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Firm-Specific Variation and Capital Openness

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Abstract:

This paper compares the comovement of individual stock returns across emerging markets. Morck *et al.* (2000) and Campbell *et al.* (2001) show that the US in the post war period saw rising firm specific stock return variations and thus declining comovement. We show that a similar international trend, albeit weaker, is visible for many countries. We further find the trend to be related to capital market openness but not goods market openness. Moreover, the negative relationship between capital market openness and comovement is magnified by institutional integrity (good government).

The price system is just one of those formations which man has learned to use (though he is still very far from having learned to make the best use of it) after he has stumbled upon it without understanding it.

Friedrich August von Hayek (1945)

1. Introduction

The extent to which individual stock prices move independently varies both across countries and over time. Morck *et al.* (2000) show that individual stock prices rise and fall concurrently more than in lower-income economies in the mid 1990s. Campbell *et al.* (2001) and Morck *et al.* (2000) find a long-term rise in firm-specific variation in US stock returns, and a consequent decline in stock price comovement in that country.

We document analogous changes in the individual stock returns in some, but not all emerging markets. Panel regressions reveal a highly significant and robust link between greater capital market openness and higher firm-specific variation. This effect is most evident in emerging market economies with sound institutions. Indeed, capital market openness and poor institutions may actually increase comovement. Similar effects are not evident for trade openness.

These results are important in several ways. Since Wurgler and Durnev *et al.* (2003) link more idiosyncratic returns to more efficient capital allocation, capital market openness might perhaps improve capital allocation. Since trade openness is unrelated to comovement, greater specialization seems an implausible explanation. The heightened linkage between capital market openness and idiosyncratic variation in the presence of good institutions supports the finding of Morck *et al.* (2000) that idiosyncratic variation is somehow related to the institutions of the stock market and of private property.

The remainder of the paper is arranged as follows. Section two describes our conceptual starting points. Section three describes our methodology and section four presents our empirical findings. Section six concludes.

2. Comovement and Openness

The comovement of stock returns can be measured by the variation in individual returns not explained by market returns - either in absolute terms or as a fraction of total variation. Below, we use the same measures, plus the proportion of stocks moving with the market and the average correlation of the returns of randomly selected pairs of stocks as robustness checks. High comovement indicates that stock prices are driven by aggregate factors, and that firm-specific determinants of value are relatively unimportant.

In recent years, differences in return comovement have become the subject of research. Campbell *et al.* (2001) and Morck *et al.* (2000) document rising absolute and relative levels of firm-specific variation over the decades of the twentieth century in US stocks. Using individual returns from a cross section of countries, Morck *et al.* (2000) find that firm-specific variation is a greater part of total variation in more developed countries. They are unable to explain these differences as due to differences in macroeconomic stability, country or market size, economy structure, or fundamentals comovement. Rather, greater official corruption is highly correlated with more comovement; and, in countries with below average corruption, stronger investor protection laws are associated with higher firm-specific variation.

Comovement may be economically important for two general classes of reasons.

The first relates to portfolio risk and option valuation. Campbell *et al.* (2001)

note that many investors are not fully diversified, and so are exposed to greater risk when firm-specific variation is greater. They further show that greater firm-specific variation means investors need larger portfolios to diversify fully. Campbell *et al.* (2001) also point out that greater firm-specific variation should affect option prices, as Black-Scholes and other option valuation techniques depend on the sum of firm-specific and market-related variation in the return of the underlying asset.

The second class of reasons for studying stock return comovement has to do with its importance to the real economy. We now review each of these reasons in turn.

First, Bertrand *et al.* (2002) find that tunneling, the transfer of income and assets between firms in a pyramidal group, is economically important. La Porta *et al.* (1999) show that large pyramidal groups are the predominant corporate ownership structures outside the United States and United Kingdom. Perhaps open capital markets are more transparent, and hence less amenable to tunneling. The result might be less comovement in both firm fundamentals and returns.

Second, economic growth arises from technological progress. Schumpeter (1914) holds that this occurs as innovative firms rise to displace established industry leaders in a process of creative destruction. More intense creative destruction thus causes the fundamentals of innovative and laggard firms to differ more. Perhaps open capital markets are associated with a faster pace of creative destruction, and hence with more idiosyncratic stock price changes.

Third, comovement has corporate governance implications. Morck *et al.* (1989) show that boards dismiss the chief executive officer (CEO) in response to negative firm-specific stock market performance, but not negative industry or market movements.

They suggest that boards have difficulty assigning blame for downturns that affect more than the firm alone. Other corporate governance mechanisms, such as shareholder lawsuits, proxy contests, institutional investor pressure, executive stock options, and the like also depend on firm-specific share price changes distinguishing well-run from poorly-run companies.

Fourth, greater comovement may be symptomatic of market inefficiencies, such as bubbles or herding. Roll (1988) argues that idiosyncratic variation reflects trading by investors with private firm-specific information. Morck *et al.* (2000) speculate that more idiosyncratic variation reflects more intense trading by such investors, and hence with more efficient markets. Campbell *et al.* (2001) dispute this, noting that West (1978) shows more informed price estimates to have lower variation as information is subsequently revealed.

Morck *et al.* (2000) and Durnev *et al.* (2003) cannot explain firm-specific variation with fundamentals comovement. Beny (2000) finds more idiosyncratic returns in countries with stronger prohibitions against insider trading. Bushman *et al.* (2002) find that stock returns exhibit greater firm-specific returns variation in countries with more developed financial analysis industries and with a freer press. Goetzmann and Masso (2002) find greater firm-specific variation in countries that permit short sales. Fox *et al.* (2002) find significantly higher firm-specific price variation following a major historical tightening in US disclosure law for affected stocks, but not for others. Durnev *et al.* (2002a) show returns more accurately predicting future earnings changes in industries where stocks more idiosyncratically. Collins *et al.* (1987), and others in the accounting literature, regard such predictive power as gauging the 'information content' of stock

prices. Given the framework of West (1978), these findings point to an as-yet unclear explanation of comovement.

Regardless, more idiosyncratic prices are associated with better quality capital allocations. Tobin (1982) defines the market as *functionally efficient* if price changes induce an efficient allocation of capital. Wurgler (2000) shows capital flows to be more responsive to value-added in countries where stock returns are less in synch. Durnev *et al.* (2002b) show that US industries in which individual returns are more idiosyncratic also exhibit fewer signs of both overinvestment and underinvestment, as measured by the deviation of Tobin's marginal q ratios above and below an optimal value. Both studies posit that stock markets with more idiosyncratic prices are more functionally efficient.

Our objective is to see if the US pattern of rising idiosyncratic variation extends to other countries, and to see what factors correlate with the magnitudes of this change across countries. In searching for candidate explanations for the differing decreases in the comovement of individual stock returns in different countries, we need to consider factors that affect many countries, but to differing degrees. One such factor is increasing integration into the global economy. We make no pretense that globalization is the only such factor. However a study of all the possible factors contributing to changing comovement is beyond the scope of this effort. We focus on globalization because several plausible arguments point in this direction.

First, economic openness, especially to capital flows, has clearly changed to different degrees in different countries over the past decade, and in ways that can be measured – if with difficulty.

Second, capital market liberalization allows savers more investment alternatives,

and makes them less concerned about the idiosyncratic risk in individual companies. This may allow firms leeway to undertake more idiosyncratically risky investments in some countries without unsettling investors.

Third, openness increases both capital and product market competition, and this creates pressure to improve standards of corporate governance. Better corporate governance should induce each firm's managers to seek ways to elevate their firms' fundamental values relative to firms run by others. Curtailing tunneling and other safety nets for poor corporate managers should likewise render poor governance more obvious.

Fourth, capital market openness creates pressures on regulators to adopt international accounting standards, and to regulate stock markets in ways that better protect public investors. It also creates local demand for information professionals, such as accountants and financial analysts, who might, in turn, press for reforms to bring up their professions' standards. This might both lower the cost of private information and increase the risk-adjusted returns arbitrageurs can earn using such information. Or, in turn, capital market openness may reflect subtle institutional reforms that bring about more effective protection for investors.

Fifth, as Caves (1986) notes, openness increases the rewards to innovators by allowing them to achieve greater economies of scale. Also, more interaction with foreign competitors conceivably leads to technology spillovers that innovative local firms can exploit. Moreover, Rajan and Zingales (2002) and Morck, Stangeland, and Yeung (2000) argue capital market openness lets entrepreneurial upstarts obtain financing from abroad. As well-financed innovative firms pull ahead of sedate rivals, firm specific differences in stock returns grow.

All of these changes doubtlessly create profitable opportunities for some firms and damage the prospects of others. This engenders increased firm-specific variation in firm fundamental values.

Critics of globalization argue that openness precipitates crises. For example, the official Bernama news agency quoted Malaysian Prime Minister Mahathir Mohamad as blaming Malaysia's economic crisis on international financiers who "robbed the Palestinians of everything, but in Malaysia they could not do so, hence they do this, depress the ringgit."¹ Perhaps more sagaciously, Bhagwati (1998) argues that capital market openness can indeed lead to financial crises, and argues that only product market openness is justified. The Malaysian Prime Minister went on to impose capital controls. Tobin (2000) argues that a small transactions tax on international currency markets would prevent rapid destabilizing financial flows.

In addition, neoclassical trade theory argues that goods market openness allows greater specialization. Openness should thus reduce an economy's diversification across industries. This, in turn, could increase the comovement of individual firms' stocks.

Thus, the impact of openness on comovement might be positive or negative. Which of these two contradictory sets of effects dominates under what circumstances is an empirical issue, to which we now turn.

3. Methodology

Estimating the Comovement

Our main comovement measures are based on market model regressions for individual

¹ From an October 10th 1997 speech to Muslim villagers, quoted in "Malaysia Premier Sees Jews Behind Nation's Money Crisis," by Seth Mydans, *New York Times*, October 16, 1997.

securities. Let the return on stock j in period t be r_{jt} , the domestic market return for country n at t be r_{nt} , and the US market return at t be r_{mt} . To assess the comovement of individual stocks in country n during period τ , we run the regression

$$r_{jt} = \beta_0 + \beta_1 \tilde{r}_{njt} + \beta_2 r_{mt} + \varepsilon_{jt} \quad [1]$$

separately for each stock $j \in n$ using all T_j observations $t \in \tau$. The transformed domestic market return, \tilde{r}_{njt} is the equal-weighted average return of all stocks in n except j itself,

$$\tilde{r}_{njt} \equiv \frac{\sum_{i \in n, i \neq j} r_{it}}{J_{nt} - 1} \quad [2]$$

where J_{nt} is the number of stocks in country n at time t . We thus use a different domestic market return for each regression. This is because we are interested in the comovement of stock j with other stocks, not with itself. In economies with a small number of traded stocks, this eliminates a potential upward bias in our comovement measures.

A simple variance decomposition expresses the sum of squared variation in r_{jt} , denoted $s_{j\tau}^2$, as the sum of the squared variation explained by regression [1], ${}_m s_{j\tau}^2$, and the residual variation ${}_\varepsilon s_{j\tau}^2$. The systematic variation in stock j during interval τ is ${}_m \sigma_{j\tau}^2 = \frac{1}{T_j - 1} {}_m s_{j\tau}^2$, the firm-specific variation is ${}_\varepsilon \sigma_{j\tau}^2 = \frac{1}{T_j - 1} {}_\varepsilon s_{j\tau}^2$, and the total variation is $\sigma_{j\tau}^2 = \frac{1}{T_j - 1} s_{j\tau}^2$ where T_j is the number of return observations for firm j in during τ .

To estimate country-level analogs, we take a weighted average of the J_n firm-level measures in each country n . Thus, the *average absolute firm-specific return variation* for stocks in country n during interval τ as

$${}_\varepsilon \sigma_{n\tau}^2 = \frac{\sum_{j \in n} {}_\varepsilon s_{j\tau}^2}{\sum_{j \in n} T_j - J_n} \quad [3]$$

We interpret a larger $\epsilon \sigma_{n\tau}^2$ as signifying less comovement in individual returns.

An analogous procedure generates the *average absolute systematic return variation* for stocks in country n during time interval τ ,

$${}_m \sigma_{n\tau}^2 = \frac{\sum_{j \in n} {}_m S_{j\tau}^2}{\sum_{j \in n} T_j - J_n} \quad [4]$$

We interpret a greater ${}_m \sigma_{n\tau}^2$ as signifying more comovement in individual returns.

Scaling firm-specific variation by total variation, we obtain the R^2 statistic of regression [1],

$$R_{j\tau}^2 \equiv \frac{{}_m S_{j\tau}^2}{S_{j\tau}^2} = \frac{{}_m \sigma_{j\tau}^2}{\sigma_{j\tau}^2} \quad [5]$$

To gauge the importance of systematic variation as a fraction of total variation in country n , we can define a country-level analog,

$$R_{n\tau}^2 \equiv \frac{{}_m S_{n\tau}^2}{S_{n\tau}^2} = \frac{{}_m \sigma_{n\tau}^2}{\sigma_{n\tau}^2} \quad [6]$$

the *average relative systematic variation* in the stocks of country n during interval τ . We take a lower $R_{n\tau}^2$ as signifying less comovement.

In addition to the above, we employ two simpler comovement measures as robustness checks. One is the fraction of stocks moving the same direction during a given period. The other averages the simple correlations of the returns of each of the $30 \times 29 = 870$ pairings of 30 randomly selected stocks from each country n in each period.

To construct these measures, we download a time series of Wednesday-to-Wednesday returns for every stock in DataStream, deleting returns with zero or missing volume at either endpoint. Using weekly returns economizes on downloading time.

DataStream contains coding errors, especially for Latin American, due to misplaced decimal points. An algorithm checks for such errors and drops affected observations.

Regression Framework

We seek to explain comovement with measures of openness to the global economy, taking into account the different levels of institutional development in different countries.

We thus run panel regressions of the form

$$\begin{bmatrix} \text{comovement} \\ \text{measure} \end{bmatrix} = \begin{bmatrix} \text{fixed} \\ \text{effects} \end{bmatrix} + \beta_1 \begin{bmatrix} \text{openness} \\ \text{measure} \end{bmatrix} + \beta_2 \begin{bmatrix} \text{openness} \\ \text{measure} \end{bmatrix} \times \begin{bmatrix} \text{institutional} \\ \text{development} \end{bmatrix} + \eta_{n\tau} \quad [7]$$

We follow Morck *et al.* (2000) in using as dependent variables the natural logarithm of average firm-specific variation, $\ln(\sigma_{n\tau}^2)$, the natural logarithm of systematic variation, $\ln({}_m\sigma_{n\tau}^2)$, and the difference between them, which we denote by the Scandinavian letter $\varnothing_{n\tau}$.² Note that $\varnothing_{n\tau}$ is a logistic transformation of the R^2 measure, for

$$\varnothing_{n\tau} \equiv \ln({}_m\sigma_{n\tau}^2) - \ln(\sigma_{n\tau}^2) = \ln\left(\frac{R_{n\tau}^2}{1 - R_{n\tau}^2}\right) \quad [8]$$

Since ${}_m\sigma_{n\tau}^2$ and $\sigma_{n\tau}^2$ are both bounded below by zero, and $R_{n\tau}^2$ lies within the unit interval, these transformations are necessary to provide approximately normally distributed dependent variables.

We use several alternative measures to capture different aspects of openness.

We use the *trade openness* measure suggested by Frankel (2000),

$$\begin{bmatrix} \text{trade} \\ \text{openness} \end{bmatrix}_{n\tau} \equiv \frac{M_{n\tau}}{Y_{n\tau}} - \left(1 - \frac{Y_{n\tau}}{\sum_n Y_{n\tau}}\right) \quad [9]$$

² Pronounced “oy”.

where $M_{n\tau}$ is total imports and $Y_{n\tau}$ is gross domestic product (GDP). If national borders do not affect buying patterns imports over GDP equals one minus the nation's share of world production, leaving the value of the openness measure zero. In a completely closed economy the variable's value is minus one plus the country's GDP as a fraction of world GDP. As the country becomes more open, the measure rises towards zero. Trade openness can rise above one for an entrepôt state. Frankel (2000) recommends this measure in lieu of the traditional imports plus exports over GDP, which tends to be larger for smaller economies.

We construct the variable using data from *World Development Indicators 2000*, produced by the World Bank. For our sample, the variable is always negative. Note, however, that we exclude the city-states of Singapore and Hong Kong, which are probably the most important entrepôt countries. Hong Kong is a particularly unique case because of her switching from a UK colonial state to a Chinese special administration region during our sample period.

Measuring capital market openness is more difficult, for investment stock and flow measures are often highly problematic. We therefore use a carefully developed *capital market openness measure* provided by Edison *et al.* (2001). This is a direct measure of the openness of each country's stock market to foreign investors. Essentially, it reflects the value of stocks that can be purchased by foreign investors as a percentage of total domestic market capitalization.³ The index should assume values

³ This measure is based on an "investable" index, reflecting the market as available to foreign investors, divided by a "global" index, reflecting the whole market. Both are from the International Finance Corporation (IFC). To control for "asymmetric shocks to investable and non-investable stocks", the measure is adjusted using price indices computed by IFC for the two categories of stocks. Since the stocks available to foreigners may trade at different prices than the stocks available to locals, the value of stocks available to foreigners can, in theory, exceed total domestic stock market capitalization. The index used in Edison *et al.* (2002) is actually one minus this openness ratio, and measures the intensity of capital controls.

closer to one if a market is more open and closer to zero if it is more closed.

The index is available for most emerging markets from 1990 through 2001, though it is unavailable for some in the very early 1990s.

The capital market and trade openness measures are also quite consistent. In general, countries with open capital markets have open goods markets, and the two types of openness exhibit similar time trends. Notable exceptions are Indonesia (capital market openness rose, while trade openness shows no consistent trend), Malaysia and the Philippines (capital market openness shows no consistent trends, but trade openness rises), and Pakistan (capital market openness rise while the goods market becomes more closed).

To assess the development of a country's institutions, we use the *good government* measure constructed by Morck *et al.* (2000). This measure is the sum of three measures constructed by La Porta *et al.* (1999) that gauge the respect a country's government show for the rule of law, the efficiency of a country's legal system, and the freedom of its government and civil service from corruption. Each of these individual measures ranges from zero to ten. The good government variable therefore must lie between zero and thirty, with higher numbers connoting better institutions.

All our regressions control for country, year, and crisis fixed effects.

Including country fixed effects nets out own-country averages. We do this because Morck *et al.* (2000) show mean comovement to vary across countries for a variety of reasons having to do with economy structure, economy size, and fundamentals comovement. We have no reliable measures of how these factors change through time for each country, and therefore subsume them into general fixed effects. We recognize

that this may not capture the full effects of changes in these variables. If such changes are correlated with changing openness, our openness variable might pick up effects that, more properly, should be ascribed to changes in these other variables. If these other effects are, themselves, also associated with economic openness, this is defensible. If they are not, we must interpret our openness variable more broadly, as perhaps capturing part of a broader range of institutional or other changes.

Year fixed effects capture global macroeconomic factors, and also let us extract any residual time trend in our data.

A number of emerging economies experienced financial crises during the 1990s. Hence, we include three crisis dummies to capture transitory changes in comovement associated with the unusual conditions prevailing in the affected markets. An Asian crisis dummy is one for East Asian countries in 1997 and 1998, and zero otherwise. A Mexican peso crisis is one for Latin American countries in 1995, and zero otherwise. Finally, a Brazilian real crisis dummy is one for Latin American countries in 1998, and zero otherwise.

Sample

Table 1 lists the countries in our final sample. The list of countries in Table 1 is the intersection of those for which the Edison *et al.* (2002) capital openness measure is available, those for which the good government index is available, and those for which DataStream stock returns are available. We go back only to 1990s because stock return data for earlier years are unavailable on DataStream for many countries. We thus have annual comovement measures from 1990 to 2001. We require that five years of

comovement data be available to include a country in our panel. Our trade openness variable is unavailable for Taiwan (ROC).

The resulting panel contains annual measures for 17 countries from 1990 to 2001 totaling 183 country-year observations. We work with less than a full panel because data for some countries are not available in the early 1990s. Table 1 displays country means and univariate statistics for our key variables.

4. Findings

Figure 1 summarizes the pattern across all emerging economies. Panel A, weighting each country equally, reveals falling $R_{n\tau}^2$ and ${}_m\sigma_{n\tau}^2$ along with a rising ${}_\varepsilon\sigma_{n\tau}^2$, though none are monotonic. Panel B, weighting each stock equally with no regard to its country, reveals a similar picture.

Space constraints prevent the inclusion of detailed descriptions of each country. Twelve of our eighteen countries show a decline in $R_{n\tau}^2$ from the first year of data to the last. In fourteen countries, ${}_\varepsilon\sigma_{n\tau}^2$ rises; while ${}_m\sigma_{n\tau}^2$ rises in eleven.

During crisis years, ${}_\varepsilon\sigma_{n\tau}^2$ and ${}_m\sigma_{n\tau}^2$ both spike. The latter rises more, so $R_{n\tau}^2$ also spikes. These observations are not surprising, at least on the surface.⁴

Our present focus is on how openness and institutions correlate with comovement. These same factors may affect the virility and incidence of crises, so crises cannot really be disentangled from them. However, a thorough analysis of the interactions of crises

⁴ Economic crises, by their very nature, are systematic. They affect broad swaths of firms and industries simultaneously, and so are apparent as elevated systematic variation. Firm-specific variation can rise too, for the crisis may affect some firms or sectors more than others, and may even present opportunities to some firms. If crises also correspond to manias and panics, market swings due to noise trading might also heighten comovement.

with institutions, openness, and stock return variation is beyond the scope of this study, though we are pursuing it elsewhere. Nonetheless, we clearly must control for transitory changes in R^2 , $\sigma_{n\tau}^2$ and $\sigma_{m\tau}^2$ during crisis when we evaluate the determinants of their more permanent levels. We return to this issue below.

Table 2 reports our regression results. Panel A shows that trade openness is positively related to the comovement measure $\phi_{n\tau}$. When we include both trade openness and its cross term with good government in 2.3, trade openness has a positive coefficient while the cross term has a negative one; both insignificant. However, the F-statistic indicates joint significance. In contrast, capital market openness is significantly associated with lower systematic variation relative to the total. Again, the cross product with institutional development is significant. Both remain significant when included together in 2.6, however, capital openness takes a positive sign and the cross term becomes negative. Including both trade and capital openness and both cross terms in 2.7 leaves the point estimates of the two capital openness terms virtually unchanged from 2.6. The point estimates in 2.7, which are both individually and jointly significant, imply that a good government index greater than twenty makes the overall effect of capital openness on comovement negative. The mean value for the good government measure in our sample is nineteen.

Panel B shows openness in trade significantly positively related to absolute systematic variation, but unrelated to firm-specific variation. The cross term between trade openness and good government in 2.9 is also negative and statistically significant.

Panel C shows no relationship between trade openness and absolute firm-specific variation. Capital openness and its cross product are both significantly related to higher

firm-specific variation. When both are included in 2.20, the individual coefficients are insignificant and capital openness *per se* switches sign. Although an F test shows the two to be jointly significant, collinearity problems make interpreting the point estimates problematic. If we ignore such problems, a good government index above eleven induces a positive relationship between capital openness and absolute firm-specific variation.

Robustness Checks

To ascertain that our results are not due to comovement changes associated with crises, we repeat our regressions dropping all observations for which any of the three crisis dummies described above is one. The results are virtually unchanged, and the panel regression R^2 's rise.

Dropping the crisis dummies and including all observations also generates results similar to those shown, as does including only country fixed effects.

As alternative comovement measures, we employ the average correlation between all possible pairs of thirty stocks, randomly selected in each country for each period, and the fraction of stocks moving with the market. Regressions explaining logistic transformations of these measures of comovement closely resemble the regressions explaining \varnothing_{nt} .

As a robustness check, we use an alternative measure constructed by and Abiad and Mody (2002), which assigns score to different aspects of capital flow openness.⁵ Unfortunately, this measure is available only to 1996. It generates a pattern of signs and coefficients

⁵ These are: directed credit/reserve requirements, interest controls, entry barriers/pro-competition measures, regulation /securities markets, privatization, and international capital flows openness.

similar to those shown, but with much lower significance levels, probably due to the much smaller intersection of that measure with our comovement estimates.

Substituting the simple trade openness measure of imports plus exports over GDP for the Frankel (2000) trade measure generates similar patterns of signs and significance to those shown.

Cook's D statistics indicate that outliers are not driving our results. Tests for heteroskedasticity reject the need for modified t-tests.

5. A Case Study

A case in point to illustrate the situation is the contrast between two Eastern European countries, Poland and Czech. Both countries experienced a flurry of new legislation in 1991 and 1992 established basic market economy institutions. However, Glaeser *et al.* (2001) show that the two countries then followed very different trajectories. The judicial systems remained underdeveloped in both countries. However, strict Polish regulatory enforcement contrasted starkly with the hands-off regulation inspired by the libertarian philosophy of the Czech government in the 1990s. Glaeser *et al.* (2001) argue that the Czech financial system was stunted relative to that of Poland by the laissez faire philosophy of Czech leaders, and stress the need for law enforcement, by either the judiciary or regulators, to make markets work.

Neither country is included in our sample because of the unavailability of complete stock market and institutional development data. However, by downloading daily data from DataStream and following precisely the same procedure outlined in

section 3, we are able to construct a set of bimonthly comovement measures for these countries.⁶

Figure 2 shows an upward trend in firm-specific variation in Poland and a downward trend in the Czech Republic in the latter years of the 1990s, as both opened their economies in preparation for accession to the European Union. The declining comovement in Polish stocks contrast well with the absence of a trend in Czech stocks. The contrast illustrates how opening is associated with reduced comovement and higher firm-specific variation only if the institutions of private property are sound.

6. Conclusions

This paper shows that the firms-specific variation in individual stock returns rose (though not monotonically) during the 1990s across most emerging markets. This indicates that the rising firm-specific variation detected by Morck *et al.* (2000) and Campbell *et al.* (2001) in US stocks is an international phenomenon.

We find this trend to be related to globalization. Greater capital market openness is associated with higher firm-specific variation and lower comovement, as measured by the R^2 of market model regressions for the average stock. In contrast, goods market openness is associated with higher systematic variation, but greater comovement of individual stocks. These effects are magnified by greater institutional integrity (good government).

Although there is near uniform agreement among economists that trade openness is welfare enhancing, capital openness is subject to debate, with many, such as Bhagwati

⁶ But for the time involved in downloading from DataStream, this could be done with all countries, and further investigation of higher frequency comovement measures is high on our research agenda.

(1998) arguing that capital openness creates scope for destabilizing market-wide fluctuations – so-called ‘hot money’ problems. Our results suggest that such concerns can be overstated. If the problem is market-wide fluctuations, these are associated with trade openness, not capital openness. In retrospect, this is reasonable, for trade openness is thought to induce greater specialization.

The reasons for capital openness being associated with higher firm-specific variation and lower comovement are at present unclear. Candidate explanations include reduced tunneling due to greater transparency, a faster pace of creative destruction causing greater differences between innovators and laggards, differences in the cost structure of information and hence in informed arbitrage, more diversified shareholders who are more less concerned about the idiosyncratic risk, allowing firms leeway to undertake more idiosyncratically risky investments, and higher standards of corporate governance and better regulation that reward more innovative management.

Regardless of the precise reasons, higher firm-specific variation appears to be related to more functionally efficient stock markets. Tobin (1982) defines the market as *functionally efficient* if stock price changes induce an efficient allocation of capital. Wurgler (2000) shows capital flows to be more responsive to value-added in countries where stock returns are less in synch. Durnev *et al.* (2002b) show that US industries in which individual returns are more idiosyncratic also exhibit fewer signs of both overinvestment and underinvestment, as measured by the deviation of Tobin’s marginal q ratios above and below an optimal value. Both studies posit that stock markets with more idiosyncratic prices are more functionally efficient.

Given these findings, the magnitude of firm-specific variation in a country’s

stocks presents itself as an interesting variable with which to examine institutional development, as suggested by the Czech-Poland comparison above. Better institutions should cause the market to make a sharper distinction between firms with good prospects and firms with poor prospects and thus to allocate capital more efficiently. We believe that these findings suggest a new and potentially useful measure of the effectiveness of reforms in different countries. We propose that increasing firm-specific variation might be regarded as a gauge of the extent of real institutional reform.

The view outlined here is not new. In the *Pure Theory of Capital*, Hayek (1941, p. 6) argues that “[The] stock of capital is not an amorphous mass, but possesses a definite structure, that it is organized in a definite way, and that its composition of essentially different items is much more important than its aggregate ‘quantity’.” In a healthy economy, Hayek argues, different companies undertake different investments because their managers possess different levels of entrepreneurial ability, openness to innovation, and foresight. Some firms succeed and others fail as the economy grows through this ongoing process of creative destruction.

We recognize that ours is not the final word, and invite alternative explanations of the patterns we detect. We welcome ideas about how to distinguish such possibilities from the economic underpinnings we propose.

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Table 1. Sample Descriptive Statistics

Comovement is measured by average market model R squared, $R_{n\tau}^2$, average firm-specific variation, $\epsilon \sigma_{n\tau}^2$, and average systematic variation $\ln_m \sigma_{n\tau}^2$. Capital openness is value-weighted fraction of the market open to foreign investors. Trade openness is imports over GDP relative to GDP over world GDP. Good government is a cross-section index taking low values where corruption is worse. Data are for 1990 through 2001.

Market	$R_{n\tau}^2$	$\epsilon \sigma_{n\tau}^2$	$\ln_m \sigma_{n\tau}^2$	Capital openness	Trade openness	Good government
Brazil	0.1757	0.0080	0.0018	0.74	-0.87	20.24
Chile	0.1625	0.0033	0.0007	0.81	-0.70	19.60
Colombia	0.1448	0.0040	0.0007	0.66	-0.79	18.97
Greece	0.2874	0.0054	0.0025	0.81	-0.74	21.01
India	0.2516	0.0078	0.0027	0.19	-0.85	18.44
Indonesia	0.1837	0.0093	0.0025	0.56	-0.71	15.40
Korea	0.3006	0.0080	0.0028	0.36	-0.65	22.20
Malaysia	0.4342	0.0037	0.0033	0.75	-0.10	22.76
Mexico	0.2463	0.0036	0.0013	0.65	-0.72	18.61
Pakistan	0.1987	0.0072	0.0018	0.59	-0.78	13.47
Peru	0.1652	0.0077	0.0017	1.01	-0.82	14.92
Philippines	0.1963	0.0085	0.0023	0.49	-0.54	12.94
Portugal	0.1172	0.0039	0.0005	0.68	-0.62	24.85
South Africa	0.0965	0.0087	0.0009	1.00	-0.77	23.07
Taiwan	0.3922	0.0032	0.0027	0.23	.	25.13
Thailand	0.2701	0.0065	0.0024	0.38	-0.53	20.17
Turkey	0.3753	0.0087	0.0056	0.99	-0.75	18.13
Mean	0.2352	0.0063	0.0021	0.64	-0.69	19.41
Std	0.0978	0.0023	0.0012	0.25	0.18	3.67
Minimum	0.0965	0.0032	0.0005	0.19	-0.87	12.94
Maximum	0.4342	0.0093	0.0056	1.01	-0.10	25.13

Table 2. Panel Regressions

Independent variables include *capital openness*, a value-weighted fraction of the market open to foreign investors; *trade openness*, imports over GDP relative to GDP over world GDP; and interactions with *good government*, a cross-section index taking low values where corruption is worse. The Peso crisis dummy is one for Latin American countries in 1995, and zero otherwise. The Asian Crisis dummy is one for Asian countries in 1997 and 1998, and zero otherwise. The Real crisis dummy is one for Latin American countries in 1998, and zero otherwise. Data are for 1990 through 2001. The dependent variables are as indicated. All regressions include year and country fixed effects.

Panel A. Dependent variable is $\ln(\cdot)$, a logistic transformation of market model R2

Regression	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Trade openness	1.97** * (.79)		2.02 (2.84)				.11 (2.90)
Trade openness x good government		.10** (.04)	-.0026 (.15)				.11 (.15)
Capital openness				-.43* (.25)		2.72** (1.35)	2.96** (1.43)
Capital openness x good government					-.02** (.01)	-.15** (.06)	-.15** (.07)
Peso Crisis Dummy	.64*** (.21)	.64*** (.21)	.64*** (.21)	.64*** (.23)	.65*** (.23)	.63*** (.23)	.64*** (.21)
Asian Crisis Dummy	.16 (.16)	.18 (.16)	.16 (.16)	.20 (.17)	.20 (.17)	.17 (.17)	.15 (.16)
Real Crisis Dummy	.35 (.24)	.35 (.25)	.35 (.24)	.41 (.27)	.41 (.27)	.38 (.27)	.32 (.24)
F Statistic for openness terms	6.22***	5.69**	3.09**	3.05*	4.62**	4.39***	3.16**
Regression R^2	.7544	.7534	.7544	.7214	.7242	.7315	.7654

Panel B. Dependent variable is logarithm of average systematic variation

Regression	2.15	2.16	2.17	2.18	2.19	2.20	2.21
Trade openness	3.15*** (1.08)		-0.03 (3.88)				.38 (4.00)
Trade openness x good government		.17*** (.06)	.17 (.20)				.16 (.21)
Capital openness				.35 (.33)		1.84 (1.83)	1.45 (1.97)
Capital openness x good government					.01 (.02)	-.07 (.08)	-.04 (.09)
Peso Crisis Dummy	1.10*** (.29)	1.11*** (.29)	1.11*** (.29)	1.08*** (.31)	1.09*** (.31)	1.08*** (.31)	1.08*** (.29)
Asian Crisis Dummy	.63*** (.22)	.66*** (.21)	.66*** (.22)	.57*** (.23)	.58*** (.23)	.56** (.23)	.61*** (.22)
Real Crisis Dummy	.20 (.33)	.20 (.33)	.20 (.33)	.30 (.36)	.30 (.36)	.29 (.36)	.19 (.33)
F Statistic for openness terms	8.50***	9.29***	4.61***	1.12	.80	.90	3.10**
Regression R^2	.7233	.7248	.7248	.6667	.6660	.6682	.7311

Panel C. Dependent variable is logarithm of average firm-specific variation

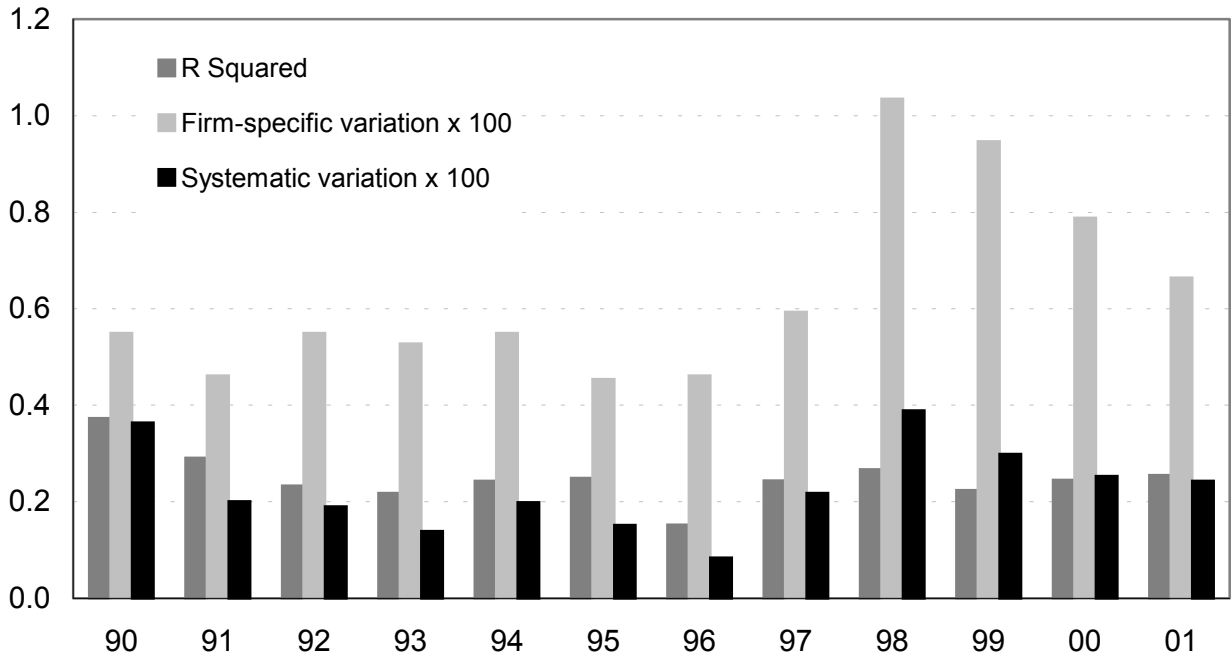
Regression	2.8	2.9	2.10	2.11	2.12	2.13	2.14
Trade openness	1.18 (.89)		-2.04 (3.19)				.28 (3.19)
Trade openness x good government		-.07 (.05)	.17 (.17)				.05 (.17)
Capital openness				.78*** (.24)		-.88 (1.33)	-1.50 (1.57)
Capital openness x good government					.04*** (.01)	.08 (.06)	.11 (.07)
Peso Crisis Dummy	.46** (.24)	.46** (.24)	.47** (.24)	.44** (.23)	.44** (.23)	.45** (.23)	.44** (.23)
Asian Crisis Dummy	.47*** (.18)	.47*** (.18)	.49*** (.18)	.37** (.17)	.38** (.17)	.39** (.17)	.46*** (.17)
Real Crisis Dummy	-.15 (.27)	-.15 (.27)	-.14 (.27)	-.11 (.26)	-.10 (.26)	-.09 (.26)	-.13 (.26)
F Statistic for openness terms	1.76	2.46	1.43	10.6***	11.8***	6.11***	3.72***
Regression R^2	.5934	.5955	.5967	.6295	.6324	.6335	.6296
Sample	167	167	167	182	182	182	167
Degrees of freedom	136	136	135	150	150	149	133

Sample is 167 country-year panel observations. Numbers in parentheses are coefficient standard errors.

Figure 1. Changing Comovement in Individual Emerging Market Stocks

Annual comovement measures are derived from market model regressions of weekly individual stock returns on domestic and US market returns, and include the average regression R^2 , the systematic (explained) variation in the average stock's returns, and the firm-specific (residual) variation in the average stock's returns.

Panel A. Averages for each country are weighted equally



Panel B. Averages across all stocks without regard for country

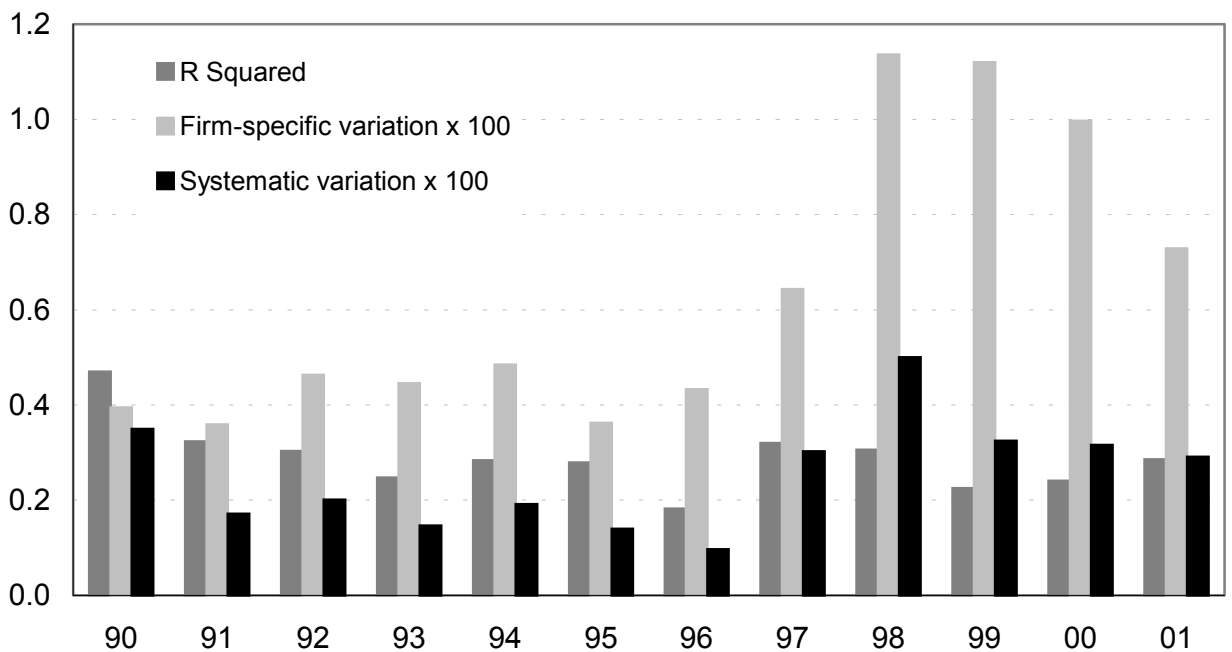
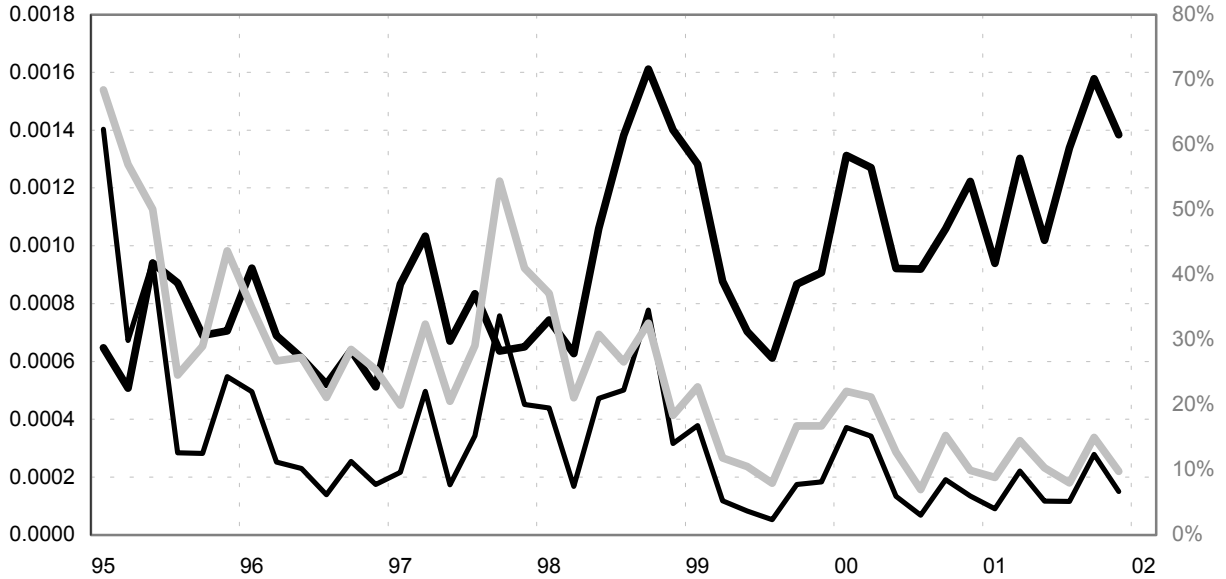


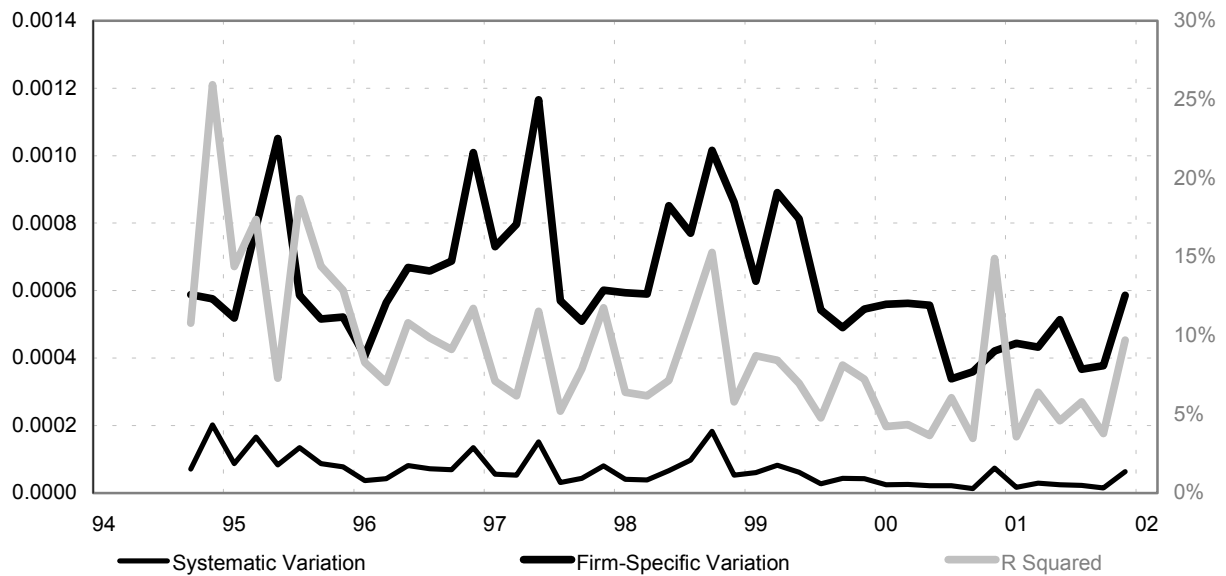
Figure 2. Variance Decomposition of Individual Stock Returns in Poland and the Czech Republic

Bimonthly comovement measures are derived from market model regressions of daily individual stock returns on domestic and US market returns, and include the average regression R^2 , the systematic (explained) variation in the average stock's returns, and the firm-specific (residual) variation in the average stock's returns.

Panel A. Poland



Panel B. The Czech Republic



Systematic and firm-specific variation are plotted on the left axis, R squared is on the right axis.