjoy preferential access to bank capital, securities issuance, and state subsidies; while outsiders face severe capital constraints and are often branded criminals for raising funds in unconventional ways.<sup>22</sup> Finally, in many transition economies, checks on political corruption, like a free press, are not established traditions.

### 5.7 *Avoiding a transition to entrenchment*

Rajan and Zingales (2003) argue that transitions to entrenchment of this sort are common in the economic history of the twentieth century. At the beginning of the century, many economies had huge, highly developed stock markets. For example, Argentina and France, by some measures, had stock markets as large as that of the US. They document a *great reversal*, whereby many stock markets were pared away by regulators. They suggest that these reversals were due to rent-seeking by established corporate insiders, and also argue that capital market openness limited such reversals in some countries. Elsewhere, they argue that such rent-seeking hobbled financial markets and locked in the economic power of entrenched elites.

If the synchronicity of stock prices in some transition economies is a harbinger of this, it is a matter of grave concern. Fortunately, the literature offers several clues about how countries might avoid this fate.

1. Better general property rights protection is clearly important. Morck, Yeung and Yu (2000) show that countries that protect general private property rights better have much less synchronous individual stock returns. Wurgler (2000) relates this to more functionally efficient capital allocation.
2. Investor rights matter. In countries that offer solid protection of private property rights in general, Morck, Yeung and Yu (2000) find a significant correlation between greater cross-sectional independence in individual stock returns and the specific shareholder rights listed in La Porta *et al.* (1998).
3. Transparency matters. Durnev, Fox, Morck and Yeung (2003) relate improvements in US disclosure rules to decreases in the synchronicity of the stocks affected; and Durnev, Morck, Yeung, and Zarowin (2003) relate synchronous stock returns to other measures of stock market murkiness. Bushman *et al.* (2004) relate the lack of corporate transparency to poor accounting regulations and, more directly relevant to some transition economies, to a state controlled press. This is intuitively sensible, as investors cannot be expected to incorporate firm-specific information into share prices as readily in countries that restrict their access to information.

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<sup>22</sup> See, e.g., 'Tycoons at risk in China's murky business world: Entrepreneurs are falling foul of the law but they may be being singled out for other reasons', *Financial Times*, Nov 17, 2003 and 'Paying the penalty for bucking the system,' *South China Morning Post*, Dec 3, 2003.

4. Openness to the global economy, capital account openness in particular, is important. While trade openness clearly limits local politicians' power to protect established firms from competition; capital openness lets local entrepreneurs acquire foreign financial backing. Capital account openness also lets local savers invest abroad, in firms other than those controlled by the local elite, undermining any monopsony power of large local firms in sourcing capital. Liberalized foreign direct investment also lets 'outside parties' compete to develop local investment opportunities and to challenge local established firms' monopoly power in undertaking investment projects. All of this suggests that local entrenched elites gain by lobbying against globalization, and by lobbying particularly hard against capital account liberalization.

A substantial body of evidence points in this direction, though a definitive understanding of the issue remains distant. Morck *et al.* (2000) find that the Canada–US free trade agreement of 1987 raised the share prices of independent Canadian firms relative to industry benchmarks and lowered those of otherwise similar firms controlled by old money Canadian families. Johnson and Mitton (2002) find that the imposition of Malaysian capital controls in the late 1990s raised the stock prices of firms connected to the ruling political faction. Li *et al.* (2004) find that capital market openings increase the cross-sectional independence of individual firms' stock returns. Rajan and Zingales (2003) find that more open economies were less afflicted by great reversals, or financial atavism, during the twentieth century.

## 6. Conclusions

A stock market that prices differences in different firms' investment opportunities is an important precursor to economic growth. Cross-sectionally independent individual stock returns are important for efficient capital allocation. Lower stock prices raise the cost of capital to firms that are poorly-run and question their managers' control rights, while higher stock prices direct capital to successful firms and accolades to their managers. A higher quality of capital allocation ultimately leads to higher productivity and faster economic growth.

This has direct implications for transition economies. Many transition economies established stock markets, hoping these can stimulate and sustain economic growth in the long term. The results surveyed here suggest that simply *having* a stock market *per se* is unlikely to either stimulate or sustain economic growth. This is because stock markets allocate capital poorly unless informed investors gather and process information about companies, use this to undertake profitable trades, and thereby continually and precisely update individual stock prices.

Stock prices in some transition economies rise and fall *en masse*, reflecting macroeconomic information at best, but perhaps merely noise trading or Keynesian *animal spirits*. Stock markets in these countries do little to direct capital towards

high quality firms and away from low quality firms. In general, these countries seem to be doing little to improve the functioning of their stock markets.

Highly synchronous stock returns are linked to weak general property rights' protection, weak investor property rights, corporate opacity, and closed economies. These conditions may result from political rent-seeking by entrenched economic insiders. They may fear general property rights, investor protection, transparency, and openness directly, or as instruments of a better functioning financial system capable of financing innovative competitors who threaten the *status quo*. Slow economic and productivity growth is the price the economy pays for this.

There is thus a potential danger that some transition economies are in transit from dictatorship by communist bureaucrats to economic dictatorship by a small clique of politically well-connected, entrenched insiders. In this scenario, insiders use 'connections' to get rich in the early stages of transition, in some cases building pyramidal corporate groups to sidestep poorly functioning markets and expand their control over the economy's resources. Once installed, the elite undertake further political rent-seeking to lock in the *status quo*. This rent-seeking aims to limit outsiders' property rights, public investors' rights, transparency, and openness to the global economy. It induces capital misallocation and therefore slow growth. It seems likely that a lack of upward economic mobility for latecomers should also result, though there is no evidence for or against this at present.

Negating this political rent-seeking should be a priority in transition economies – especially those like Russia and China, whose stock prices remain highly synchronous. General property rights' protection protects outsiders from insiders, the weak from the strong, and upstarts from the established. Investor protection lets outsiders raise capital on better terms and partially negates the advantage the established derive from existing wealth. Transparency likewise lets upstarts prove their honesty and competence to investors. All three limit the private benefits the established elite can extract, and so reduce their perception advantage from the *status quo*.

Economic openness in general, and openness to financial flows in particular, also circumvent elite entrenchment problems. Local competitors and innovators can obtain foreign financial backing, and foreign competitors can enter the local market. Under these circumstances, rent-seeking to undermine the local financial system is, at best, pointless to established insiders. Although free capital flow is often condemned as a source of macroeconomic instability, protectionism in finance has the even more unattractive consequences discussed above. Transition economies should conduct responsible macroeconomic and financial policies to avoid financial crises. Barriers against global financial markets are probably very expensive prophylactics.

## References

- Acemoglu, D., Johnson, S. and Robinson, J. A. (2001). 'The colonial origins of comparative development: An empirical investigation', *American Economic Review*, 91(5) (Dec), pp. 1369–1401.

- Acemoglu, D., Johnson, S. and Robinson, J. A. (2002). 'Reversal of fortune: Geography and institutions in the making of the modern world income distribution', *Quarterly Journal of Economics*, 117(4), pp. 1231–94.
- Beck, T., Loayza, N. and Levine, R. (2000). 'Finance and the sources of growth', *Journal of Financial Economics*, 58, pp. 261–300.
- Beny, L. (2000). *A Comparative Empirical Investigation of Agency and Market Theories of Insider Trading*, Harvard Law School Doctoral Dissertation.
- Berle, A. and Means, G. (1932). *The Modern Corporation and Private Property*. New York: Macmillan.
- Breusch, T. S. and Pagan, A. (1980). 'The Lagrange multiplier test and its applications to model specification in econometrics', *Review of Economic Studies*, 47, pp. 239–53.
- Burkart, M., Panunzi, F. and Shleifer, A. (2003). 'Family firms', *Journal of Finance*, 58(5), pp. 2001–2167.
- Bushman, R., Piotroski, J. and Smith, A. (2004). 'What determines corporate transparency?' *Journal of Accounting Research*, 42(2), pp. 207–52.
- Claessens, S., Djankov, S. and Lang, L. H. P. (2000). 'The separation of ownership and control in East Asian Corporations', *Journal of Financial Economics*, 58(1–2), pp. 81–112.
- Chang, J., Khanna, T. and Palepu, K. (2000). 'Analyst activity around the world', Harvard Business School Working Paper.
- Collins, D. W., Kothari, S. P. and Rayburn, J. (1987). 'Firm size and the information content of prices with respect to earnings', *Journal of Accounting and Economics*, 9, pp. 111–38.
- Collins, D. W. and Kothari, S. P. (1989). 'An analysis of intertemporal and cross-sectional determinants of earnings response coefficients', *Journal of Accounting and Economics*, 11, pp. 143–81.
- Cull, R., Matesova, J. and Shirley, M. (2002). 'Ownership structure and the temptation to loot: Evidence from privatized firms in the Czech Republic', *working paper 2568*, Development Economics Research Group, Washington, DC: The World Bank.
- De Long, J. B., Shleifer, A., Summers, L. H. and Waldmann, R. J. (1989). 'The size and incidence of the losses from noise trading', *Journal of Finance*, 44, pp. 681–96.
- De Long, J. B., Shleifer, A., Summers, L. H. and Waldmann, R. J. (1990). 'Noise trader risk in financial markets', *Journal of Political Economy*, 98, pp. 703–38.
- Durnev, A., Morck, R. and Yeung, B. (2000). 'Does firm-specific information in stock prices guide capital allocation?' *NBER Working Paper No. 8093*, Cambridge, MA: NBER.
- Durnev, A., Morck, R., Yeung, B. and Zarowin, P. (2003). 'Does greater firm-specific return variation mean more or less informed stock pricing?' *Journal of Accounting Research*, 41(5), pp. 797–836.
- Durnev, A., Morck, R. and Yeung, B. (2004). 'Value enhancing capital budgeting and firm-specific stock returns variation', *Journal of Finance*, 59(1), pp. 65–105.
- Engerman, S. and Sokoloff, K. (1997). 'Factor endowments, institutions, and differential paths of growth among New World economies: A view from economic historians of the United States', in Haber, S. (ed.), *How Latin America Fell Behind*, Stanford, CA: Stanford University Press.
- Faccio, M. and Lang, L. H. P. (2002). 'The separation of ownership and control: An analysis of ultimate ownership in Western European countries', *Journal of Financial Economics*, 65, pp. 365–95.

- Filatovchev, I., Bleaney, M. and Wright, M. (1999). 'Privatisation, insider control and managerial entrenchment in Russia', *Economics of Transition*, 7(2), pp. 481–504.
- Financial Times* (2003). 'Tycoons at risk in China's murky business world: Entrepreneurs are falling foul of the law but they may be being singled out for other reasons', Nov 17.
- Fox, M., Durnev, A., Morck, R. and Yeung, B. (2003). 'Law, share price accuracy and economic performance', *Michigan Law Review*, 102(3), forthcoming.
- French, K. R. and Roll, R. (1986). 'Stock return variances: The arrival of information and the reaction of traders', *Journal of Financial Economics*, 17, pp. 5–26.
- Glaeser, E., Johnson, S. and Shleifer, A. (2001). 'Coase versus the Coasians', *Quarterly Journal of Economics*, 116, pp. 853–99.
- Grossman, S. (1976). 'On the efficiency of competitive stock markets where traders have diverse information', *Journal of Finance*, 31, pp. 573–85.
- Grossman, S. and Stiglitz, J. (1980). 'On the impossibility of informationally efficient markets', *American Economic Review*, 70, pp. 393–408.
- Hayek, F. A. von (1945). 'The use of knowledge in society', *American Economic Review*, 35, pp. 519–30.
- Jensen, M. and Meckling, W. (1976). 'Theory of the firm: Managerial behavior, agency costs and ownership structure', *Journal of Financial Economics*, 3, pp. 305–60.
- Jin, L. and Myers, S. C. (2004). 'R2 around the world: New theory and new tests', *NBER working paper W-10453*, Cambridge, MA: National Bureau of Economic Research.
- Johnson, S., La Porta, R., Lopez-De-Silanes, F. and Shleifer, A. (2000). 'Tunneling', *American Economic Review*, 90, pp. 22–27.
- Johnson, S. and Mitton, T. (2002). 'Cronyism and capital controls: Evidence from Malaysia', *Journal of Financial Economics*, 67(2), pp. 351–71.
- Khanna, T. (2000). 'Business groups and social welfare in emerging markets: Existing evidence and unanswered questions', *European Economic Review*, 44(4–6), pp. 748–61.
- King, R. and Levine, R. (1993). 'Finance and growth: Schumpeter might be right', *Quarterly Journal of Economics*, 108, pp. 717–38.
- King, R. and Levine, R. (1994). 'Capital fundamentalism, economic development, and economic growth', *Carnegie-Rochester Conference Series on Public Policy*, 40, pp. 259–92.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1997). 'Legal determinants of external finance', *Journal of Finance*, 52, pp. 1131–49.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1998). 'Law and finance', *Journal of Political Economy*, 106, pp. 1112–55.
- La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (1999). 'Corporate ownership around the world', *Journal of Finance*, 54, pp. 471–517.
- La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2000). 'Government ownership of banks', *National Bureau of Economic Research Working Paper No. 7620*, Cambridge, MA: NBER.
- La Porta, R., Lopez-de-Silanes, F. and Zamarripa, G. (2003). 'Related lending', *Quarterly Journal of Economics*, 118(1), pp. 231–68.
- Levine, R. (1997). 'Financial development and economic growth: Views and agenda', *Journal of Economic Literature*, 35, pp. 688–726.
- Levine, R. (2002). 'Bank-based or market-based financial systems: Which is better?' *Journal of Financial Intermediation*, 11, pp. 1–30.
- Levine, R. and Zervos, S. (1998). 'Stock markets, banks, and economic growth', *American Economic Review*, 88, pp. 537–58.

- Li, K., Mørck, R., Yang, F. and Yeung, B. (2004). 'Firm-specific variation and openness in emerging markets', *Review of Economics and Statistics*, forthcoming.
- Mørck, R., Shleifer, A. and Vishny, R. (1988). 'Management ownership and corporate performance: An empirical analysis', *Journal of Financial Economics*, 20, pp. 293–315.
- Mørck, R. and Nakamura, M. (1999). 'Banks and corporate control in Japan', *Journal of Finance*, 54, pp. 319–39.
- Mørck, R., Stangeland, D. and Yeung, B. (2000). 'Inherited wealth, corporate control, and economic growth', in Mørck, R. (ed.), *Concentrated Corporate Ownership*, Chicago, IL: University of Chicago Press.
- Mørck, R., Yeung, B. and Yu, W. (2000). 'The information content of stock markets: Why do emerging markets have synchronous stock price movements?' *Journal of Financial Economics*, 59, pp. 215–38.
- Mørck, R., Wolfenzon, D. and Yeung, B. (2004). 'Economic entrenchment and economic growth', mimeo, Stern School of Business, Department of Finance, New York University.
- Murphy, K. M., Shleifer, A. and Vishny, R. (1991). 'The allocation of talent: Implications for growth', *Quarterly Journal of Economics*, May, pp. 503–30.
- Murphy, K., Shleifer, A. and Vishny, R. (1993). 'Why is rent-seeking costly to growth?' *American Economic Review*, 82(2) (May), pp. 409–14.
- Rajan, R. and Zingales, L. (2003). 'The great reversals: The politics of financial development in the 20th century', *Journal of Financial Economics*, 69, pp. 5–50.
- Roe, M. (2003). 'Political determinants of corporate governance: Political context, corporate impact', Oxford, UK: Oxford University Press.
- Roll, R. (1988). 'R<sup>2</sup>', *Journal of Finance*, 43, pp. 541–66.
- Shleifer, A. and Vishny, R. W. (1986). 'Large shareholders and corporate control', *Journal of Political Economy*, 95, pp. 461–88.
- Shleifer, A. and Vishny, R. W. (1997). 'The limits of arbitrage', *Journal of Finance*, 52, pp. 35–55.
- Sokoloff, K. L. and Engerman, S. L. (2000). 'Institutions, factor endowments, and paths of development in the New World', *Journal of Economic Perspectives*, 14, pp. 217–32.
- South China Morning Post* (2003). 'Paying the penalty for bucking the system', Dec 3.
- Stulz, R. (1988). 'On takeover resistance, managerial discretion and shareholder wealth', *Journal of Financial Economics*, 20(1/2), pp. 25–54.
- Tobin, J. (1982). 'On the efficiency of the financial system', *Lloyd's Banking Review*, 153, pp. 1–15.
- Wurgler, J. (2000). 'Financial markets and the allocation of capital', *Journal of Financial Economics*, 58, pp. 187–214.