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Corporate Stability and Economic Growth

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Abstract

Greater instability in a country's list of top corporations is associated with faster economic growth. This faster growth is primarily due to faster growth in total factor productivity in industrialized countries, and faster capital accumulation in developing countries. These findings are consistent with the view that economic growth is more closely tied to the rise of new large firms than to the prosperity of established large firms.

Although a stable list of leading corporations is highly correlated with government size, it is unrelated to other possible policy goals, such as (successful) income equalization and avoiding economic crises, it is related to other political factors. However, the list of top firms is more stable in countries with fewer rights for creditors in bankruptcy and with bank-based rather than stock market-based financial systems.

These findings appear to oppugn arguments of the form “What’s good for General Motors is good for America”. We propose that political rent-seeking by large established firms underlies increased corporate stability.

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"In general, it is not the owner of stagecoaches who builds railways."

Schumpeter (1934, p. 66)

1. Introduction

National economies have landmark corporations. The shipping company, Maersk, symbolizes the Danish economy and its maritime history, just as Nokia is an economic symbol of Finland's success in the "new economy." Many, especially the principals of these great corporations, claim a linkage between an economy's fortunes to those of its landmark firms. Most famously, GM chairman Charles Wilson proclaimed, "What is good for the country is good for General Motors and vice versa."

This view is not without economic foundation. First, large corporations may be so because they are well managed, their growth genuinely creating new wealth and therefore macroeconomic growth. Second, great corporations own the resources to create and commercialize innovations, as Schumpeter (1942) argued. Third, huge corporations provide a degree of economic stability and security for their managers and workers. This stability creates an environment in which investment in high-risk productivity gains is possible without exposing the firm's stakeholders to unacceptable personal risk. In short, the longevity and prosperity of an economy's great corporations may well be good for economic growth.

But this view is not universal. Certainly, over the long run, economies inevitably change. One-time dominant firms become stale holders of past glory. The Hudson's Bay Company no longer reflects Canada and the great traditional watchmakers of Switzerland succumbed to Japanese competition. Certainly, the view that the steady turnover of a country's great

corporations is a sign of economic dynamism also has a reputable economic pedigree. First, Nelson and Winter (1982) argue that currently successful corporate practices frequently become obsolete. In their view, growing economy must periodically rejuvenate itself as new dominant firms advance new and better ways of doing business. This generates the economic profits responsible for economic growth. A heterogeneous field of competitors, each with a different style and strategy, gives rise to a long-run Darwinian contest for market dominance. This contest fuels growth and naturally generates the periodic displacement of dominant firms. Second, as first enunciated by Schumpeter (1912), innovations *per se* generate new dominant firms over the long run, like Microsoft in the U.S. From this viewpoint, the continuous dominance of a cadre of great corporations is symptom of economic stagnation.

Despite the fundamental nature of these issues, remarkably little is known about the influence of the longevity and health of great corporations on their host countries' long-term economic growth. In part, this may be because the above theories pertain to the very long run, measured in generations rather than years. Consequently, empirical falsification is difficult and awaits reliable data over a sufficiently long term for a sufficient number of economies.

This paper attempts a first pass at relating the stability of an economy's list of leading firms to its long-term economic growth. To this end, we construct a set of corporate stability indices for a large cross section of countries over a twenty-year period from 1975 to 1996. We use this period because it includes the first and last years for which comparable lists of leading companies are available across many countries. We relate these indices to standard measures of economic growth: US dollar real per capita gross domestic product (GDP) from 1990 to 2000. A ten year period is used to smooth out the effects of business cycles and transient crises. Our purpose is to see whether the continuous dominance of leading firms or their eclipse by other

firms is associated with faster growth. Also, we are interested in understanding the underlying reasons for the stability or instability of lists of top corporations.

We find that countries whose corporate sectors were less stable grew faster than other countries with the same initial per capita GDP, level of education, and capital stock.[1] Moreover, greater turnover in the ranks of top corporations is associated with faster productivity growth in developed countries, and faster capital accumulation in developing countries.

We then investigate the determinants of corporate sector stability, and find that measures of the size of government are highly significantly positively related to corporate sector stability. In contrast, measures of government corruption are much less important. It appears that "big government", even when benevolent, is associated with an unhealthy degree of corporate stability. We also find that both stock market development and openness to the global economy are negatively and significantly correlated with stability, while the development of the banking system is positively and significantly correlated with stability. Regressions representing a horse race of all these factors reveal government size and financial development to be paramount.

Section 2 reviews the construction of our key variables and section 3 presents our key results. Section 4 considers possible political and economic explanations of the findings in section 3. Section 5 concludes.

2. Data

In this section, we first describe the raw data used to construct our stability indexes. We then describe the indexes themselves and the other variables central to our empirical tests.

2.1 Corporate Stability Data

Our data are collected from the 1978 and 1998/99 editions of *Dun & Bradstreet's Principals of International Business*. We use this source because it includes a wide spectrum of businesses: privately held companies, publicly held companies, cooperatives, and state owned enterprises. A comparison with annual reports indicates that the 1978 edition contains 1975 data for the most part, so we refer to it as our 1975 data. The 1998/99 edition generally contains 1996 data, so we refer to it as our 1996 data. We choose these years because they were the earliest and latest data available at the time we began this project.

We select countries according to the following criteria. First, the country must appear in both the 1978 and 1998/99 editions of *Principals of International Business*. Second, we use the number of employees to rank firms by size. This allows us to include public and private firms. We require the total number of enterprises for which the number of employees is provided in the country to be large enough to allow construction of our key corporate stability variables, and thus only consider countries with thirty or more enterprises listed in both editions. Third, we delete countries whose tenth largest company has fewer than 500 employees. This removes very small countries from the sample. Fourth, comparable *per capita* GDP must be available for both 1990 and 2000. This requirement eliminates countries that were part of the former Soviet Union and Yugoslavia. Fifth, we eliminate countries that experienced prolonged and extensive involvement in war between 1975 and 1996. Sixth, we require data on education levels and the total value of capital assets for each country in the regressions that follow.

These criteria allow us to calculate stability indexes for a sample of 52 countries.

[1] Note that the question of large firm stability is separate from that of optimal firm size. Acs *et al.* (1999) find that US industries containing larger firms show evidence of faster productivity growth. Rapid turnover of large firms

2.2 Corporate Sector Stability Index Construction

This section describes how we measure the long-run stability of the corporate sector in each country. We gauge the importance of enterprises by the number of people they employ. From the 1978 and 1998/99 editions of *Dun & Bradstreet's Principals of International Business*, we obtain the names and number of employees for the ten largest employers in each of our 52 countries. If ties occur for the tenth firm, all the ties are included. For small countries, the list of top ten enterprises can include what would be considered "small firms" in larger countries. This fact necessitates controlling for country size in the subsequent analysis.

Our basic *employee-weighted corporate sector stability index* is defined as

$$\Phi_{L96} = \frac{\sum_{i=1}^{10} \delta_i L_i}{\sum_{i=1}^{10} L_i} \tag{1}$$

where L_i is the labor force employed by the i^{th} largest employer in the country, as listed in *Dun and Bradstreet's Principals of International Business, 1998/99 edition*, and the Dirac delta function δ_i is defined as

$$\delta_i = \begin{cases} 1 & \textit{if firm i is in the top ten lists for both years} \\ 0 & \textit{otherwise} \end{cases} \tag{2}$$

where the largest firms of 1975 are from *Dun and Bradstreet's Principal International Business, 1978 edition.*

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need not imply a steady state characterized by a preponderance of small firms.

We weight each firm by its 1996 labor force because we believe the more recent numbers to be less error prone. Our explorations of detailed corporate histories revealed several apparent data-entry problems with the earlier year. These errors were rectified and the lists of firms adjusted where necessary. Nonetheless, as a robustness check, we also construct analogous employee-weighted stability indexes based on 1975 labor forces, Φ_{L75}.

As a further robustness check, and a way of side-stepping precise accuracy issues surrounding the employee counts, we also construct equally-weighted corporate stability indexes, based on the same top 10 firms. Thus, our *equal-weighted corporate sector stability index* is

$$\Phi_E = \frac{1}{10}\sum_{i=1}^{10}\delta_i \tag{3}$$

In selecting the largest companies for our list, we exclude the following non-commercial organizations: Educational Services (SIC: 82), Health Services (SIC: 80), Membership Organizations (SIC: 86), Noncommercial Research Organizations (SIC: 8733), and Government Agencies (SIC: 91-97).

To construct these stability indexes, we must match company names in our 1975 data with those in our 1996 data for each country. One complication is the different presentation of some company names in the two editions. For example, some Malaysian company names contained the abbreviation *BHD* in one edition, and the word *Berhad* (Corporation in Malay) in the other. Likewise, the Finnish firm Nokia is listed as *OY NOKIA AB* in one edition and *NOKIA OYJ* in the other. The choice of language sometimes causes mismatches, too. For example, a Japanese company listed in the 1975 data as *Sumitomo Kinzoku Kogyo KK* is listed under the English translation of its name, *Sumitomo Metal Industries Limited*, in 1996.

This procedure does not capture all company name changes, for some firms change their names, yet preserve a continuity of corporate personhood. To uncover such continuity, we therefore research the histories of the ten largest employers in each country. This required reading histories of big business in each of the countries, scanning through newspaper records, and, in many cases, telephoning archivists of particular companies. Telephone inquiries of bankers, brokers, and finance professors in different countries allowed us to clarify the continuity of all the corporations in our sample. Judgment calls were inevitable, and the precise procedure we use to resolve ambiguous cases is detailed in the Appendix.

This gives us a set of corporate stability measures in each of the 52 countries, which we believe to be very reliable.

[Table 1 about here]

Panel A of Table 1 lists the values of our three corporate stability indexes for each country.

The interpretation of these indexes is straightforward. For example, the value of the top 10 labor-weighted stability index for the United State is Φ_{L96}=0.505. This means that 51% of the workers employed by the top 10 firms of 1996 worked for firms that had also been in the top 10 firms of 1975. The comparable figures for Japan, Sweden, Hong Kong, and Argentina are 77%, 50%, 39% and 23%. The equally weighted index has a similar interpretation: Φ_{E} =0.7 for Japan means that 7 of the largest 10 firms in 1975 were still among the largest 10 in 1996. A high value of the stability indexes thus indicates that a high proportion of the 1996 large firms

are 1975 large firms that survived. A low value indicates that a high proportion of 1996 firms were not prominent firms in 1975.

2.3 Variations

The definition of corporate sector stability in our primary variables is that a country's corporate sector is more stable if the list of its top ten firms changes less. However, alternative definitions are also of interest. For brevity of exposition, we shall refer to the corporate stability indexes described above and the variants introduced here as *corporate structural change indexes*.

Continuity of Corporate Control

One set of variants gauges the continuity of corporate control, rather than corporate identity. We therefore construct alternative employee-weighted and equal-weighted measures defined as in (1) and (3), but replacing the Dirac delta function, δ_i, which defines corporate continuity in those expressions, with 'continuity of control' defined as $\delta_i \times \gamma_i$, where

$$\gamma_i = \begin{cases} 1 & \textit{if firm i is controlled by the same individual or family in both years} \\ 0 & \textit{otherwise} \end{cases} \qquad (4)$$

and δ_i is as in (2).

We refer to these variants as *control continuity indexes*. As with the corporate stability indexes described above, we can weight these control continuity indexes by 1996 labor force, 1975 labor force, or equally. Thus, our 1996 employee-weighted control continuity index is

$$\Theta_{L96} = \frac{\sum_{i=1}^{10} \delta_i \gamma_i L_i}{\sum_{i=1}^{10} L_i}. \qquad (5)$$

where L_i is the labor force for firm i in 1996. Our 1975 employee-weighted control continuity index is defined analogously, but using 1975 labor force data. Our equal-weighted control continuity index is

$$\Theta_E = \frac{1}{10} \sum_{i=1}^{10} \delta_i \gamma_i \qquad (6)$$

As with the corporate stability indexes, certain judgment calls are again necessary. As a general rule of thumb, in widely held firms we assume continuity of control if the CEO's name is the same in 1975 and 1996. In family firms, we presume continuity of control if the CEOs in the two years have the same family name. We assume continued state control to imply continuity of control.

Obviously, these rules of thumb induce errors. Our rule about widely held firms misses cases where a management team pursues the same policies under the titular leadership of a succession of CEOs. The family firm rule misses instances where the heirs pursue radically different policies from the older generation, and where sons-in-law, nephews, or other relatives serve as scions. Different political leaders may impose radically different policies on state controlled firms. Our choice is to accept a 'bright line' rule that makes our data readily reproducible, but that induces noise, or to make many judgment calls that might render our data more difficult to reproduce. We take the latter approach in constructing our stability indexes because more detailed 'bright line rules' can be applied. However, this route is more

problematic in assessing continuity of control. Consequently, we adopt these simple rules of thumb and accept the errors they induce. We hope that future work with better data might allow more refined measures of control continuity and thus more reliable results.

Note that control continuity is always less than corporate stability, except in the case of Sweden. This is because the Wallenberg family took control prior to 1996 of two new top ten firms that arose between 1975 and 1996. These two new top ten firms thus have a continuity of control. This situation arises in no other country.

Panel B of Table 1 lists the values of these variables for each country.

Corporate Survival Indexes

Another alternative measure focuses on the *survival* of the old leading firms, rather than on their continued status as 'top ten' employers. This allows us to distinguish turnover whereby the older generation of leading firms disappears or flounders from turnover whereby new larger firms arise, but the old firms remain healthy and important. We can make this distinction in various ways, depending on how we gauge an old firm's continued 'importance'.

Our first set of survival indices define a top ten 1975 firm as having 'survived' if it remains in the top ten list for 1996 *or* if the growth rate of its labor force at least equaled the p*er capita* GDP growth rate of the economy. That is, we define a country's *employee-weighted top ten corporate survival index* as

$$\Omega_{L75}^{GDP} = \frac{\sum_{i=1}^{10} \max[\delta_i, \eta_i] L_i}{\sum_{i=1}^{10} L_i} \qquad (7)$$

where L_i is 1975 labor force,

$$\eta_i = \begin{cases} 1 & \textit{if firm i grew at least as fast as per capita GDP} \\ 0 & \textit{otherwise} \end{cases} \tag{8}$$

and δ_i is as in (2).

We also construct an equal weighted variant, denoted Ω_E^{GDP}. Note that a 1996 employee weighted variant is not possible, since the summation in the denominator in the analogue of (7) is not well defined. These indices are also listed in Table 1.

As a further variant along the same lines, we consider a second set of survival indexes, where a firm is defined as having survived if it remains in the top ten list for 1996 *or* its 1996 labor force is no less than half its 1975 labor force.[2] The indices again can be weighted by the 1975 labor force, which we denote $\Omega_{L75}^{50\%}$ or equally, denoted $\Omega_E^{50\%}$.

Our purpose here is to assess whether any importance of turnover in the top ten list of leading firms hinges on the 1975 top ten firms actually disappearing or declining, or whether the primary factor is the rise of new and larger firms. We recognize that growth in the number of employees is a questionable measure of importance, for productivity increases might render reduced labor forces economically efficient. Unfortunately, we are dependent on labor force figures because these are the only numbers available for both public and private firms for a large cross section of countries in both years. The paucity of public firms before the 1990s in many countries makes more nuanced measures of importance impracticable.

[2] As the robustness section below shows, the precise threshold is unimportant.

The 1996 fates of our top ten 1975 firms are ascertained first by checking the 1996 Dun and Bradstreet data. Where this is ambiguous, we check company websites, business history books, and biographies of the 1975 principals. Once again, judgment calls are unavoidable. For example, some firms spin off divisions over time. Although the core firm may be smaller in 1996, the aggregation of all successor firms might be large. In general, we follow the fate of the principal successor firm only. In some cases, this is impossible. For example, the Argentine state-owned enterprise Servicios Electricos del Gran Buenos Aires SA (Segba) is one of that country's top ten firms for 1975. In the early 1990s, it split into Edenor and Edusur – with roughly equal numbers of employees going into each. In this example, we take the combined employees of the two successor firms in assigning survival status to the predecessor firm.

The correlation between the employee-weighted survival index and the correspondingly defined stability index is 0.787. That between the two equally weighted indexes is 0.928. Both correlations are statistically significant at 0.01% level.

The upper panels of Table 2 provide summary univariate statistics for our corporate stability, control continuity, and corporate survival indexes.

[Table 2 about here]

Below, we shall begin by examining statistical relationships involving our basic top ten corporate stability indexes. By then turning to the control continuity indexes and corporate survival indexes, we can make preliminary inferences about possible economic underpinnings of the basic result.

2.3 Measuring Economic Growth

Our corporate stability indexes gauge the longevity of the dominance of each country's largest corporations. Corporate longevity could be due to sustained economic success, or it could be due to a slow turn over of economic power and dominance due to hitherto unspecified forces in an economy. In the former interpretation, long-lived large corporations are a force for economic growth. In the latter interpretation, long-lived large corporations might reflect, or perhaps cause, economic stagnation. Hence, the empirical relationship between these indices and economic growth is of interest.

We define *long-term economic growth* as growth in per capita GDP,

$$\Delta \ln(y) = \ln(\textit{per capita } GDP_{2000}) - \ln(\textit{per capita } GDP_{1990}) \qquad (9)$$

Ideally, we would like to measure economic growth subsequent to, and therefore potentially 'caused by' corporate stability. However, the economic effects we are interested in are thought to operate only over the very long term – generations rather than years. To capture corporate stability over such a period, we use data from 1975 to 1996. This leaves only a short window over which to measure subsequent economic growth. Moreover, this post 1996 window is contaminated by economic crises in Latin American and East Asia at its starting point. To obtain a more meaningful measure of economic growth, we therefore measure each country's real p*er capita* gross domestic product (GDP) growth from 1990 to 2000. Data are from the Penn World Tables, Version 6.1.[3] GDP figures are expressed in US dollars at purchasing power parity exchange rates, and inflation-adjusted to 1996 dollars. In this way, differences in inflation rates

[3] The Penn World Tables are available at the National Bureau of Economic Research website, www.nber.org.

and living costs across countries are removed. Since $\Delta \ln(y) \cong \Delta y / y$, we interpret $\Delta \ln(y)$ as a fractional growth rate in per capita GDP.

Summary statistics for this variable are shown in the second panel of Table 2. The mean value of 0.21 for $\Delta \ln(y)$ indicates that the typical country's *per capita* GDP rose by about 21% during the decade from 1990 to 2000 in terms of real US dollars at purchasing power parity.

It is also of interest to decompose overall growth into growth due to capital accumulation and growth due to increased total factor productivity (TFP). To do this, we first measure each country's rate of *per capita* physical capital growth, which we denote $\Delta\ln(k)$, over the relevant period from 1990 to 2000. We then follow the methodology of Beck, Levine and Loayza (1999), and estimate each country's TFP growth as roughly equal to the growth in its *per capita* GDP minus 0.3 times the growth of its physical capital *per capita*. All relevant data are from the Penn World Tables, Version 6.1

Summary statistics for these variables are also available in the second panel of Table 2.

3. Main Results

This section presents our main finding, clear negative cross-country correlation between corporate stability and long-term economic growth. In this section, we first present simple correlations between our corporate stability indexes and long-term economic growth. We then turn to regressions analogous to those of Mankiw (1995), but adding corporate stability as an additional independent variable. The section concludes with a discussion of the robustness of these results.

3.1. Regressions on Corporate Stability of Long-Term Economic Growth

Economic growth rates are known to be lower for countries that have already achieved higher levels of income, for countries with less educated workforces, and for countries with less extensive capital assets.[4] If corporate stability is correlated with any of these other determinants of economic growth, these simple correlations may only reflect aspects of economic growth that are already known.

To assess the relationship of corporate stability with economic growth after controlling for these effects, we must therefore employ regression analyses. We follow the specification recommended by Mankiw (1995), and explain growth in income with initial income, initial stock of physical capital, and initial stock of human capital. To this list we add a corporate sector stability index.

Thus, we run regressions of the form

$$\begin{bmatrix} economic \\ growth \\ rate \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} initial \\ income \\ level \end{bmatrix} + \beta_2 \begin{bmatrix} initial \\ physical \\ capital \end{bmatrix} + \beta_3 \begin{bmatrix} initial \\ human \\ capital \end{bmatrix} + \beta_4 \begin{bmatrix} corporate \\ \text{sec}\,tor \\ stability \end{bmatrix} + \varepsilon \qquad (10)$$

where the *economic growth rate* is $\Delta \ln(y) \cong \Delta y / y$, or growth in *per capita* GDP as defined above, and *corporate sector stability* is one of the stability indexes, as defined above.

The control variables included in (10) are defined as follows.

To capture initial income, we use the logarithm of 1990 *per capita* GDP, denoted ln(y). This variable is defined as in the definition of economic growth in (9). It is expressed in US

[4] See e.g. Barro (1991), Mankiw (1995).

dollars converted at purchasing power parity and adjusted for inflation to 1996 dollars. Raw data are from Penn World Table 6.1.

Our measure of initial physical capital stock measure is the logarithm of real *per capita* physical capital in 1990, which we denote ln(k). To construct this variable, we first construct a time series of the total stock of physical capital in country i in year t, denoted $K_{i,t}$, by applying the recursive formula

$$K_{i,\,t+1} = K_{i,\,t} + I_{i,\,t} - \delta K_{i,\,t} \tag{11}$$

where we assume an initial capital stock of zero for 1950, $I_{i,t}$ is aggregate real investment for country i in year t, taken from Penn World Table 6.1, and δ is a depreciation rate of 7% under the perpetual inventory method. This procedure is similar to that used by King and Levine (1994).

As a proxy for the initial stock of human capital *per capita* in each country, we take the logarithm of the average years of education for people aged 25 or over. These data are from Barro and Lee (2000).

We wish to ascertain that differences in country size do not affect our results. We therefore redo all our regressions with a measure of country size as yet another independent variable. To gauge country size, we use the logarithm total 1990 GDP, expressed in 1985 real US dollars at purchasing power parity exchange rates, which we denote ln(Y). This variable precisely equals the logarithm of the product of initial *per capita* income, or y, and total population. These data are from Penn World Table 6.1. Thus, the two sets of regressions we run have the forms

$$\Delta \ln(y) = \beta_0 + \beta_1 \ln(y) + \beta_2 \ln(k) + \beta_3 \ln(h) + \beta_4 \Phi + \varepsilon \tag{11}$$

and

$$\Delta \ln(y) = \beta_0 + \beta_1 \ln(y) + \beta_2 \ln(k) + \beta_3 \ln(h) + \beta_4 \ln(Y) + \beta_5 \Phi + \varepsilon \qquad (12)$$

In the previous section, we noted that growth can occur either because of capital accumulation or because of total factor productivity (TFP) growth, and that overall growth in *per capita* GDP can be decomposed into two components reflecting these two processes. We therefore also run regressions analogous to (11) and (12), but substituting first total factor productivity growth, denoted ΔTFP, and then capital accumulation, denoted Δln(k), where both variables are as described above.

Table 3 presents all of these regressions. A clear, statistically significant negative correlation between corporate stability and long-term economic growth remains evident across all specifications. A more stable list of leading corporations is associated with slower economic growth. Moreover, a stable list of leading corporations is associated with slower productivity growth and slower capital accumulation.

[Table 3 about here]

These relationships are economically as well as statistically significant. The average coefficient on corporate sector stability in Panel A of Table 3 is -0.367. A one standard deviation increase in the labor-weighted stability index thus associates with a lowering of *per capita* GDP growth by 0.367 x 0.208 or 7.6%. This is approximately 52% of the cross country standard deviation of real growth in *per capita* GDP. Similarly, a one standard deviation increase in the equal-weighted stability index is associated with a decline in per capita GDP

growth equal to 48% of the standard deviation of that variable. One standard deviation increases in labor and equal weighted stability are likewise associated with productivity growth reductions of 42% and 36%, respectively, of the standard deviations of productivity growth; and with capital accumulation reductions of 45% and 44%, respectively, of the standard deviation of that variable.

These estimates indicate that corporate sector stability is associated with growth retarding factors that account for a substantial part of the variation in economic growth across countries.

3.3 Variations

New Capital or New Faces?

Turnover in the list of top companies has two consequences. First, a new collection of capital assets acquires economic predominance. Second, a new cadre of managers takes control of the country's major capital assets.

The corporate stability measures in Table 3 gauge the stability in a country's list of top ten companies, and thus are most directly measures of the first of these consequences. However, it is possible that the second consequence is actually the driving force behind our findings, and the corporate stability indexes are only serving as proxies for corporate control continuity.

To assess this possibility, we measure the second consequence directly using our corporate control continuity indexes, whose construction is discussed above. Replicating Table 3 substituting corporate control continuity indexes for the analogous corporate stability indexes yields regression coefficients on control continuity that are uniformly statistically insignificant. Table 4 displays these results.

[Table 4 about here]

These findings suggest that growth is associated with a turnover in the actual corporations, rather than just of the people running them.

Death or Exile?

Turnover in the list of a country's top ten companies can come about in two ways: First, the old leading companies might die or decline into insignificance. Second, the old firms might continue to prosper and play an important role in the economy, but new larger firms might rise to displace them in the top ten list.

To distinguish the relative importance of these two mechanisms, we replicate the regressions of Table 3 using our corporate survival indexes, rather than our stability indexes. Recall that the former measure the fraction of 1975 top ten firms that survive as moderately important companies in 1996, whereas the stability indexes used in Table 3 gauge the fraction of 1975 top ten firms that are still in the top ten in 1996.

[Table 5 about here]

Table 5 shows that the mere survival of these old leading firms, even though they have fallen from the top ten list, is significantly associated with slower growth and slower productivity growth. However, the mere survival of venerable old firms is not associated with lower rates of capital accumulation.

The relationships between the resilience of 1975 top ten firms and both economic growth and productivity growth are actually more economically important than the analogous effects in Table 3. This is because the standard deviations of the survival indexes are uniformly larger than those of the stability indexes, and this more than compensates for the lower point coefficients in Table 5. Thus, the coefficient on corporate survival in the first column in Panel A of Table 5 is -0.225. A one standard deviation increase in the labor-weighted survival index, with survival defined as growing at least as fast as per capita GDP, lowers *per capita* GDP growth by 0.225 x 0.794 or 20.2%. This is approximately 139% of the cross country standard deviation of real growth in *per capita* GDP. Similarly, a one standard deviation increase in the equal-weighted survival index, again with survival defined as growing at least as fast as *per capita* GDP, is associated with a decline in *per capita* GDP growth equal to 48% of the standard deviation of that variable. A one standard deviation increases in these same labor or equal-weighted survival indexes is likewise associated with productivity growth reductions of 219% or 189%, respectively, of the standard deviations of TFP growth. When 'survival' is defined as having at least half as many workers in 1996 as in 1975, the economic significance of the relationship between growth and the survival of old leading firms is almost as stark. A one standard deviation increase in the labor-weighted survival index, so defined, is associated with *per capita* GDP and TFP growth falling by 65% and 95%, respectively, of their standard deviations. Only if we use an equal-weighted survival index, with survival defined as losing no more than half the labor force, do the economic significance figures fall back to the levels of Table 3 or lower. A one standard deviation increase in this survival index is associated with *per capita* GDP and TFP growth declining by only 17% and 68%, respectively, of their standard deviations.

Rich or Poor?

In rich countries, *per capita* GDP is primarily accomplished through growth in productivity. In poor countries, capital accumulation is responsible for a larger part of growth. Since the stability and survival of venerable old firms are differently associated with growth through productivity enhancement and growth through capital accumulation, it is possible that our stability and survival indexes might have different associations with growth in rich and poor countries.

To examine this possibility, we reproduce the regressions of Tables 3 and 5 for rich and poor country subsamples. We define countries as rich if their per capita GDP in 1990 is above the median for the 52 countries in our sample.

[Table 6 about here]

Panel A of Table 6 shows that corporate stability is significantly negatively related to total factor productivity growth, but insignificantly related to capital accumulation rate in rich countries. In contrast, in poor countries, higher corporate stability is significantly related to slower capital accumulation, with a negative but insignificant impact on productivity growth. Holding constant the initial levels of GDP, capital stock and human capital, greater turnover in the list of top ten corporations is associated with faster productivity growth in developed economies, and faster capital accumulation in developing economies.

We can rerun the regressions of Table 6 substituting the continuity of control and corporate survival indexes for the corporate stability index. The continuity of control index remains insignificant for both rich and poor countries. Both variants of the corporate survival

index yield a pattern of signs and point estimates similar to those shown in Table 6, the mere survival of a country's grand old firms is associated with slower productivity growth in rich countries and with slower capital accumulation in poor countries.

3.4 Robustness Tests

These basic results in Tables 3 though 6 survive a battery of robustness checks. Sensible changes in the specification of the regressions or in the definitions of the variables in them generate qualitatively similar results. By this we mean that these changes do not alter the sign, approximate magnitude, or significance of the coefficient on the corporate stability indexes.

The industrial structure of an economy might matter. Specifically, dependence on natural resources might affect both stability and growth. Including the resource dependence measure of Hall and Jones (1998) in our regressions as an additional control variable preserves the rough magnitudes and significance levels of the stability, managerial continuity, and survival measures. Likewise, including fuel, oil, and metals production over GDP as a control variable changes nothing, except that it renders the stability indexes slightly less significant in explaining capital accumulation.

Our corporate stability variables might have different interpretations in large and small countries, as they might reflect a greater turnover associated with smaller firm size in smaller countries. To control for this, we augment the regression with alternative measures of country size. The measure of country size we use in the tables is the logarithm of 1990 GDP in US dollars (converted at purchasing power parity). Using the logarithm of 1975 population or the logarithm of area (in square kilometers) generates qualitatively similar results.

As a second robustness check, we substitute real GNP, converted to US dollars at purchasing power parity, for real GDP throughout. This also generates qualitatively similar results.

In a further set of robustness tests, we substitute two alternative productivity growth measures. The first is per capita productivity growth that considers human capital accumulation, as proposed by Mankiw (1995). The second alternative productivity growth rate is *per capita* productivity growth considering human capital accumulation as proposed by Hall and Jones (1998). Both of these alternatives produce patterns of signs, coefficient size, and statistical significance very similar to those shown in the Tables.

One of our survival indexes defines a firm as having 'survived' to 1996 if its labor force that year is no less than 50% of its 1975 labor force. Using 10%, 25%, 50% or 90% cutoffs generate similar patterns of signs and coefficients to those shown, with no systematic relationship to the size of the threshold.

Finally, if we measure initial stock of human capital by the logarithm of the average number of years of total education in the male population over 25 in 1990, rather than the average for the general adult population (on the grounds that males are more likely to be in the work force in many countries), we again obtain qualitatively similar results.

Note however, that using GDP or GNP growth converted to US dollars at market exchange rates, rather than purchasing power parity rates, renders corporate stability insignificant. We suspect this lack of robustness reflects the inappropriateness of market exchange rate conversions, and that it ought not to be considered a robustness problem.

3.5 Discussion

Greater instability in the list of a countries top ten corporations is associated with faster economic growth. So are smaller survival odds for top ten companies. This faster growth is the result of faster productivity growth and faster capital accumulation rates. Productivity growth is the more important factor in high income countries, while capital accumulation is the more important factor in low income countries.

4. The Political Economy of Corporate Turnover

The above results, linking a stable roster of top corporations to poor economy performance, beg the question of why the dominance of leading large firms is as stable as it is in so many countries. The answer is doubtless complicated and answering it fully is beyond the scope of this study. We therefore limit ourselves to considering certain key features of the institution environment that might plausibly be important.

In particular, we focus on the scope and nature of government intervention because high profile efforts by governments to save national champion corporations are a recurring feature of business news throughout the world. While such news stories attest to the general importance the survival of great corporations can acquire, bailouts of great corporations attract the attention of both investors and political opponents. Champion firms may often be bailed out quietly and indirectly.

After considering general measures of the scope for government intervention and of its likely form, we therefore focus on two sorts of policy decisions that are currently thought to be of first order importance in determining barriers to the entry and rapid growth of upstart firms. The first is policy regarding the structure of the financial system, for a weak financial system can

prevent potential rivals from growing, or from entering into competition in the first place. See King and Levine (1993) for evidence of the importance of this factor. The second is policy regarding openness to global market forces, for well-crafted trade and capital barriers can also stymie upstart firms. See Lenway *et al.* (1996) and Morck et al. (2000) for empirical evidence of the importance of openness in this context. This list is certainly not exhaustive, and we welcome additional studies that highlight factors not included in it.

4.1 The Involvement of Politicians

Instances of politicians using public funds to rescue tottering corporate giants are not rare. For example, when Philipp Holzmann AG disclosed a DM2.4 billion-mark problem in its books, its banks demanded a comprehensive restructuring. *The Wall Street Journal* (Nov. 25, 1999) describes the subsequent politicking as follows: When the banks rejected Holzmann's DM4.3-billion restructuring proposal as inadequate, a chorus of German politicians vilified the banks' unwillingness to "shield a 150 year old German company and save the jobs of Holzmann's 17,000 domestic workers." German Chancellor Gerhard Schroeder, after buying the banks' acquiescence with a federal guarantee on a DM100 million loan and DM150 million in new capital, exulted "The banks have recognized their economic and social responsibility."

Such respect for corporate stability is not confined to European politicians. *Business Week* (September 11, 1998) quotes an anonymous prominent businessman explaining that the Malaysian prime minister, Mahathir Mohamad "doesn't believe in bankruptcies. He has a moral objection to them." The *Business Week* article added that during the Asian crisis when "the intensity of business collapses and bank collapses was like tenpins falling every day," Mr. Mahathir Mohamad "couldn't stand it. He doesn't believe in bankruptcies."

Politicians can protect the stability of established corporate empires in less direct ways than bailouts. Although Thai Petrochemical Industries was insolvent in 1997, the firm was not officially declared bankrupt until 2000. According to the *Wall Street Journal* (February 12, 2001), the CEO, Prachai Leophairatana filed thirteen different lawsuits and a criminal embezzlement charge against the creditors. Although the creditors have formally fired him, he continues to occupy the CEO's office and run the company. The Thai government seems unable or unwilling to evict him.

This esteem for corporate stability can have a darker side. In the mid 1990s, the government of Zimbabwe invested a great deal of effort to save the state telephone utility, PTC, from a cell phone company being organized by Strive Masiyiwa, an entrepreneur. The story, according to the *National Post* (February 26, 2000), is as follows. PTC phone lines served 1.4% of Zimbabweans, and the hundreds of thousands of people requesting new lines endured waits of up to four years and were expected to pay large bribes to bureaucrats. When Masiyiwa proposed a joint venture with PTC to provide cell phone service, he recounts that "They looked at me and said: 'We don't see a future in it. We certainly aren't going to waste valuable resources on it.' " When Masiyiwa decided to go it alone, PTC forbade it on the grounds that the state had a monopoly on telecommunications. Masiyiwa hired an American lawyer, challenged PTC's position in court, and won. He then formed a company, Econet, and with foreign partners built base stations across the country. A few days before service was to begin, Zimbabwe's president Robert Mugabe, invoked emergency presidential powers and made it illegal for a private business to build a cellular network. Offenders would face two years in jail. Masiyiwa recounts that "Parliament sat through three sittings to turn [the decree] into law in one day." He returned to the courts, and a judge finally ordered that a cell phone license be put up for public tender. A

string of politically connected consortia sprung up to bid, and Telecel, a consortium backed by Leo Mugabe, the president's nephew and a member of parliament, won the license. Masiyiwa's salvation was an anonymous civil servant, who leaked documents proving that a corrupt official had docked 20% from Econet's score on the tender bid. Strive Masiyiwa should have won in the first place. After more court battles, a cabinet shuffle, and threats of resignation from the late vice-president, Econet finally got a license to operate. Within a week of its launch, the company had 10,000 subscribers, and rapidly overtook Telecel and the state-run cell phone company, NetOne. As the situation in Zimbabwe further deteriorated in the late 1990s, Masiyawa found it prudent to move his base of operations to South Africa.

4.2 The Nature of Political Intevention

We now consider possible motives politicians might have in enhancing the stability of their countries largest corporations. One set of explanations relates to how corporate stability might be the result from the behavior of honest politicians. A second set of explanations hinges on the nature of political corruption.

We consider the explanations associates with honest politicians first.

First, politicians might prefer a relatively even income distribution. Corporate stability may be a side-effect of this, if preserving jobs at big companies protects the incomes of a wide segment of the population while allowing them to be eclipsed can lead to high economic gains that benefit only a handful. This was the German government's declared motive in bailing out Philipp Holzmann. Finance Minister Hans Eichel stated that "the government has a responsibility to step in if a major German company is about to collapse and cost thousands of

people their jobs".[5] The same motive seems to underlie Chancellor Gerhard Schroeder's pressed German banks to save the jobs of the 22,000 employees of the bankrupt engineering firm Babcock Borsig AG with a $700 to $800 million bailout.[6]

Corporate stability may be a side effect of this, if preserving jobs in big companies protects the incomes of a wide segment of the population while allowing other corporations to displace them benefits only a handful. As a consequence, government policies might be biased against upstarts and tend to protect established large firms.

Second, politicians might prefer to avoid instability, independent of its contribution to future growth. Competition that causes financial distress to established large corporations, even if only temporary, and even if it would improve their performance in the long run, might be politically unacceptable because of the perception that stability *per se* is a valuable public good. Such beliefs seem to have led the Japanese government to propose a ¥200 billion ($1.90 billion) bailout of Sogo Department Stores, which *Asiaweek* described as part of Japan's long tradition of corporate bailouts designed to minimize "confusion".[7] *Asiaweek* continues that, to the bewilderment of senior politicians, the bailout was derailed when "[t]he public exploded over the use of their tax money to rescue a poorly managed private company." Again, government policies might therefore lean towards protecting large established corporations.

Third, politicians might pro-actively defend large established corporations because they perceive it to be in their self-interest to do so. Politicians might, for example, distrust markets or entrepreneurs for ideological reasons. If established top corporate leaders sympathize with government objectives, large established corporations might actually be convenient channel

[5] See Edmund Andrews 'Navigating the Economy of a Changing Germany', *New York Times*, December 7, 1999.
[6] See 'Schroeder Seeks bailout Aid for Bankrupt Firm' *International Herald Tribune*, July 6, 2002, p 11.
[7] See Jonathan Sprague and Murakami Mutsuko 'Tokyo's Sogo Shocker - A bailout and a reversal show no policy at all' *Asiaweek*, 26(29), July 28, 2000.

through which politicians can intervene in the economy. Indeed, the transaction costs of directly negotiating with, influencing, and monitoring the people in charge of a handful of large corporations is likely low in comparison with alternative intervention channels. Politicians might come to see protecting such corporations as a means to advancing their economic, social and political objectives. For example, *Business Week* reports that Malaysian Prime Minister Mahathir is unapologetic about his government's policy of selecting a handful of wealthy businessmen for privileges and assigning them the role of creating jobs, implementing big projects, and keeping the economy growing. The article quotes Mustapha Mohamed of the Finance Ministry as saying "We view Malaysia as a corporation, and the shareholders in the government are companies." and that "To the extent you help the bigger guys, the smaller guys benefit."[8]

A less charitable view of the business-government cooperation described above might be that wealthy, established corporations (or the families behind them) are buying economic survival with support for the policies and priorities of powerful politicians. In other words, political rent-seeking by established firms or their entrenched owners might underlie enhanced corporate stability.

This leads into our second set of explanations, which turn on various sorts of official corruption.[9] Dishonest politicians, intent on accumulating personal wealth or power, might find large well-established corporations needing protection from competitors to be enthusiastic trading partners. The corporations might pay bribes to politicians directly, they might channel money to those to whom politicians owe favors, or they might serve as conduits for channeling

[8] See Sheri Prasso, Mark Clifford and Joyce Barnathan 'Malaysia: The Feud - How Mahathir and Anwar became embroiled in a clash that threatens to send Malaysia into upheaval' *Business Week*, October 28, 1998.

public money back to the politicians themselves. Moreover, large, established corporations and the old-moneyed families that own them might be much better long-term partners in political rent-seeking deals than ephemeral upstart corporations (see Morck, 1995).

These lists are not intended to be exhaustive. Big government may well be associated with other, as-yet ill-understood, reallocations of resources that are particularly harmful to upstart firms and that create an economic bias towards the survival of large firms. And there are, no doubt, many other mechanisms than those described above that might link official corruption with heightened survival odds for large established corporations.

We then turn to the channels through which politicians actually promote the longevity of large established corporations.

One possibility is that corporate stability is a by-product of an underdeveloped financial sector.[10] Upstarts have less access to financing in an economy with underdeveloped financial institutions and markets. In contrast, large established corporations can use their internal cash flows to fund new investment, even investment that is economically inefficient. Politicians can thus protect large, established firms by limiting the economic roles of financial markets, perhaps by deliberately misregulating them. Of course, it is also possible that financial institutions and markets are underdeveloped for exogenous cultural or historical reasons, and that this inadvertently leads to corporate stability (see La Porta *et al*., 1997).

Another possibility is that economic barriers against the global economy as a tool that politicians might use to protect established large firms. Protectionism might be adopted as a means to protect established corporations from more efficient foreign competitors. Or

[9] A growing empirical literature documents the first-order importance of rent-seeking relationships between politicians and the business sector in low-income economies. See e.g. Fisman and Svennson (2000) and Fisman (2002), as well as developed economies, see e.g. Fisman and Di Tella. (2001).

alternatively, protectionism might be adopted for purely ideological reasons, and the ensuing corporate stability might be an unintended consequence.

4.3 Empirical Evidence

We now conduct a cursory investigation of each of these sets of explanations and political channels in turn.[11]

Economic Equality

If corporate stability is associated with a more egalitarian income distribution, this should be evident in *gini coefficients*, standardized measures of income inequality, or in changes in those coefficients.[12] Table 7 shows that there is no statistically detectable relationship between our measures of corporate stability and either the level of income inequality or the change in income inequality from 1975 to 1996. Regressing the change in the *gini* on corporate stability controlling for the initial value of *gini* likewise reveals no relationship. Substituting the corporate survival indexes (not shown) for the corporate stability indexes likewise reveals no detectable relationship. Including *per capita* GDP growth as a control variable also generates qualitatively similar results.

It follows either that corporate stability is not motivated by a political desire for income equality - or that it is a remarkably ineffective means of achieving income inequality.

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[10] See Khanna and Palepu (2000), La Porta et al. (2000), Levine (2000), Rajan and Zingales (2001), Johnson and Mitton (2001), Morck et al. (2001), Olsen (2001) and others.

[11] We are currently working on more substantial econometric investigations of these issues, and hope to include the results in the next draft of this paper.

[12] A country's *gini coefficient* is the area between a graph of its actual cumulative income distribution and a forty-five degree line, which represents a perfectly uniform income distribution.

[Table 7 about here]

Economic Distress

We find no statistical correlation between our corporate sector stability, control continuity, or corporate survival indexes and various indicators of the occurrence of an economic crisis. These indicators include a dummy for the occurrence of a banking crisis between 1970 and 1994, the fraction of bank assets affected by a banking crisis, a dummy for the occurrence of a major political crisis during the same period, the overall inflation rate across those years, and the number of *coups d'état* during that period.[13] To conserve space, details of these results are omitted. They are available from the authors.

Government Intervention in the Economy

The size of government might affect our corporate stability indexes and their variants. For example, a bigger government might raise the costs of doing business by increasing regulatory compliance costs and the like. This might give large established firms a first mover advantage.

[Table 8 about here]

Thus, Panel A in Table 8 relates our stability, continuity, and survival indexes to total government spending over GDP and the growth in government spending as a fraction of GDP from 1975 to 1996. Bigger government sectors and faster growing government sectors are

significantly associated with a more stable list of top ten companies and with higher odds of survival for 1975 top ten firms. There is also evidence of a link between larger government and greater continuity of corporate control, measured by the 1996 labor-weighted index.

The stability and continuity of control indexes using 1975 labor weights (not shown) generate results similar to those for the 1996 weighting, but with lower statistical significance levels. Corporate survival, gauged by whether or not 1996 labor force is at least half of the 1975 level, is insignificantly related to government size and growth.

While it is tempting to argue from this finding that big government fosters corporate stability, the economic mechanism underlying the finding is, of course, ambiguous.

Property Rights

One possibility is that the principals of established large firms induce corrupt politicians are induced to use the power of the state to safeguard the *status quo*. If such rent-seeking arrangements underlie the findings of Table 8, we should expect measures of government corruption to matter at least as much as simple measures of the size of government.

[Table 9 about here]

Table 9 measures the development of each country's institutions using four indexes that capture official respect for the rule of law, the absence of official corruption, the freedom of private property holders from the threat of expropriation by the state, and freedom of private

[13] We are grateful to Raphael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert Vishny for providing us with these variables, and with many of the other variables used in this section. We are currently compiling several other measures of the occurrence or frequency of extreme economic conditions.

businesses from the threat of contract repudiation by the government. These indexes range from one to ten, with higher values indicating less corruption and greater respect for private property.

All these measures of government integrity are positively, not negatively, related to corporate stability and survival. General corruption and lawlessness do not seem to facilitate greater stability in the list of leading corporations or better odds of survival for large established firms, as a broad-spectrum rent-seeking hypothesis would seem to imply.

However, before discarding the view that rent-seeking underlies corporate stability and survival, we need to consider more nuanced ways in which officials and the principals of large established firms might entrench the *status quo*.

Hayek (1960) argues that courts in countries with judicial systems based on British Common Law are effective in restraining both politicians and elites from abuses of power, while legal systems based on continental civil law traditions are relatively ineffective in these regards. We follow La Porta et al. (1998) in distinguishing civil law traditions based on the French Napoleonic Code from those based on German or Nordic legal principles on the grounds that the French Code is particularly inefficacious at protecting diffuse private property rights.

Panel C of Table 8 partitions our sample of countries into subsamples whose legal systems derive from British, French and German or Scandinavian legal traditions. Surprisingly, we find no difference between the corporate stability, control continuity, and corporate survival indexes for Common Law and French Civil Law countries. Rather, countries with German or Nordic Civil Law systems have less turnover among their top ten companies, greater continuity of corporate control, and higher survival rates for large old companies than either British or French law countries.

In summary, there is no evidence that greater overt corruption is associated with lower rates of turnover in the list of top firms, Indeed, measures of the probity of government are associated with greater stability in the list of top firms and better survival odds for those firms.

Financial System Development

Schumpeter (1912, 1939) argues that a well-functioning financial system is a prerequisite for rapid economic growth because it allows innovative entrepreneurs to obtain financing for new firms that carry their wealth-creating ideas to market. King and Levine (1993) present evidence that countries with better developed financial systems do grow faster, and interpret it as supporting this view. Schumpeter (1912) holds that the rise of these innovative new firms necessitates the demise of established, non-innovative firms in a process he dubs creative destruction. This reasoning suggests that better functioning financial systems might be associated with faster growth and more corporate turnover.

We gauge the development of a country's financial system in three ways – the legal protection available to investors (including creditors), the importance of the country's banking system, and the importance of its stock market.

[Table 9 about here]

Panel A of Table 9 relates our corporate stability, management continuity, and corporate survival indexes to measures of the strength of legal rights available to each of creditors and shareholders, and to a measure of the strength of accounting disclosure rules. These data are from La Porta *et al.* (1998). Stronger shareholder rights are significantly associated with greater

turnover in the list of top ten firms, more changes in the management of the top ten firms, and lower survival odds for large, old firms. Stronger accounting disclosure rules appear to be linked to greater stability in the list of top firms, and to higher survival odds for large, old firms. Creditor rights appear unimportant.

Panel B of Table 9 relates the size of the banking system to our stability, control continuity, and survival indexes. The size of the banking system is measured by the total domestic credit extended by the banking sector as a fraction of GDP. The regressions displayed in Panel B contain the level of this variable in 1975 and its change from 1975 to 1996. A larger banking system is associated with a more stable list of top firms, less top management turnover at those firms, and higher survival odds for large, old firms. The growth in importance of the banking system is unrelated to the stability of the top ten list and to survival of these firms, but is associated with higher managerial turnover.

We obtain from Beck, Levine, and Loayza (1999) a battery of variables measuring the development of banking systems. Substituting another standard measure of the importance of the banking system, total domestic credit extended to the private sector over GDP, yields virtually identical results. Other measures, including average domestic assets of deposit taking banks as a fraction of GDP between 1960 and 1995, average liquid liabilities of the financial system as a fraction of GDP between 1960 and 1995, and average commercial bank domestic assets divided by commercial bank plus central bank domestic assets between 1960 and 1995, generate the same pattern of signs and significance levels.

Panel C gauges the development of the financial system by the size (total market capitalization) of the stock market in 1976 and its growth from 1976 to 1995. We use these years because these data are available from La Porta *et al.* (1998). A rapidly growing stock

market is associated with reduced stability in a country', and that a large banking system (relative to GDP) is associated with enhanced corporate stability. It would appear that stock market development is associated with corporate turnover, while a developed banking system is associated with the stability of large, established firms.

The results in Panels A and B suggest that well-developed debt-financing institutions, exemplified by strong creditor rights and evident in large banking sectors, have uncertain associations with measures of the turnover in the list of top corporations, management turnover in those firms, and the survival of top firms. Highly developed banking sectors do not seem to contribute to growth by augmenting corporate turnover. This is consistent with country-level studies that link bank involvement in client firm governance to bail-outs of large firms and long-term performance problems.[14]

In contrast, the results in Panels A and C show greater stock market development, manifest either in greater shareholder rights or in faster growing markets, to be highly related to more changes in the list of top firms and to lower survival odds for large established firms. Overall, these results suggest that the link between corporate sector instability and faster growth might involve more developed stock markets. On possibility is that stock markets provide readier financing than would banks to upstart entrepreneurs with wealth creating ideas, and so might contribute to faster paced creative destruction.

Openness to the Global Economy

Using historical evidence, Rajan and Zinglaes (2002) argue that the principals of large established firms in many countries actively press governments to hobble national stock markets to deprive potential upstart competitors of capital. This can bring together unusual bedfellows,

such as leftist politicians and seemingly highly principled business leaders attacking 'speculation'. Large honest governments might thus be amenable, perhaps unknowingly, to fettered stock markets and an entrenched cadre of top corporations.

Rajan and Zinglaes find, however, that openness to the world economy seems to render such business-government cooperation less successful, perhaps because entrepreneurs can obtain financing from abroad or because foreign entrepreneurs can upset the local status quo. Others, including Morck *et al.* (2001), draw similar conclusions.

Table 10 therefore investigates the relationship between our corporate stability, control continuity, and corporate survival indexes and measures of openness to the global economy. Openness is measured by net foreign direct investment inflow as a fraction of GDP or by trade (exports plus imports) as a fraction of GDP. We take initial openness for 1960 and change in openness from that year to 1995 because these data are available in Beck, Levine, and Loayza (1999). The regressions in Table 10 explain the corporate stability and other indexes with initial levels of these openness ratios and their growth to 1996.

Table 10 shows that more openness early on is significantly associated with less stability in the list of top firms, less continuity of control, and lower survival odds for large, established firms. Changes in openness appear unimportant – perhaps suggesting that the effects of economic openness require time to manifest, or that a permanence of openness is required.

As robustness checks, we also measure openness as gross foreign direct investment over GDP and as Sachs and Warner (1997)'s years that the country is open. Gross foreign direct investment produces results very similar to those in Panel A, but the Sachs and Warner variable generates an insignificant positive relationship between stability and openness.

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[14] See Morck and Nakamura (1999) and Morck, Nakamura and Shivdasani (2000) for evidence from Japan.

Frankel (2000) points out that the traditional measure of trade openness, exports plus imports over GDP, is larger for smaller countries. In principle, this should not be a problem, for Tables 3, 4 and 5 show that our corporate sector structural change measures are unrelated to country size. Moreover, small countries may genuinely and of necessity be more open than large countries. Nonetheless, as a robustness check, we substitute a size-invariant measure of trade openness recommended by Frankel (2000) - imports over GDP minus all foreign countries' GDP over world GDP. The intuition is that, in a world without border, imports over GDP should equal foreign production over world production. If imports are higher than this, the economy is more open. Substituting this measure renders the initial level of trade openness insignificant and the change in trade openness marginally significant (p = 0.08 for Φ_{L96} and p = 0.06 for Φ_E in one-tailed tests), with greater opening to foreign trade linked to lower stability. Management continuity is likewise negatively related to stability, while survival is not. While adding the logarithm of population to the regressions in Table 10 changes nothing, adding the logarithm of total GDP renders the trade opening variables insignificant. In contrast, adding the same variable to regressions using the Frankel measure actually raises their significance markedly (p = 0.03 for Φ_{L96} and p = 0.04 for Φ_E in two-tailed tests). The significance of the Frankel opening measures in control continuity regressions do not change with the inclusion of the log of total GDP.

A very tentative interpretation of these results is that openness to the global economy facilitates reduced corporate stability, and that this stimulates growth. Clearly, further work is needed to clarify this relationship.

The Channels Connecting Stability with Growth

The results above are generally consistent with the view that that corporate stability is associated with big (though not corrupt) government and bank-centered (rather than stock market-centered) financial systems in closed economies. Corporate stability does not appear associated with (successful) policies directed at promoting equality or over avoiding economic crises.

In this section, we explore whether the component of stability associated with each of these effects is crucial to the relationship between stability and growth. To do this, we run 'horse race' regressions. We revisit the regressions of Tables 3 through 5, in which we related economic growth to the corporate stability and other indexes. We now add the variables that, in section 4, were found to affect corporate stability – first one set at a time and then all together.

We first include the initial government size and growth in government variables in these regressions. Next we include a measure of government corruption to the regressions of Tables 3 through 5. Then we control for the initial size of the banking system and its growth to these same regressions. Next, we include initial stock market capitalization and its growth rate. After that, we take into account initial openness and change in openness. Finally, we include all of these controls simultaneously.

Our objective is to determine which of these factors affecting corporate stability might be most critical to its negative relationship with economic growth. We ascertain this by seeing which sets of additional controls most diminish the statistical significance of the corporate stability, control continuity, and corporate survival variables. Or, if including these variables raises the significance of our corporate sector indexes, we could conclude that none of these

effects is paramount, and that controlling for them merely clarifies an effect we do not capture in the discussion of section 4.

[Table 11 about here]

Table 11 summarizes these regressions, for the number of point estimates and significance levels generated in this exercise is too large to allow easy complete display of all the results.

Controlling for any single set of the factors discussed in section 4 leaves corporate stability and survival significantly related to per capita GDP growth. Only when all of these effects are included simultaneously do stability and survival lose statistical significance. Thus, the link between corporate stability or survival and economy growth cannot be due singly to government size, corruption, bank development, stock market development, or openness. The link might be due to a combination of these factors.

However, the lack of significance of the corporate structural change indexes when all of these sets of controls are included simultaneously should be interpreted with caution. Our sample for these 'kitchen sink' regressions consists of only 32 countries, and these regressions absorb 14 degrees of freedom, leaving only 18 degrees of freedom for estimation. Indeed, the F-statistics (not shown) of these 'kitchen sink' regressions are all insignificant. In contrast, their counterparts in Tables 3 and 5 are statistically significant for the most part. This indicates that the additional variables in the kitchen sink regressions of Table 11 add no real explanatory power.

Finally, the Table 11 *per capita* GDP growth regression in which stock market size and growth are added is the only specification with an F statistic significantly higher than its Table 3 counterpart. Moreover, this happens despite a smaller sample, necessitated by the unavailability of initial market capitalization data for several countries. This would seem to suggest that stock market development augments growth through mechanisms not requiring the turnover of top corporations.

In contrast to the per capita GDP results, the productivity regressions are substantially affected by the inclusion of specific additional controls. Including either the bank development and openness variables renders both the stability and survival indexes insignificant in explaining productivity growth. From this, we can tentatively infer that the linkages between productivity growth on the one hand and corporate stability and survival on the other depend on the banking system and degree of openness. Recall that a long-established and well-developed banking system is associated with greater stability and survival, while openness is associated with lower stability and survival odds. The negative impact of high stability of the list of top ten firms and of their prolonged survival on productivity growth appears to coincide with both bank domination of the financial system and a lack of ingress of the global economy.

Again, though, caution is warranted. While including either the bank development or openness variables renders corporate stability and survival insignificant in explaining productivity growth, none of these added variables are significant themselves in the regressions underlying Table 11. Moreover, including these variables lowers the regression F statistics (not shown). Again, the regressions underlying Table 11 in which the stock market size and growth variables are added have significantly higher F statistics than their Table 3 and Table 5 counterparts.

Finally, including the stock market development variables as additional controls renders corporate stability and survival insignificant in explaining capital accumulation. Several economic explanations might be consistent with this finding. For example, stock market development might allow upstarts to accumulate capital and better displace established firms. Or, pressure from investors might encourage more breaking up of large conglomerates in countries where stock market growth is greater.

5. Discussion and Conclusions

Countries whose rolls of leading firms change substantially over the years tend to grow faster than countries whose lists of leading firms change little. This faster growth is due to faster growth in total factor productivity and faster capital accumulation. The productivity effect is more important in developed economies, while the capital, accumulation effect matters most in developing countries.

Corporate stability does not appear to be associated with (successful) government policies to equalize income distributions or avoid economic crises. Stability is, however, positively associated with both the importance of government in the economy and with the integrity of government. Countries also have more stable lists of top firms if their banking systems are large and their stock markets are smaller. Greater openness to the global economy is associated with more turnover in the list of top firms. None of these effects convincingly accounts for the full importance of stability in the list of top firms. However, the importance of banks versus the stock market and economic openness seems to account for the relationships of stability with productivity growth and capital accumulation.

We perceive two ways to view our results. One interpretation is that policies that promote the banking system, hobble the stock market, or shut out the global economy retard economic growth because they preserves the dominance of established corporations. There is a lack of economic rejuvenation. Indeed, these policies may be championed by groups with strong vested interests in the *status quo* precisely because they have such an effect. An alternative interpretation is that correlations are not proof of causation, and that the economics underlying these empirical findings remain uncertain.

If the first interpretation is correct, a slow turnover of large corporations reflects the lobbying power of vested interests. These might include mainly the political or corporate elites, or they might encompass swaths of the general population who prefer the status quo. Slow turnover of leading firms is associated with slow growth because it is symptomatic of a dearth of innovation. Schumpeter (1912) argues that economic growth is caused by the emergence of new firms that grow rapidly because they are innovators. Old established firms, he posits, have a vested interest in preserving the *status quo* and the value of existing capital assets. This explains his observation in the introductory quote: "*In general, it is not the owner of stagecoaches who builds railways.*" In a similar vein, Nelson and Winter (1982) argue that a less contestable economy leads to less heterogeneity in firms' practices, and that this slows the pace of Darwinian evolution towards higher productivity practices and, therefore, slows growth.

Certainly, our findings do not support the view of Schumpeter (1942) that large established firms are the most important engines of long run economic growth because they provide the stability and resources needed to support innovation. While this view may be valid in some industries or time periods, our results suggest that other considerations are more general.

Moreover, if large firms, or interests allied to them, protect the status quo by lobbying governments, this reduces incentives to innovate and, if Murphy *et al.* (1993) are correct that political rent seeking has increasing returns to scale, increases their returns from further rent-seeking. This encourages further rent-seeking and discourages innovation by large firms. In this way, large firms perhaps lose the innovation advantage Schumpeter (1942) gives them.

Our findings raise the concern that the corporate sectors of some countries might be excessively stable, and that this stability might be inimical to economic growth. It is plausible that such excessive stability results from rent-seeking by an established economic elite, whereby wealthy insiders use the power of the state to affect the financial system, openness, and other institutional features of the economy so as to preserve the value and viability of their corporate holdings. Thus, our findings lend credence to a concern, initially raised by Olsen (1963, 1982, 2000) and recently given empirical validation by Johnson and Mitton (2001), Morck *et al.* (2001), and Rajan and Zingales (2001), that economic entrenchment of wealthy insiders is likely a serious impediment to growth in many countries.

We recognize that further work is needed to clarify the direction of causation in the economics underlying these results. We welcome additional theoretical or empirical work that might cast light upon these issues.

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Table 1.
Panel A Corporate Sector Structural Change Indexes

Corporate stability indices are the fraction of the top ten firms, by employees, in each country in 1975 that are still in the top ten in 1996 weighted by each firm's 1996 labor force, Φ_{L96}, 1975 labor force, Φ_{L75}, and equally. Control continuity, Θ is the fraction of 1975 top ten firms still controlled by the same individual or family in 1996. Corporate survival indexes Ω^{GDP} are fractions of top ten 1975 firms still in the 1996 top ten *or* growing as fast as *per capita* GDP. Corporate survival indexes $\Omega^{50\%}$ are fractions of top ten 1975 firms still in the 1996 top ten *or* with more than half their 1975 employees.

	Corporate Sector Stability Indexes			Corporate Control Continuity Indexes			Leading Corporation Survival Indexes			
Country	Φ_{L96}	Φ_{L75}	Φ_{E}	Θ_{L96}	Θ_{L75}	Θ_{E}	Ω_{L75}^{GDP}	Ω_{E}^{GDP}	$\Omega_{L75}^{50\%}$	$\Omega_{E}^{50\%}$
Argentina	0.23434	0.31173	0.4	0.05852	0.00000	0.1	0.31173	0.2	0.31173	0.2
Australia	0.49213	0.66851	0.5	0.12111	0.11686	0.1	0.66851	0.6	0.84251	0.8
Austria	0.58947	0.58685	0.4	0.28114	0.34475	0.2	0.58685	0.4	0.62327	0.5
Belgium	0.25932	0.40802	0.3	0.09189	0.18366	0.1	0.40802	0.3	0.46367	0.4
Bolivia	0.22292	0.71923	0.2	0.22292	0.71923	0.2	0.77273	0.4	0.79691	0.5
Brazil	0.37011	0.40767	0.4	0.37011	0.40767	0.4	0.40767	0.4	0.51225	0.6
Canada	0.37058	0.24959	0.3	0.11381	0.08281	0.1	0.24959	0.3	0.33291	0.4
Chile	0.29859	0.38690	0.3	0.22942	0.32338	0.2	0.38690	0.3	0.43258	0.4
Colombia	0.18567	0.23808	0.2	0.18567	0.23808	0.2	0.23808	0.2	0.80904	0.8
Denmark	0.59680	0.48935	0.4	0.19666	0.00000	0.1	0.48935	0.3	0.48935	0.3
Egypt	0.11406	0.23343	0.2	0.06670	0.18260	0.1	0.23343	0.2	0.33776	0.5
Finland	0.60252	0.53235	0.6	0.26458	0.23343	0.3	0.53235	0.5	0.70551	0.6
France	0.38725	0.56400	0.4	0.19856	0.32534	0.2	0.56400	0.4	1.00000	1.0
Germany	0.72087	0.76277	0.7	0.30319	0.34063	0.3	0.76277	0.7	0.83818	0.8
Ghana	0.11158	0.32787	0.2	0.03656	0.10793	0.1	0.38286	0.3	0.50217	0.4
Greece	0.41278	0.38197	0.3	0.36451	0.33372	0.2	0.40174	0.4	0.42116	0.5
Guatemala	0.00000	0.00000	0.0	0.00000	0.00000	0.0	0.14778	0.2	0.14778	0.2
Hong Kong	0.39337	0.71270	0.3	0.09615	0.15350	0.2	0.71270	0.4	0.92429	0.8
India	0.17355	0.18407	0.2	0.17355	0.18407	0.2	0.18407	0.2	0.45619	0.6
Indonesia	0.09188	0.23529	0.1	0.09188	0.23529	0.1	0.23529	0.1	0.55231	0.6
Iran	0.46528	0.24509	0.4	0.38350	0.12426	0.3	0.37599	0.4	0.37599	0.4
Ireland	0.34480	0.29260	0.2	0.34480	0.29260	0.2	0.29260	0.2	0.35267	0.3
Israel	0.73493	0.60896	0.6	0.51229	0.51756	0.4	0.60896	0.6	0.72639	0.8
Italy	0.59662	0.47672	0.5	0.59662	0.47672	0.5	0.47672	0.5	0.47672	0.5
Jamaica	0.20488	0.24485	0.3	0.06282	0.07872	0.1	0.24485	0.3	0.29922	0.3
Japan	0.77070	0.72527	0.7	0.33898	0.40519	0.3	0.72527	0.7	0.72527	0.7

Table 1 (Continued)

Country	Corporate Sector Stability Indexes			Corporate Control Continuity Indexes			Leading Corporation Survival Indexes			
	Φ_{L96}	Φ_{L75}	Φ_E	Θ_{L96}	Θ_{L75}	Θ_E	Ω_{L75}^{GDP}	Ω_E^{GDP}	$\Omega_{L75}^{50\%}$	$\Omega_E^{50\%}$
Kenya	0.25367	0.33928	0.2	0.21216	0.33928	0.1	0.36957	0.2	0.36957	0.2
Korea	0.50042	0.38087	0.4	0.42491	0.29017	0.3	0.38087	0.4	0.58543	0.7
Malaysia	0.09437	0.24117	0.1	0.00000	0.00000	0.0	0.27663	0.2	0.36977	0.4
Mexico	0.45987	0.72212	0.4	0.12029	0.35770	0.1	0.75942	0.5	0.83775	0.7
Netherlands	0.65070	0.79353	0.4	0.50174	0.58621	0.2	0.79353	0.4	0.86729	0.7
New Zealand	0.26101	0.08775	0.3	0.00000	0.00000	0.0	0.08775	0.1	0.08775	0.1
Norway	0.33327	0.31123	0.3	0.14653	0.09389	0.1	0.31123	0.3	0.47121	0.5
Pakistan	0.21428	0.42908	0.5	0.19001	0.27112	0.4	0.42908	0.3	0.61666	0.6
Peru	0.57665	0.45936	0.5	0.32600	0.36171	0.3	0.45936	0.5	0.51301	0.5
Philippines	0.23806	0.25999	0.2	0.13520	0.18445	0.1	0.25999	0.2	0.47615	0.4
Portugal	0.19507	0.34266	0.2	0.08800	0.29122	0.1	0.34266	0.2	0.56900	0.5
Senegal	0.06911	0.05749	0.1	0.06911	0.05749	0.1	0.10312	0.2	0.14875	0.2
Singapore	0.16885	0.22328	0.2	0.11061	0.14885	0.1	0.22328	0.2	0.44258	0.5
South Africa	0.55368	0.68514	0.5	0.19628	0.18659	0.1	0.68514	0.5	0.72868	0.6
Spain	0.38640	0.46344	0.3	0.15332	0.29650	0.2	0.46344	0.3	0.59053	0.5
Sri Lanka	0.04449	0.07093	0.1	0.04449	0.07093	0.1	0.07093	0.1	0.37774	0.4
Sweden	0.49863	0.60596	0.5	0.72582	0.48215	0.6	0.60596	0.5	0.60596	0.5
Switzerland	0.79994	0.79643	0.6	0.05453	0.06635	0.1	0.83344	0.7	0.96332	0.9
Taiwan	0.19469	0.39190	0.2	0.19469	0.39190	0.2	0.39190	0.2	0.78736	0.6
Thailand	0.35035	0.60730	0.3	0.35035	0.30070	0.3	0.60730	0.4	0.91762	0.9
Tunisia	0.05952	0.18399	0.1	0.05952	0.18399	0.1	0.29438	0.2	0.44157	0.5
Turkey	0.08351	0.20833	0.1	0.08351	0.20833	0.1	0.20833	0.1	0.47936	0.4
United Kingdom	0.30582	0.23128	0.2	0.00000	0.00000	0.0	0.23128	0.2	0.30723	0.3
Uruguay	0.38378	0.49031	0.3	0.25441	0.35923	0.2	0.49031	0.3	0.49031	0.3
United States	0.50488	0.53122	0.5	0.00000	0.00000	0.0	0.53122	0.5	0.58416	0.6
Venezuela	0.57313	0.73303	0.4	0.53106	0.69746	0.3	0.77687	0.5	0.77687	0.5

Table 2
Univariate Statistics for Main Variables

Variable		Mean	Standard Deviation	Minimum	Maximum
Corporate Stability Indexes					
Corporate stability index based on top 10 employers, weighted by the 1996 labor force.	Φ_{L96}	0.356	0.208	0.000	0.800
Corporate stability index based on top 10 employers, weighted by the 1975 labor force.	Φ_{L75}	0.416	0.211	0.000	0.796
Corporate stability index based on top 10 employers, equally weighted.	Φ_{E}	0.327	0.165	0.000	0.700
Control Continuity Indexes					
Management stability index based on top 10 employers, weighted by the 1996 labor force.	Θ_{L96}	0.205	0.168	0.000	0.726
Management stability index based on top 10 employers, weighted by the 1975 labor force.	Θ_{L75}	0.243	0.177	0.000	0.719
Management stability index based on top 10 employers, equally weighted.	Θ_{E}	0.181	0.129	0.000	0.600
Corporate Survival Indexes					
Corporate survival using per capita GDP growth as benchmark, labor weighted.	Ω_{L75}^{GDP}	0.431	0.206	0.071	0.833
Corporate survival using per capita GDP growth as benchmark, equally weighted.	Ω_{E}^{GDP}	0.337	0.162	0.100	0.700
Corporate survival index using 50% as benchmark, labor-weighted.	$\Omega_{L75}^{50\%}$	0.555	0.219	0.088	1.000
Corporate survival index using 50% as benchmark, equally weighted.	$\Omega_{E}^{50\%}$	0.519	0.200	0.100	1.000
Growth Measures					
Growth in per capita GDP in US dollars at PPP, 1990 to 2000	$\Delta\ln(y)$	0.210	0.146	-0.111	0.624
Total factor productivity growth, 1990 to 2000	$\Delta\mathrm{TFP}$	0.141	0.115	-0.169	0.467
Capital accumulation rate, 1990 to 2000	$\Delta\ln(k)$	0.231	0.209	-0.217	0.674
Control Variables					
1990 per capita GDP in thousands of US Dollars at PPP	y	11.4	7.87	1.18	26.5
Average years of total education for adults (age > 25, as of 1990)	h	6.44	2.67	1.88	12.0
1990 per capita capital assets in millions of US Dollars at PPP	k	27.3	22.6	1.29	79.0
1990 total GDP in trillions of US Dollars at PPP	Y	0.469	1.00	0.010	6.62

Sample is the 52 countries listed in Table 1.

Table 3
Regressions of Economic Growth on Corporate Stability Indexes

Dependent variables are 1990 to 2000 *per capita* GDP growth, $\Delta\ln(y)$, total factor productivity growth, ΔTFP, and per capita capital accumulation, $\Delta\ln(k)$. Independent variables are labor or equal-weighted corporate sector stability indexes, measuring the proportion of top ten firms in 1996 that were top ten firms in 1975. Control variables are the logs of 1990 *per capita* GDP, capital assets *per capita*, average years of education for adults, and total GDP (in panel B only). All financial variables are in 1985 US dollars at purchasing power parity.

Panel A		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.231	(.42)	0.346	(.14)	-0.381	(.34)	-0.104	(.81)	0.211	(.55)	-1.048	(.08)
Corporate Stability, labor-weighted	Φ_{L96}	-0.352	(.01)	-0.224	(.04)	-0.427	(.02)	-0.382	(.01)	-0.236	(.04)	-0.487	(.01)
Log of per capita GDP, 1990	$\ln(y)$	-0.095	(.38)	-0.151	(.09)	0.185	(.22)	-0.114	(.30)	-0.158	(.08)	0.148	(.33)
Log of average years of education	$\ln(h)$	0.158	(.05)	0.104	(.11)	0.181	(.11)	0.160	(.05)	0.104	(.11)	0.184	(.10)
Log of per capita capital assets, 1990	$\ln(k)$	0.071	(.40)	0.109	(.12)	-0.126	(.29)	0.079	(.35)	0.112	(.11)	-0.109	(.35)
Log of country GDP, 1990	$\ln(Y)$	-		-		-		0.017	(.30)	0.007	(.60)	0.033	(.14)
F-Statistic	F	2.47	(.06)	1.80	(.14)	3.09	(.02)	2.20	(.07)	1.47	(.22)	3.00	(.02)
Adjusted R-Squared	R^2	0.103		0.059		0.141		0.105		0.044		0.164	
Sample	N	52		52		52		52		52		52	

Panel B		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.325	(.26)	0.405	(.09)	-0.266	(.50)	-0.100	(.82)	0.221	(.53)	-1.070	(.07)
Corporate Stability, equally weighted	Φ_E	-0.388	(.01)	-0.238	(.06)	-0.501	(.02)	-0.454	(.01)	-0.266	(.04)	-0.624	(.01)
Log of per capita GDP, 1990	$\ln(y)$	-0.097	(.37)	-0.150	(.09)	0.177	(.24)	-0.126	(.26)	-0.163	(.08)	0.123	(.41)
Log of average years of education	$\ln(h)$	0.149	(.06)	0.097	(.13)	0.172	(.12)	0.151	(.06)	0.098	(.13)	0.177	(.10)
Log of per capita capital assets, 1990	$\ln(k)$	0.064	(.45)	0.103	(.14)	-0.128	(.28)	0.079	(.35)	0.109	(.12)	-0.100	(.39)
Log of country GDP, 1990	$\ln(Y)$	-		-		-		0.022	(.19)	0.009	(.48)	0.041	(.07)
F-Statistic	F	2.33	(.07)	1.64	(.18)	3.19	(.02)	2.26	(.06)	1.40	(.24)	3.37	(.01)
Adjusted R-Squared	R^2	0.095		0.048		0.147		0.110		0.037		0.189	
Sample	N	52		52		52		52		52		52	

Samples are countries listed in Table 1. Numbers in parentheses are probability levels for rejecting the null hypothesis of zero coefficients.

Table 4
Regressions of Economic Growth on Corporate Control Continuity Indexes

Dependent variables are 1990 to 2000 *per capita* GDP growth, $\Delta\ln(y)$, total factor productivity growth, ΔTFP, and per capita capital accumulation, $\Delta\ln(k)$. Independent variables are labor or equal-weighted corporate control continuity indexes, measuring the proportion of top ten firms under the control of the same individual or family in 1996 and 1975. Control variables are the logs of 1990 *per capita* GDP, capital assets *per capita*, average years of education for adults, and total GDP (in panel B only). All financial variables are in 1985 US dollars at purchasing power parity.

Panel A		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.310	(.32)	0.392	(.11)	-0.274	(.52)	0.165	(.72)	0.376	(.30)	-0.701	(.26)
Control continuity, labor-weighted	Θ_{L96}	-0.015	(.91)	0.005	(.96)	-0.064	(.73)	-0.019	(.89)	0.004	(.97)	-0.078	(.67)
Log of per capita GDP, 1990	$\ln(y)$	-0.022	(.85)	-0.101	(.27)	0.264	(.10)	-0.028	(.81)	-0.102	(.27)	0.245	(.13)
Log of average years of education	$\ln(h)$	0.118	(.16)	0.078	(.23)	0.133	(.25)	0.117	(.17)	0.078	(.24)	0.130	(.26)
Log of per capita capital assets, 1990	$\ln(k)$	-0.011	(.90)	0.054	(.44)	-0.216	(.08)	-0.010	(.91)	0.054	(.44)	-0.211	(.09)
Log of country GDP, 1990	$\ln(Y)$	-		-		-		0.007	(.66)	0.001	(.95)	0.022	(.34)
F-Statistic	F	0.61	(.66)	0.64	(.64)	1.60	(.19)	0.52	(.76)	0.50	(.78)	1.46	(.22)
Adjusted R-Squared	R^2	-0.032		-0.029		0.045		-0.050		-0.052		0.043	
Sample	N	52		52		52		52		52		52	

Panel B		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.304	(.33)	0.394	(.11)	-0.302	(.48)	0.164	(.72)	0.375	(.30)	-0.706	(.26)
Control continuity, equal-weighted	Θ_E	0.009	(.96)	-0.004	(.98)	0.044	(.85)	-0.003	(.98)	-0.006	(.97)	0.007	(.98)
Log of per capita GDP, 1990	$\ln(y)$	-0.017	(.88)	-0.103	(.26)	0.285	(.07)	-0.024	(.83)	-0.104	(.26)	0.264	(.10)
Log of average years of education	$\ln(h)$	0.119	(.16)	0.078	(.24)	0.135	(.24)	0.117	(.17)	0.078	(.24)	0.131	(.26)
Log of per capita capital assets, 1990	$\ln(k)$	-0.015	(.86)	0.055	(.42)	-0.235	(.05)	-0.013	(.88)	0.056	(.43)	-0.229	(.06)
Log of country GDP, 1990	$\ln(Y)$	-		-		-		0.007	(.67)	0.001	(.94)	0.021	(.37)
F-Statistic	F	0.60	(.66)	0.64	(.64)	1.58	(.20)	0.51	(.77)	0.50	(.78)	1.42	(.23)
Adjusted R-Squared	R^2	-0.032		-0.030		0.043		-0.050		-0.052		0.040	
Sample	N	52		52		52		52		52		52	

Samples are countries listed in Table 1. Numbers in parentheses are probability levels for rejecting the null hypothesis of zero coefficients.

Table 5
Regressions of Growth on Leading Firm Corporate Survival Indexes

Dependent variables are 1990 to 2000 *per capita* GDP growth, $\Delta\ln(y)$, total factor productivity growth, ΔTFP, and per capita capital accumulation, $\Delta\ln(k)$. Independent variables are labor or equal-weighted top firm survival indices, measuring the proportion of top ten 1975 firms that 'survive' in 1996. Survival as a top firm is defined either as growth faster than per capita GDP growth or as a labor force decline of not more than 50%. Control variables are the logs of 1990 *per capita* GDP, capital assets *per capita*, average years of education for adults, and total GDP (in panel B only). All financial variables are in 1985 US dollars at purchasing power parity.

Panel A		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.278	(.94)	0.372	(.45)	-0.317	(.22)	0.278	(.75)	0.374	(.66)	-0.320	(.12)
Survival, defined as growth > *per capita* GDP growth, labor-weighted.	Ω_{L75}^{GDP}	-0.255	(.02)	-0.186	(.03)	-0.228	(.14)	-		-		-	
Survival, defined as growth > *per capita* GDP growth, equal-weighted.	Ω_{E}^{GDP}	-		-		-		-0.381	(.01)	-0.260	(.03)	-0.403	(.05)
Log of per capita GDP, 1990	$\ln(y)$	-0.039	(.71)	-0.117	(.16)	0.260	(.09)	-0.069	(.52)	-0.136	(.11)	0.225	(.14)
Log of per capita capital assets, 1990	$\ln(k)$	0.019	(.82)	0.079	(.22)	-0.200	(.08)	0.048	(.56)	0.097	(.14)	-0.164	(.16)
Log of average years of education	$\ln(h)$	0.123	(.12)	0.082	(.19)	0.137	(.22)	0.125	(.11)	0.083	(.19)	0.140	(.21)
F-Statistic	F	2.10	(.10)	1.92	(.12)	2.21	(.08)	2.46	(.06)	1.99	(.11)	2.69	(.04)
Adjusted R-Squared	R^2	0.080		0.067		0.087		0.103		0.072		0.117	
Sample	N	52		52		52		52		52		52	

Panel B		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.299	(.58)	0.385	(.33)	-0.287	(.62)	0.303	(.41)	0.386	(.26)	-0.273	(.90)
Survival, defined as growth in labor force > -50%, labor-weighted.	$\Omega_{L75}^{50\%}$	-0.123	(.22)	-0.142	(.07)	0.064	(.64)	-		-		-	
Survival, defined as growth in labor force > -50%, equal-weighted.	$\Omega_{E}^{50\%}$	-		-		-		-0.032	(.77)	-0.098	(.26)	0.217	(.15)
Log of per capita GDP, 1990	$\ln(y)$	-0.016	(.89)	-0.099	(.25)	0.277	(.07)	-0.018	(.87)	-0.101	(.25)	0.276	(.07)
Log of per capita capital assets, 1990	$\ln(k)$	-0.009	(.91)	0.061	(.34)	-0.232	(.05)	-0.012	(.88)	0.060	(.36)	-0.242	(.04)
Log of average years of education	$\ln(h)$	0.118	(.15)	0.078	(.22)	0.133	(.25)	0.117	(.17)	0.073	(.26)	0.144	(.20)
F-Statistic	F	1.01	(.41)	1.56	(.20)	1.63	(.18)	0.63	(.65)	0.98	(.43)	2.19	(.09)
Adjusted R-Squared	R^2	0.001		0.042		0.047		-0.030		-0.001		0.085	
Sample	N	52		52		52		52		52		52	

Samples are countries listed in Table 1. Numbers in parentheses are probability levels for rejecting the null hypothesis of zero coefficients.

Table 6
Regressions of Growth on Corporate Stability Indices for High and Low Income Country Subsamples

Dependent variables are 1990 to 2000 *per capita* GDP growth, $\Delta\ln(y)$, total factor productivity growth, ΔTFP, and per capita capital accumulation, $\Delta\ln(k)$. Independent variables are labor or equal-weighted corporate sector stability indexes, measuring the proportion of top ten firms in 1996 that were top ten firms in 1975. Control variables are the logs of 1990 *per capita* GDP, capital assets *per capita*, average years of education for adults, and total GDP (in panel B only). All financial variables are in 1985 US dollars at purchasing power parity. High income countries have above median per capita GDP.

Panel A: High Income Countries		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		2.675	(.00)	1.744	(.01)	3.103	(.01)	2.519	(.00)	1.595	(.02)	3.081	(.01)
Corporate Stability, labor-weighted	Φ_{L96}	-0.184	(.14)	-0.191	(.07)	0.022	(.89)	-		-		-	
Corporate Stability, equally weighted	Φ_{E}	-		-		-		-0.286	(.05)	-0.288	(.02)	0.007	(.97)
Log of per capita GDP, 1990	$\ln(y)$	-0.131	(.41)	-0.179	(.18)	0.159	(.44)	-0.130	(.40)	-0.177	(.16)	0.158	(.44)
Log of average years of education	$\ln(h)$	0.099	(.27)	0.106	(.15)	-0.024	(.84)	0.110	(.20)	0.116	(.10)	-0.020	(.86)
Log of per capita capital assets, 1990	$\ln(k)$	-0.121	(.25)	0.001	(.99)	-0.407	(.01)	-0.107	(.29)	0.014	(.86)	-0.404	(.01)
F-Statistic	F	5.41	(.00)	3.57	(.02)	6.37	(.00)	6.22	(.00)	4.51	(.01)	6.36	(.00)
Adjusted R-Squared	R^2	0.414		0.291		0.462		0.455		0.360		0.462	
Sample	N	26		26		26		26		26		26	

Panel B: Low Income Countries		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.092	(.87)	0.223	(.64)	-0.437	(.55)	0.167	(.78)	0.238	(.63)	-0.236	(.76)
Corporate Stability, labor-weighted	Φ_{L96}	-0.496	(.07)	-0.213	(.35)	-0.941	(.01)	-		-		-	
Corporate Stability, equally weighted	Φ_{E}	-		-		-		-0.320	(.28)	-0.068	(.78)	-0.840	(.04)
Log of per capita GDP, 1990	$\ln(y)$	-0.187	(.29)	-0.177	(.25)	-0.036	(.88)	-0.125	(.50)	-0.131	(.40)	0.021	(.93)
Log of average years of education	$\ln(h)$	0.147	(.23)	0.078	(.46)	0.230	(.16)	0.136	(.29)	0.074	(.49)	0.206	(.23)
Log of per capita capital assets, 1990	$\ln(k)$	0.179	(.20)	0.151	(.21)	0.095	(.60)	0.109	(.44)	0.103	(.38)	0.021	(.91)
F-Statistic	F	1.62	(.21)	0.83	(.52)	2.80	(.05)	0.91	(.48)	0.59	(.67)	1.98	(.13)
Adjusted R-Squared	R^2	0.090		-0.028		0.224		-0.015		-0.070		0.136	
Sample	N	26		26		26		26		26		26	

The high income countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, South Korea, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, UK, and US. The low income countries are the remainder of those listed in Table 1.

Table 7
Regressions of Rise in Economic Inequality on Corporate Sector Structural Change Indexes

Dependent variable is increase in GINI coefficient from 1975 to 1996. Independent variables are corporate stability and management stability indices based on the largest 10 employers in the country. Control variables are the GINI coefficient in 1975, the log of 1975 per capita GDP, the log of 1975 capital assets per capita, and the log of the average total years of education for the adult population (age over 25) in 1975. All variables expressed in US dollars at purchasing power parity.

		Corporate Sector Index Used											
		Corporate Stability				Control Continuity				Corporate Survival			
		Φ_{L96}		Φ_{E}		Θ_{L96}		Θ_{E}		Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Panel A													
Constant		14.82	(.02)	14.16	(.04)	13.70	(.02)	14.26	(.01)	12.27	(.04)	13.10	(.04)
GINI coefficient in 1975	$GINI_0$	-0.37	(.01)	-0.36	(.01)	-0.35	(.01)	-0.35	(.01)	-0.34	(.01)	-0.35	(.01)
Corporate sector index		-4.39	(.48)	-3.59	(.64)	-5.27	(.45)	-7.61	(.40)	0.02	(1.00)	-1.92	(.80)
F Statistics	F	3.95	(.03)	3.78	(.03)	3.99	(.03)	4.07	(.02)	3.65	(.03)	3.69	(.03)
Adjusted R-Squared	R^2	0.109		0.104		0.111		0.113		0.099		0.101	
Sample	N	49		49		49		49		49		49	
Panel B													
Constant		21.25	(.40)	23.91	(.33)	20.92	(.36)	22.16	(.33)	25.64	(.28)	26.19	(.29)
GINI coefficient in 1975	$GINI_0$	-0.39	(.01)	-0.39	(.01)	-0.39	(.01)	-0.40	(.01)	-0.41	(.01)	-0.40	(.01)
Corporate sector index		-0.34	(.97)	2.62	(.79)	-3.12	(.67)	-5.20	(.59)	3.86	(.57)	4.60	(.63)
Log of 1975 real per capita GDP	$ln(y)$	4.86	(.32)	4.97	(.31)	4.74	(.33)	4.36	(.37)	4.80	(.32)	4.98	(.30)
Log of 1975 *per capita* physical capital	$ln(k)$	-4.97	(.20)	-5.24	(.19)	-4.76	(.22)	-4.50	(.25)	-5.27	(.17)	-5.41	(.17)
Log of 1975 average years of education	$ln(h)$	0.69	(.85)	0.68	(.85)	0.57	(.88)	0.36	(.92)	0.69	(.85)	0.70	(.85)
Log of 1975 total GDP	$ln(Y)$	-0.32	(.75)	-0.43	(.67)	-0.31	(.75)	-0.26	(.79)	-0.44	(.65)	-0.50	(.62)
F Statistics	F	1.56	(.18)	1.58	(.18)	1.60	(.17)	1.62	(.17)	1.63	(.16)	1.61	(.17)
Adjusted R-Squared	R^2	0.066		0.067		0.070		0.072		0.073		0.071	
Sample	N	49		49		49		49		49		49	

Samples are the countries listed in Table 1 less Ghana, Guatemala, and Switzerland. Numbers in parentheses are probability levels.

Table 8
Corporate Sector Structural Change and the Size of Government

The dependent variables in Panel A are corporate stability, control continuity, and corporate survival indexes; the independent variables are government spending over GDP, and growth in that variable from 1975 to 1996. The institutional development variables in Panels B and C range from one to ten, and take higher values in countries with more developed (i.e. less corrupt) institutions. Panel C exhibits the mean corporate stability, control continuity, and corporate survival indexes for countries whose legal systems are derived from British, French, and German/Nordic legal traditions.

Panel A. Government Size Regressions	Corporate Stability Φ_{L96}		Φ_{E}		Control Continuity Θ_{L96}		Θ_{E}		Corporate Survival Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Constant	0.118	(.19)	0.142	(.05)	0.076	(.33)	0.107	(.08)	0.356	(.00)	0.223	(.00)
Government spending over GDP, 1975[a,b]	1.672	(.01)	1.279	(.01)	0.897	(.07)	0.521	(.18)	0.559	(.37)	0.837	(.07)
Change in government spending over GDP, 1975-96	1.204	(.10)	1.038	(.07)	0.394	(.52)	0.542	(.26)	0.675	(.38)	0.678	(.24)
F Statistics	4.32	(.02)	4.03	(.02)	1.80	(.18)	1.02	(.37)	0.52	(.60)	1.68	(.20)
Adjusted R-Squared	.122		.112		.032		.001		-.021		.028	
Sample	49		49		49		49		49		49	

Panel B. Correlations with Institutional Development	Corporate Stability Φ_{L96}		Φ_{E}		Control Continuity Θ_{L96}		Θ_{E}		Corporate Survival Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Respect for rule of law	0.420	(.00)	0.331	(.03)	0.043	(.78)	-0.061	(.69)	0.341	(.02)	0.344	(.02)
Absence of official corruption	0.557	(.00)	0.468	(.00)	0.128	(.36)	0.007	(.96)	0.313	(.02)	0.390	(.00)
Freedom from expropriation	0.427	(.00)	0.308	(.04)	0.067	(.66)	-0.019	(.90)	0.262	(.09)	0.333	(.03)
Govt. respect for contracts	0.528	(.00)	0.423	(.00)	0.162	(.25)	0.070	(.62)	0.339	(.01)	0.383	(.01)

Panel C. Corporate sector structural change index means by legal origin		Corporate Stability Φ_{L96}	Φ_{E}	Control Continuity Θ_{L96}	Θ_{E}	Corporate Survival Ω_{L75}^{GDP}	Ω_{E}^{GDP}
British Common Law		0.310	0.305	0.143	0.139	0.3809	0.3068
French Napoleonic Code		0.298	0.274	0.209	0.178	0.4146	0.2988
German Codes[a]		0.561	0.480	0.293	0.250	0.562	0.4745
T-tests	*British v. French*	(.84)	(.50)	(.19)	(.30)	(.61)	(.86)
	British v. German	(.00)	(.01)	(.02)	(.05)	(.03)	(.02)
	French v. German	(.00)	(.00)	(.20)	(.14)	(.06)	(.00)

Sample size is 49 countries for Panel A. The Panel B sample is 44 countries for tests using the rule of law and freedom from expropriation variables and 52 countries for tests using the absence of corruption and respect for contracts variables. The sample for panel C includes 18 common law, 23 French code, and 10 German code countries. The last include countries with Nordic Civil Codes. Panel C encompasses all the countries in Table 1 save Iran, which adopted an Islamic legal code in 1979. We are grateful to Raphael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert Vishny for providing us with these variables.

Table 9. Corporate Sector Structural Change and Financial System Development

Regressions explain corporate stability, control continuity, and corporate survival indexes with shareholder and creditor legal rights, the growth and development of the banking system, and the growth and development of the stock market.

Panel A. Financial development measured by creditor & shareholder rights	Corporate Stability				Control Continuity				Corporate Survival			
	Φ_{L96}		Φ_{E}		Θ_{L96}		Θ_{E}		Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Constant	0.266	(.09)	0.271	(.03)	0.230	(.09)	0.218	(.05)	0.363	(.02)	0.228	(.08)
Creditor rights index	-0.014	(.56)	-0.021	(.28)	0.004	(.84)	0.000	(1.00)	-0.017	(.49)	-0.020	(.32)
Shareholder rights index	-0.046	(.08)	-0.027	(.21)	-0.058	(.01)	-0.036	(.06)	-0.054	(.04)	-0.037	(.09)
Accounting rules index	0.005	(.05)	0.004	(.09)	0.002	(.27)	0.001	(.48)	0.005	(.06)	0.005	(.03)
F Statistics	1.91	(.15)	1.58	(.21)	2.23	(.10)	1.33	(.28)	2.21	(.11)	2.37	(.09)
Adjusted R-Squared	.069		.045		.091		.026		.089		.100	

Panel B. Financial development measured by domestic bank credit	Corporate Stability				Control Continuity				Corporate Survival			
	Φ_{L96}		Φ_{E}		Θ_{L96}		Θ_{E}		Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Constant	0.129	(.02)	0.158	(.00)	.116	(.02)	.122	(.00)	.250	(.00)	.170	(.00)
Domestic credit from banking sector over GDP, 1975	0.004	(.00)	0.003	(.00)	.002	(.01)	.001	(.02)	.003	(.00)	.003	(.00)
Change in domestic credit from banking sector /GDP, 75-96	0.000	(.84)	0.000	(.88)	-.001	(.11)	-.001	(.06)	.000	(.72)	.000	(.82)
F Statistics	12.19	(.00)	11.00	(.00)	4.01	(.03)	3.74	(.03)	6.17	(.00)	10.79	(.00)
Adjusted R-Squared	.323		.299		.113		.104		.180		.294	

Panel C. Financial development measured by stock market capitalization	Corporate Stability				Control Continuity				Corporate Survival			
	Φ_{L96}		Φ_{E}		Θ_{L96}		Θ_{E}		Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Constant	0.523	(.00)	0.452	(.00)	.280	(.00)	.226	(.00)	.547	(.00)	.443	(.00)
Stock market capitalization over GDP, 1976	-0.127	(.15)	-0.101	(.15)	-.143	(.08)	-.110	(.09)	-.093	(.33)	-.081	(.29)
Growth in stock market capitalization over GDP, 76 -95	-1.104	(.00)	-0.777	(.01)	-.395	(.23)	-.167	(.52)	-.733	(.06)	-.736	(.02)
F Statistics	5.17	(.01)	3.96	(.03)	1.78	(.18)	1.49	(.24)	1.89	(.16)	2.93	(.07)
Adjusted R-Squared	.172		.129		.038		.024		.043		.088	

Sample for Panel A is the countries in Table 1 less Bolivia, Chile, Ghana, Guatemala, Indonesia, Iran, Ireland, Jamaica, Kenya, Pakistan, Senegal, Sri Lanka, Tunisia, and Venezuela. We are grateful to Raphael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert Vishny for providing us with these variables. The Panel B sample is 48 countries: those in Table 1 less Germany, Hong Kong, Korea, and Taiwan. Data are from the World Bank's "World Development Indicators, 2001". Sample for Panel C is 41 countries: those listed in Table 1 less Bolivia, Ghana, Guatemala, Iran, Ireland, Israel, Jamaica, Kenya, Senegal, Sri Lanka, and Tunisia. Data is from La Porta et al. (2000).

Table 10
Openness to the Global Economy and Corporate Sector Structural Change
Regressions of corporate stability, control continuity, and corporate survival indexes on various measures of growth in openness to the global economy controlling for initial level of openness.

Panel A. Openness measured by net foreign direct investment inflow as a fraction of GDP	Corporate Stability				Control Continuity				Corporate Survival			
	Φ_{L96}		Φ_{E}		Θ_{L96}		Θ_{E}		Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Constant	0.353	(.00)	0.332	(.00)	.211	(.00)	.193	(.00)	.399	(.00)	.326	(.00)
Net foreign direct investment inflow over GDP, 1975	-0.051	(.06)	-.056	(.01)	-.034	(.17)	-.035	(.07)	-.020	(.49)	-.024	(.23)
Change in net foreign direct investment inflow/GDP 75-96	0.017	(.36)	0.022	(.11)	.015	(.38)	.011	(.40)	.019	(.35)	.008	(.59)
F Statistic	1.99	(.15)	4.70	(.01)	1.17	(.32)	1.88	(.16)	0.59	(.56)	0.78	(.46)
Adjusted R-Squared	.043		.144		.008		.039		-.019		-.010	

Panel B. Openness measured by trade as a fraction of GDP	Corporate Stability				Control Continuity				Corporate Survival			
	Φ_{L96}		Φ_{E}		Θ_{L96}		Θ_{E}		Ω_{L75}^{GDP}		Ω_{E}^{GDP}	
Constant	0.464	(.00)	0.462	(.00)	.238	(.00)	.254	(.00)	.482	(.00)	.442	(.00)
Trade as % of GDP, 1960	-0.005	(.00)	-.002	(.06)	-.003	(.02)	-.002	(.16)	-.003	(.08)	-.002	(.08)
Trade as % of GDP, avg. of 1960-95	0.002	(.24)	0.000	(.84)	.002	(.20)	.000	(.94)	.002	(.42)	.000	(.95)
F Statistics	6.24	(.00)	4.80	(.01)	3.08	(.06)	2.48	(.10)	1.92	(.16)	3.41	(.04)
Adjusted R-Squared	.196		.150		.088		.064		.041		.101	

Panel A samples is 45 countries - those in Table 1 less Germany, Greece, Hong Kong, Japan, Korea, Switzerland, and Taiwan. Data for panel A are from the World Bank's "World Development Indicators, 2001". Panel B sample is 44 countries – those in Table 1 less Egypt, Hong Kong, Indonesia, Iran, Singapore, Tunisia, Turkey, and Venezuela. Data for panel B are from Beck, Levine, and Loayza (1999).

Table 11
Summary of Horse Race Regressions

The statistical significance, at a ten percent probability level, of corporate stability, control continuity, and corporate survival indexes when additional control variables are included in regressions controlling for initial income, initial stock of physical capital, and initial stock of human capital.

Panel A. Dependent variable is Per capita GDP growth

	Corporate Stability		Control continuity		Corporate survival	
Independent variable of interest	Φ_{L96}	Φ_{E}	Θ_{L96}	Θ_{E}	Ω_{L75}^{GDP}	Ω_{E}^{GDP}
Tables 3 4 & 5 results	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Govt. spending/GDP in 75 and govt. spending/GDP growth 75-.96	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Absence of official corruption	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Bank credit availability in 75 and change in bank credit 75-.96	neg.	insig.	insig.	insig.	neg.	neg.
Additional controls added: Market capitalization in 76 and growth in market capitalization	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: FDI net inflow over GDP in 75 and change in FDI net inflow/GDP 75-.96	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: All the above	insig.	insig.	insig.	insig.	insig.	insig.

Panel B. Dependent variable is productivity growth

	Corporate Stability		Control continuity		Corporate survival	
Independent variable of interest	Φ_{L96}	Φ_{E}	Θ_{L96}	Θ_{E}	Ω_{L75}^{GDP}	Ω_{E}^{GDP}
Tables 3 4 & 5 results	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Govt. spending/GDP in 75 and Govt. spending/GDP growth 75-.96	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Absence of official corruption	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Bank credit availability in 75 and change in bank credit availability 75-.96	insig.	insig.	insig.	insig.	insig.	insig.
Additional controls added: Market capitalization in 76 and growth in market capitalization	neg.	insig.	insig.	insig.	neg.	neg.
Additional controls added: FDI net inflow over GDP in 75 and change in FDI net inflow/GDP 75-.96	insig.	insig.	insig.	insig.	insig.	insig.
Additional controls added: All the above	insig.	insig.	insig.	insig.	insig.	insig.

Panel C. Dependent variable is capital accumulation

	Corporate Stability		Control continuity		Corporate survival	
Independent variable of interest	Φ_{L96}	Φ_{E}	Θ_{L96}	Θ_{E}	Ω_{L75}^{GDP}	Ω_{E}^{GDP}
Tables 3 4 & 5 results	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Govt. spending/GDP in 75 and Govt. spending/GDP growth 75-.96	neg.	neg.	insig.	insig.	insig.	neg.
Additional controls added: Absence of official corruption	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Bank credit availability in 75 and change in bank credit 75-.96	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: Market capitalization in 76 and growth in market capitalization	insig.	neg.	insig.	insig.	insig.	insig.
Additional controls added: FDI net inflow over GDP in 75 and change in FDI net inflow/GDP 75-.96	neg.	neg.	insig.	insig.	neg.	neg.
Additional controls added: All the above	insig.	insig.	insig.	insig.	insig.	insig.

The samples are 49, 52, 48, 41, 45, and 32 countries in columns one through six, respectively. Samples vary because all additional control variables are not available for all countries.

Appendix on the Procedure for the Determination of Continuity

We begin with complete lists of all firms in each country for 1975 and 1996 from *Dun and Bradstreet's Principals of International Business* volumes for 1978 and 1998/99 volumes, respectively. The firms listed in each volume are sorted by number of employees, and a preliminary match is performed by comparing company name.

We then manually check for minor changes in company names, such as *Limited* in one year and *Corporation* in the other, *Aktiengesellschaft* in one and *AG* in the other, and the like. Next we check for the use of well-known abbreviations, like *IBM*, in one list and the company's full name, *International Business Machines*, in the other. Abbreviations are only matched in this way if the identity of the company is clear.

We then take into account the corporate group structure of many countries' large businesses. *Principals of International Business* provides information on parent-subsidiary linkages, which we use to delete subsidiaries from our lists, and to consolidate reported employee figures of subsidiaries into those of parent firms.[1] Local companies controlled directly by foreign firms are taken as separate entities in the host country.

This procedure generates lists the top ten firms, ranked by number of employees, for each of the two years.

However, it does not deal with company name changes. If name changes are more common in some countries than others, this should reduce our stability measures evenly across all countries, and so is statistically innocuous. However, if name changes are more common in some countries than others, our results might be distorted. We therefore conduct an exhaustive search for name changes of the top ten companies in each country, gathering this information separately, and by hand, for each firm.

For each top ten 1975 firm that apparently disappeared by 1996, we check for name changes, significant ownership changes (such as privatizations, or mergers and acquisitions), restructurings, downsizing, and failure. We also construct detailed corporate histories of all apparently new 1996 top ten firms to see if they are actually continuations of 1975 top ten firms.

Corporate continuity can be disguised in corporate groups. For example, a group restructuring that moves firms up or down in a family pyramid can cause the leading firm of the group to change, say from a construction firm to a bank, even though the actual physical assets of the corporate group as a whole have not changed. If the leading firm of a corporate group changes, but the group continues to be controlled by the same individual or family, we treat the group as having survived.

To operationalize this procedure, we require detailed corporate control histories, first for each apparently new firm in our 1996 lists, and then for each remaining apparently defunct firm in our 1975 list. To construct these histories, we use the following sequence of steps.

First, we located the company website using the *Google* search engine. (We experimented with other search engines, such as *Yahoo* and *AltaVista*, and found that Google led us more directly to corporate websites for foreign companies.) Company websites often contain

[1] Our phone conversation with Dun and Bradstreet confirmed that when D&B lists companies, "branches and divisions are consolidated [with the headquarter], but any other entities (subsidiaries or affiliated companies) are listed separately." For example, the Australian company WOOLWORTHS LTD has four subsidiaries listed in the D&B 98/99 CD edition: WOOLWORTHS (Q'LAND) PTY LTD, WOOLWORTHS (SOUTH AUSTRALIA) PTY LTD, WOOLWORTHS (VICTORIA) PTY LTD, and WOOLWORTHS (W A) PTY LTD. We add the employee figures of each subsidiary to the parent, WOOLWORTHS LTD, and only include the parent in our top-employer list. As one last step, we search the company's website or other corporate information sources such as Worldscope, Orbis, or Forbes, to verify our data with numbers from consolidated financial reports.

detailed corporate histories regarding governance continuity, merger and acquisition activities, and corporate restructuring in links to "about", "history", or "management profile", and in many cases this information was sufficient to ascertain whether or not a 1996 firm is a continuation of a 1975 top ten firm. These sites also contain information the let us double check *Dun and Bradstreet*'s employees figures to confirm the identity of the firm.

Where these histories are unavailable, incomplete or ambiguous, we sent e-mails to the addresses given in the "contact us" links. We received replies to 35% of these inquiries.

If only a single piece of critical information was needed, we phoned the company in question. Although leading corporations around the world use English, we nonetheless encountered language barriers in several countries. To solve this problem, we asked students fluent in the local language to phone the company for us. Our inquiries were often met with a cold and suspicious silence. Nonetheless, information obtained from phone calls did help us classify several firms.

For some firms, corporate websites could not be found. We therefore consulted other directories of leading businesses. In a few cases, these sources clarified the continuity of firms that were listed under different names in the two years by Dun and Bradstreet. Unfortunately, this technique only helped in a few cases.

In some cases, Google brought us to legal documents, news releases or government reports that mention the names of our companies. These often contained useful information about the history and evolution of the company, and allowed us to track name changes and merger and acquisition activities. We also found bankruptcy or business termination notices in many cases. The Google search engine is particularly useful in this context because it retains cached pages as back up files. Most news websites only provide anonymous user access to current information, however Google's back-up files contain a wealth of stale news items on our companies. These allowed us to accept of reject a continuity of existence for many of our firms.

In running these searches, we always entered the exact company name as listed in *Dun and Bradstreet's Principals of International Business* in quotes. If the search engine failed to find the corporate website or other useful material, we removed the quotes and ran the search again. If the search returned a few words from the full company name, we checked the context around the key words to see if the web pages pertained to our companies.

We also checked with bankers and finance professors in countries with particularly difficult cases to gain more detailed information about the fates of certain companies.

If none of these methods of investigation of apparently new 1996 companies reveal a connection to an apparently defunct 1975 company, we presume that the 1975 company has disappeared.

Finally, *Dun and Bradstreet* often repeats itself when listing companies in the 1998/99 edition on CD. After investigating several of these duplicate entries in detail, we adopted the following convention. If the same company name appears twice with different addresses, we treat these entries as separate plants run by the same company and sum the employee figures. If the same company is listed twice with the same address, we take the larger of the two employee figures. In a few cases, slightly different spellings of a company's name appear with same address and phone number, and the same (or very close) employee figures. We treat these as duplicate entries and use the larger of the employee figures. We verify this information with other sources such as Worldscope, Orbis, or Forbes.

This procedure leaves us with lists of the top ten firms in each country, ranked by number of employees, in each of 1975 and 1996. We are highly confident of the accuracy of these lists.

To determine the continuity of control of the largest ten firms from 1975 to 1996, we obtain data for large shareholders and top executives for each firm in 1975 and in 1996, and match the names of the controlling family/groups. Dun and Bradstreet lists one official for each company in Principal International Business, usually the CEO, Chairman, or General Manager. We use this data as our starting point, and then use ownership data provided by La Porta *et. al*., Orbis, and Worldscope to supplement this.[2] Continuity of control exists for widely-held firms whose CEOs have the same name in 1975 and 1996, for family firms run by executives with the same family name, and for state-owned enterprises.

To construct our survival indices, we need to acquire 1996 data for all 1975 top ten firms. Most of this data comes from the companies' websites, Internet directories such as Hoover's Online, and Dun and Bradstreet. Companies that went bankrupt are assigned zero employees in 1996.

For large 1975 firms that have undergone privatization and spin-offs, we try to add back the 1996 labor force of each of the spun-off pieces of the old firm. For example, SERVICIOS ELECTRICOS DEL GRAN BUENOS AIRES SA (SEGBA) of Argentina was privatized in the early 1990s and split into EDENOR and EDUSUR that hired 3100 and 3515 workers in 1996, respectively. We count the total number of workers from EDENOR and EDUSUR as the 1996 counterpart of the 1975 firm SEGBA. This task is untenable in cases where parts of the state-owned enterprises (SOE) were sold to a large private firm. We thus assume zero employees for such SOE asset sales.

Finally we arrive at our three corporate stability indices, weighted by 1996employees, Φ_{L96}, by 1975 employees, Φ_{L75}, and equally weighted, Φ_{E}; and the corresponding control continuity and survival indices. We are very sure of the accuracy of these indices. For the corporate survival indices, we are highly confident that we did not miss any 1975 companies that remain large and important in 1996, although we may have missed companies that became so small that an exhaustive search failed to locate them.[3]

[2] We are grateful to Rafael La Porta for making his raw ownership data available to us.

[3] Dun and Bradstreet include companies whose numbers of employees are as few as 100. If we cannot find the company from all sources including Dun and Bradstreet, it is most likely that the company has less than 100 employees. We thus have an implicit definition of survival that entails having at least 100 employees in 1996.