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Big business stability and economic growth: Is what's good for General Motors good for America?

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Abstract

What is good for a country may not be good for its big businesses, at least recently. More turnover in top businesses correlates with faster per capita gross domestic product, productivity, and capital growth; supporting Schumpeter's (1942) theory of "creative destruction" – innovative firms blooming as stagnant ones wither. These correlations are greater in more developed economies, supporting Aghion and Howitt's (1992) thesis that creative destruction matters more to economies nearer the technological frontier. More big business turnover also correlates with smaller government, common law, less bank-dependence, stronger shareholder rights, and greater openness.

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"What is good for the country is good for General Motors, and vice versa."

Charles Wilson, Chairman of the Board, General Motors

Introduction

National economies have landmark corporations. Maersk shipping symbolizes Denmark's maritime history, as Nokia marks Finland's new economy. Many, often the principals of such great businesses, link an economy's fortunes to those of its landmark firms. Most famously, Charles Wilson, then chairman of the now financially shaky General Motors (GM), testified at his 1953 Senate Armed Services Committee confirmation hearing to become US defense secretary that keeping his existing job would entail no conflict of interest since "what is good for the country is good for General Motors, and vice versa."

Plausible arguments imply the opposite. Schumpeter (1912) attributes economic growth to upstart innovative firms arising and ruining doddering behemoths, a process Schumpeter (1942) dubs *creative destruction*. A feedback ensues, for today's upstarts not only become tomorrow's behemoths, but also inspire a new generation of upstarts that eventually repeat the cycle. Aghion and Howitt (1992, 1998), Aghion, Angeletos, Banerjee, and Manova (2005), and others model this process formally. Nelson and Winter (1982) explain creative destruction by visualizing firms as collections of "routines" that develop slowly and resist change. Routines let firms prosper if they fit current economic conditions: institutional constraints, consumer preferences, production technologies, and the like. But as conditions change, an economy needs upstarts with new routines to displace past winners, which intrinsically have difficulties changing their ways. All these arguments imply that Wilson is wrong, and that a negative correlation should be observed between the continuous dominance of large businesses and economic growth.

But Wilson's thesis has champions. A positive link might reflect large corporations prospering because they are well managed, and the wealth they create spilling over the economy (Chandler, 1977). Schumpeter (1942) amends his vision of creative destruction, arguing that large, quasi-monopolistic businesses can best finance ongoing innovation, which sustains both

their dominance and their economy's growth. Schumpeter (1942) adds that such stability provides job security, which Holmstrom (1989) argues permits high risk – high return undertakings, including investments in firm-specific human capital that would pose unacceptable career risks to managers and employees in smaller firms. Galbraith (1967) adds that larger firms can better absorb advertising investments that shape demand for their products. Romer (1986) formalizes Schumpeter (1942), positing that investment in innovation is worth more to a larger firm because its innovation can enhance productivity on a larger scale of operations. Chandler (1990) likewise posits rising economies of scope and scale in ever larger corporations as the motive force beneath economic growth in industrial economies. In the management literature, D'Cruz and Rugman (2000) and others suggest large business enterprises create and capture various economies of scale and scope. In each of these views, a positive feedback ensues, with the dominance of large businesses enhancing their economic fortunes, which further heightens their dominance. This feedback, in turn, fuels overall economy growth. All of these perspectives suggest a positive correlation between and economy's prosperity and that of its large corporations.

Signing the relationship between economic growth and big business stability lets us hone away one or the other class of theories. Establishing a predominant direction of causality, though of interest per se, is thus not critical for this exercise. Schumpeter (2002), in the initially omitted Chapter 7 of Schumpeter (1912), reflects on the slippery epistemology of causation in economic growth. Recognizing that "[t]he distinction between both forces and their repercussions is of great analytical value in this as in any particular case," he nonetheless concludes that economists must learn to deal with a dynamic growth process, "not with a causal chain of explanation." We sidestep all this because our objective here is distinguishing one class of dynamic processes from the other, as a first pass at least, by signing the correlation in question.

We regress real per capita gross domestic product (GDP) growth, capital accumulation, and total factor productivity (TFP) growth from 1990 to 2000 for 44 countries on the stability of their top ten firms from 1975 to 1996, with controls for initial per capita GDP, level of education,

and capital stock.[1] We say a leading 1975 business is stable if it survives to 1996 (it needs not remain in the top ten) and we explore different definitions of survival. The 1975 to 1996 window includes the first and last years for which we had comparable lists of leading businesses when we began this project. We measure growth in a ten-year window around the endpoint of the stability window, which smoothes business cycle and transient crisis effects.

We find faster growth in countries where big business is less stable, and the finding survives numerous robustness tests. This supports Schumpeter (1912), Nelson and Winter (1982), Aghion and Howitt (1992, 1998), Aghion, Angeletos, Banerjee, and Manova (2005), and other like theories; but suggests more limited traction for theories of Chandler (1977), Schumpeter (1942), Galbraith (1967), Romer (1986), Chandler (1990), and D'Cruz and Rugman (2000), at least in the late 20th century. The latter class could predominate in other periods or in certain industries. We relegate these issues to future research.

Establishing a predominant direction of causality is still "of great analytic value." Granger causality tests are unviable because the processes we study work over what Schumpeter (1912) calls the "very long run," time in generations, not years. A useful panel would require past data at generational intervals, not filling in higher frequency data. We relate big business turnover to end-of-period growth because the latter is an overarching policy objective. Curiously, growth measured around the beginning of our window is uncorrelated with our big business stability measures. This is far from conclusive but loosely suggests big business stability causing slow growth. We attempt more rigorous identification with instruments commonly used in the literature, but all fail standard weak instruments tests, implying that instrumental variables regressions using any or all of these variables provide no more information about causality than ordinary least squares (OLS) (Staiger and Stock, 1997). Despite failing to identify a predominant direction of causality, this exercise elucidates the economics underlying our finding.

[1] The question of large firm stability is distinct from that of optimal firm size. Acs, Morck, and Yeung (1999) find that US industries containing larger firms post faster productivity growth. Rapid turnover of large firms need not imply a steady state characterized by a preponderance of small firms.

First, enumerating alternative stories consistent with a negative correlation underscores the relative plausibility of the Schumpeter (1912) theory of economic development. This is because we link faster growth to a higher death rate of old leading firms, not just to their displacement from the top ten list by new bigger firms. We define death as having less than one tenth the 1975 workforce in 1996. A range of reverse causality stories might link growth to the rise of new leading firms that eclipse still prosperous old firms. However, the only reverse causality story plausibly linking growth to the destruction of old leading firms is creative destruction itself, for Schumpeter (1912) explicitly envisions corporate turnover causing growth and growth causing corporate turnover.

Second, although they fail as instruments, a cadre of institutional variables can be usefully recast as potential latent factors (things that enhance both corporate turnover and economic growth) associated with the most plausible alternative stories. We propose that the size and quality of government, the development of the financial system, and the degree of economic openness all encapsulate such alternative stories. We therefore identify the proxies for these most correlated with big business stability, and rerun our regressions of growth on stability including them as additional controls. Because these factors are also all potentially related to the intensity of creative destruction itself, this procedure works against us. That is, controlling for these factors arguably also drains our analysis of much variation driven by creative destruction. Nonetheless, our results persist: Big business stability retains a negative sign, consistent with the Schumpeter (1912) view of upstart firms undermining stagnant behemoths. Unfortunately, because no list of potential latent variables can be exhaustive; this, too, can provide only circumstantial evidence consistent with creative destruction.

A final set of clues lies in subsample regressions. Aghion and Howitt (1998) argue that growth in high-income countries, already on or near the production possibilities frontier, requires creative destruction to push that frontier outward; but that rapid growth in low-income countries can arise from improved factor allocation (outward movement from deep beneath the frontier) in

applying off-the-shelf technologies. Consistent with this, we find a stronger relation between big business stability and slow growth in a subsample of high-income countries.

Intriguingly, high-income countries' growth correlates most strongly with large private sector firm turnover, while low income countries' growth correlates mainly with sometime state-controlled enterprise (SCE) turnover. Because we disregard nationalizations and privatizations in calculating turnover, the destruction of SCEs, not their privatizations, correlates with growth. Moreover, the institutional variables discussed above are less important for low-income countries, suggesting a more direct link. We speculate that sometime SCEs in low-income countries might retain political influence to soften their budget constraints, distorting resource allocation and slowing growth (Kornai, 1986). Also, Marshall (1956, p. 339) writes that "a government could print a good edition of Shakespeare's works, but it could not get them written." Shleifer and Vishny (1994a, 1994b) and Shleifer (1996) formalize this to explain the museum pieces prominent in 1989 transition economy factories. If distrust of innovation persists in sometime SCEs, this too might directly retard growth. Thus, though privatization raises firm-level performance (Megginson, Nash, and van Randenborgh, 1994; La Porta and Lopez-de-Silanes, 1997; and World Bank, 1995), a drag on economy-level growth could linger if sometime SCEs continue to dominate.

These tests do not conclusively confirm our thesis, but they coalesce into strong circumstantial evidence that the Schumpeter (1912) process of economic development underlies economic growth in the late twentieth century.

The paper is organized as follows. Section 2 reviews the construction of our key variables, and Section 3 presents our main results. Section 4 discusses causality, identification, and latent variables. Section 5 describes subsample regressions, and Section 6 concludes.

2. Data and variables

This section describes the raw data used to construct our big business stability indexes. It then

explains the indexes themselves, the growth measures, and the other variables central to our empirical tests.

2.1. Big business sector data

Our data are hand-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-controlled enterprises.[2] This circumvents sample selection problems stemming from stock exchanges, and hence listed firms, being less important in some countries than others. Comparisons with annual reports show the 1978 volume to contain mainly 1975 figures, so we call this 1975 data. The 1998/99 volume generally contains 1996 figures, so we call it 1996 data.

Our final sample of 44 countries, listed in Table 1, meets the following criteria:

1. The country must appear in both the 1978 and 1998/99 editions of *Principals of International Business*. This eliminates transition economies.

2. We delete small economies whose tenth largest company has fewer than 500 employees or which have less than ten companies whose labor forces are listed in both editions. This removes microstate economies, which could differ fundamentally from larger countries.

3. We drop countries involved in major wars, including civil wars, between 1975 and 1996.

4. We require data on education and capital assets because these initial conditions are known to affect economic growth and are needed as controls in our regressions.

5. We require comparable national income accounts data to construct comparable economic growth measures. This limits us to countries included in the Penn World Tables.

[Table 1 about here]

[2] We use the term *state-controlled enterprise* (SCE) instead of *state-owned enterprise* (SOE) because the state could hold a control block without owning the firm outright.

2.2. Measuring the stability of leading businesses

We first need a list of each country's top businesses in 1975 and 1996. La Porta, Lopez-de-Silanes, and Shleifer (1999), Claessens, Djankov, and Lang (2000), Faccio and Lang (2002), and others show that large businesses in many countries, the US and UK being notable exceptions, are not single firms but business groups, that is, constellations of listed corporations tied together by equity control blocks and usually all ultimately controlled by a single wealthy individual or family. We therefore define a country's largest businesses as the union of its largest freestanding firms and business groups.

We start with the list of firms in Dun & Bradstreet and determine the ultimate controlling shareholder of each. To do this, we search Google, online databases such as Hoover's online, corporate websites, Worldscope, Securities Data Company (SDC) datasets, Forbes' annual lists of billionaires, newspaper archives, case studies, and academic research papers. We define a firm as controlled if it is so defined in any of these sources or if 20% or more of its stock is voted by a firm, wealthy family, government, trust, or bank.[3] We then consolidate affiliated firms into business groups accordingly.

We define a business' size as the number of people it employs. For business groups, this is the total employees in all the group's component firms. Employee tallies for business groups are cross-checked whenever possible across the various sources mentioned earlier.[4] We measure firm size by employees because this lets us include both listed and private firms. The latter typically do not disclose their assets or sales, other common measures of firm size.

The consolidation of firms into business groups leaves some countries, such as Sweden

[3] La Porta, Lopez-de-Silanes, and Shleifer (1999) show that 51% is not necessary as a single dominant shareholder can exert effective control when all other shareholders are small. We use voting rights to assign control, for cash flow rights and voting rights diverge substantially in some countries because of dual share classes and control pyramids.

[4] Some holding companies claim their subsidiaries employees, despite Dun and Bradstreet's instructions otherwise. Cross-checking, including phoning companies, resolved such data problems, at least to a first approximation.

and South Africa, with a few large dominant businesses. Thus, even the 15th or 20th largest business in some countries is small. We therefore define each country's big business sector as its ten largest businesses. If ties occur for the tenth business, all the ties are included.

In smaller countries, or countries with business groups instead of freestanding firms, this is an exhaustive list of large businesses. In larger economies, it is a sampling of big businesses biased toward the biggest. For a very small economy, even the top ten list can still include what would be considered small firms in larger countries. This necessitates controlling for country size, or for the importance of the top ten firms relative to the economy, in subsequent analyses.

The next issue is what sorts of businesses to include. We exclude enterprises not normally included in countries' private sectors: educational services [standard industrial classification (SIC 82)], health services (SIC 80), membership organizations (SIC 86), noncommercial research organizations (SIC 8733), and government agencies (SIC 9197). Beyond this, a degree of judgment is inevitable, for excluding any or all of three other categories of businesses might also be reasonable.

Financial businesses might be excluded. King and Levine (1993) show that capital market development positively affects growth. Including financial businesses in our top ten lists might capture spuriously the impact of financial system development on growth. Business groups containing financial and nonfinancial firms are assigned to one category that accounts for the greater share of their employees.

Foreign-owned enterprises might be excluded. Multinational subsidiaries are plausibly more affected by global conditions than by their host countries' economic conditions. However, some domestically based businesses might also have foreign operations, so this argument is not clear-cut. Countries that open up to the global economy gain multinational subsidiaries, and countries that isolate themselves lose multinational subsidiaries. Either could alter their top ten lists. Sachs and Warner (1995) and others show that openness contributes to economic growth and global convergence. Hence, including foreign owned enterprises might capture spuriously the

impact of openness on growth.

Finally, any firm that was a state-controlled enterprise in any part of our window might be excluded. SCEs' economic motives might differ from those of purely for-profit businesses. These motives might range from the efficient provision of public goods and promotion of new industries to wasteful government activism, bureaucratic entrenchment, and blatant corruption. These motives aggregate to an uncertain effect on growth; though Hayek (1944) and others argue eloquently that their net effect is negative. Regardless of the sign, including SCEs might capture spuriously the impact of the size of the government on growth. Because import substitution and socialist ideologies induced extensive nationalizations in the 1970s and a resurgence of liberal ideology in the 1990s induced waves of privatizations, this problem could be especially severe during our time window.

To deal with these issues, we construct several alternative lists of top ten businesses in 1975, and again in 1996.

List I includes all businesses: financial and nonfinancial, domestically controlled and foreign-controlled, as well as private sector and state-controlled. Privatizations and nationalizations are taken as continuations of the same business, but SCEs that fail, are taken over, or are broken up are classified as not surviving. These are our maximally inclusive lists.

List II is List I but excludes businesses primarily in the financial sector, banks, insurance companies, and investment banks. We define the financial sector as SIC codes 60–64, as reported in Dun and Bradstreet's *Principals of International Business.*

List III is List II but excludes foreign-controlled enterprises. We infer foreign control if a foreign person votes at least a 20% stake and is the largest shareholder.

List IV is List II but excludes SCEs. We consider an enterprise to be state-controlled if a government holds at least a 20% voting stake and is the largest shareholder.

List V is the intersection of Lists III and IV; that is, List I excluding financial companies, SCEs, and foreign-controlled enterprises. These are our minimally inclusive lists of domestically

controlled private sector nonfinancial businesses.

We wish to see if economic growth is related to the stability of a country's largest businesses. To quantify this, we must define which leading businesses from 1975 remain stable as leading businesses through 1996. One obvious approach is to define *stable* as "still in the top ten list in 1996." But a growing economy might raise new businesses into its top ten, even though its 1975 top ten prosper. A more nuanced definition of *stability* might spotlight 1975 top ten businesses that grew at least as fast as GDP, regardless of the 1996 top ten list. Other alternatives might define *stability* as a 1975 top ten business retaining at least *n* percent of its 1975 labor force, where *n* can be, e.g., 50, 25, or 10. A combined definition might designate a top 1975 business as *stable* if it is either in the 1996 top ten list or it grew (or shrank) at better than some minimal rate from 1975 to 1996. While each definition is arbitrary in some respect, robustness checks show that all yield similar empirical results.

The tables use a combined definition: A leading 1975 business is stable if it remains in the top ten list in 1996 or grew at least as fast as its country's GDP from 1975 to 1996. That is, we define a country's employee-weighted stability index as

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

where L_i is the 1975 labor force of 1975 top ten business *i*,

$$\delta_i = \begin{cases} 1 & \textit{if } i \textit{ is in the top ten lists in both } 1975 \textit{ and } 1996 \\ 0 & \textit{otherwise} \end{cases} \tag{2}$$

and

$$\eta_i = \begin{cases} 1 & \textit{if its employment grew no slower than GDP from } 1975 \textit{ to } 1996 \\ 0 & \textit{otherwise.} \end{cases} \tag{3}$$

We construct one such index for each variant of each country's list of top ten businesses. We also construct a set of analogous equally weighted stability indexes denoted Ω_E^{GDP} defined

$$\Omega_E^{GDP} = \frac{1}{10}\sum_{i=1}^{10} \max\left[\delta_i, \eta_i\right]. \quad (4)$$

To construct these indexes, we must assess the 1996 fate of each 1975 top ten business. This requires assembling a detailed history of each business.

Some businesses change names. For example, some Malaysian company names contain the abbreviation BHD in one Dun and Bradstreet volume, but Berhad (corporation in Malay) in another. Likewise, Finland's Nokia is listed as OY NOKIA AB in one edition and NOKIA OYJ in another. The choice of language sometimes causes confusion, too. For example, the Japanese company listed in the 1975 data as Sumitomo Kinzoku Kogyo KK is listed under its English name, Sumitomo Metal Industries Limited, in 1996. These changes are easily traced.

Other name changes are less obvious but are revealed in the detailed histories we construct for each business. We compile these from company websites, business history books, and biographies of the principals of our 1975 top ten businesses. If this leaves ambiguities, we scan through newspaper records and, in many cases, phone archivists at specific companies. These efforts, plus telephone inquiries to bankers, brokers, and finance professors in different countries, clarify the fates of all our 1975 top ten businesses.

The fates of a few businesses are intrinsically ambiguous. For example, some spin off divisions. Although the core business could be smaller in 1996, the aggregation of all successor businesses might be large. In general, we follow the principal successor business only. In some cases, this is problematic. For example, the Argentine state-controlled enterprise Servicios Electricos del Gran Buenos Aires SA (Segba) is one of that country's top ten businesses for 1975. In the early 1990s, it split into Edenor and Edusur with roughly equal numbers of employees going into each. In this case, we take the combined employees of the two successors in assigning continued importance to the predecessor business.

Table 1 reports the employee-weighted and equal-weighted stability indexes based on Lists I and V for each of our 44 countries. Interpreting these indexes is straightforward. For

example, the stability index of the United States based on List V, the minimally inclusive list excluding financial, state-controlled, and foreign-controlled enterprises, is $\Omega_{L75}^{GDP} = 0.531$. This means 53.1% of the employees of the top ten businesses of 1975 worked for businesses that either remain in the top ten list for 1996 or created jobs at least as fast as the growth rate of US GDP from 1975 through 1996. Similarly, Japan's equal-weighted stability index is $\Omega_{E}^{GDP} = 0.7$, indicating that seven of Japan's top ten employers in 1975 either remain among its top ten in 1996 or created jobs at least as fast as Japanese GDP grew. In general, the top businesses in higher income countries are more stable than those in developing economies.

[Table 1 about here]

Our employee-weighted and equal-weighted indexes are highly positively correlated, with $\rho = 0.851$ ($\pi < 0.01$) for the maximally inclusive indexes and $\rho = 0.824$ ($\pi < 0.01$) for the minimally inclusive indexes. The indexes based on minimally versus maximally inclusive lists are also highly significantly correlated with each other ($\pi < 0.01$ in all cases), with point estimates in the 0.52 to 0.66 range. Indexes based on different lists are more highly correlated among higher income countries.

The upper panel of Table 2 presents univariate statistics for our stability indexes.

[Table 2 about here]

2.3. Measuring economic growth

Ideally, we would measure economic growth subsequent to, and therefore potentially caused by top business stability. However, Schumpeter (1912, 1942) and others stress that the economic effects we study operate only over the very long term, time clocked in generations, not years.

More frequent data would therefore not be helpful. Genuinely augmenting our data with more time periods would require going further back in time to the mid and early 20th century. This is not possible given available data, so we are limited to a single cross section of data; in which we use our big business stability indexes, measured over 1975 to 1996, to explain long run growth at that window's endpoint.

Long-run growth cannot be measured easily at a particular time, for annual growth rates are distorted by business cycles and even transient crises. We therefore gauge long-term growth using observed growth over a window attached to 1996. Requiring that the window begin at 1996 would let us use past stability to predict future growth, an econometrically desirable temporal arrangement of variables. However, a short window beginning in 1996 generates noisy variables because its endpoints are contaminated by economic crises in East Asia and parts of Latin America as well as the Dot Com bubble. A very long window beginning in 1996 is not possible yet, for many countries publish detailed national income accounts data with a lag of several years, and these are rendered in comparable form in the Penn World Tables only after further delay.

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

$$\Delta \ln(y) = \ln(\textit{per capita GDP}_{2000}) - \ln(\textit{per capita GDP}_{1990}) \qquad (5)$$

from 1990 to 2000, a ten-year window roughly centered on the endpoint of the window over which we gauge big business sector stability. Data are from the Penn World Tables, Version 6.1, which include comparable national income accounts figures through 2000.[5] GDP figures are in US dollars at purchasing power parity and inflation-adjusted to 1996 dollars. Because $\Delta \ln(y) \cong \Delta y / y$, we interpret $\Delta \ln(y)$ as a fractional growth rate in per capita GDP.

The Penn World Tables let us decompose overall growth into growth due to capital accumulation and growth due to increased total factor productivity. To do this, we first measure each country's rate of per capita physical capital growth, $\Delta\ln(k)$, from 1990 to 2000. To estimate *ln(k)* at each endpoint, we assume an initial capital stock of zero for 1950 and construct a time

[5] The Penn World Tables are available from the National Bureau of Economic Research at www.nber.org.

series $K_{i,t}$ of total stock of physical capital in country *i* in year *t* recursively as

$$K_{i,\,t+1} = K_{i,\,t} + I_{i,\,t} - \delta K_{i,\,t.} \qquad (6)$$

where $I_{i,t}$ is aggregate real investment for country *i* in year *t*, from Penn World Table 6.1, and δ is a depreciation rate of 7% under the perpetual inventory method. Scaling total real physical capital stock by population yields per capita real physical capital stock. This procedure is similar to that in King and Levine (1994).

We then follow the methodology of Beck, Levine, and Loayza (2000) to estimate each country's TFP growth as the growth in its per capita GDP minus 0.3 times the growth of its per capita physical capital.[6]

Table 2, Panel A presents summary statistics. The mean of 0.223 for $\Delta \ln(y)$ indicates that the typical country's per capita GDP rose by about 22.3% from 1990 to 2000 in real US dollars at purchasing power parity. Likewise, the average growth in real per capita physical capital stock is 26.3% and the average total factor productivity growth is 14.4%. The ranges of these three measures are wide: from -8.3% (Venezuela) to 62.4% (Israel) in total growth, from -4.2% (Venezuela) to 46.7% (Israel) in total factor productivity growth, and from -21.7% (South Africa) to 67.4% (Korea) in real per capita physical capital accumulation.[7]

3. Main findings

Our central finding is that a more stable list of large businesses is associated with slower growth. We first show this with simple correlations and then turn to regressions analogous to the basic models surveyed in Mankiw (1995) but include *stability* as an additional independent variable. The section concludes with a robustness discussion.

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[6] Caselli (2005) shows this decomposition of economy growth changes nontrivially at capital shares above 0.4. As robustness checks, we experiment with a range of capital share assumptions. Estimates based on Caselli's methodology with constant assumptions up to 0.4 generate results similar to those shown. We follow the conventional approach of setting the capital share to 0.3 in the tables.

[7] Another approach would look analogously at the turnover in each country's list of leading industries. We are pursuing this elsewhere. While this might seem a simpler line of attack, data problems make it considerably more complicated.

3.1. Simple correlations

Table 2, Panel B presents simple correlations between our growth measures and stability indices. All our maximally inclusive stability indexes are significantly negatively correlated with all three growth measures, with significance levels somewhat lower for equally weighted than employee-weighted stability indexes. The minimally inclusive indexes, which drop financial, foreign-controlled, and state-controlled businesses, tell a slightly different story. Total per capita GDP growth and TFP growth are negatively correlated with these stability indexes, but capital accumulation is not significantly correlated with our minimally inclusive stability indexes, though the correlation point estimates remains negative.

3.2. Regressions of long-term economic growth on big business stability

Economic growth rates are known to be higher for countries with lower initial levels of income, more educated workforces, and more extensive capital assets.[8] Table 2, Panel B shows that our big business stability indexes correlate with these initial condition determinants of economic growth. Thus, the simple correlations described above might reflect only known determinants of economic growth.

We therefore follow Mankiw (1995) and regress our growth measures on a big business stability index controlling for initial income, initial stock of physical capital, and initial stock of human capital. Thus, we run regressions of the form

$$\begin{bmatrix} economy \\ growth \\ rate \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} initial \\ income \\ level \end{bmatrix} + \beta_2 \begin{bmatrix} initial \\ physical \\ capital \end{bmatrix} + \beta_3 \begin{bmatrix} initial \\ human \\ capital \end{bmatrix} + \beta_4 \begin{bmatrix} corporate \\ stability \\ index \end{bmatrix} + \varepsilon , \tag{7}$$

where the economic growth rate is either per capita GDP growth, TFP growth, or capital

[8] See Barro (1991), Mankiw (1995), and others. Barro uses initial capital investment, not assets. Our results are robust to using either.

accumulation and big business stability index is one of the stability indexes, all as defined above.

The control variables in Eq. (7) are as follows.

Initial income level is the logarithm of 1990 real purchasing power parity (PPP) US dollar per capita GDP, *ln(y)*, as in the Penn World Tables. Initial physical capital stock is the logarithm of real per capita physical capital in 1990, *ln(k)*, from Eq. (6) in Section 2. As a proxy for the initial human capital stock per capita, we take the logarithm of the average years of education for people age 25 and over, ln(*h*), from Barro and Lee (2001).

Thus, the regressions we run take the forms

$$growth = \beta_0 + \beta_1 \ln(y) + \beta_2 \ln(k) + \beta_3 \ln(h) + \beta_4 \Omega + \varepsilon , \qquad (8)$$

where Ω is Ω_{L75}^{GDP} or Ω_{E}^{GDP}. Table 3 presents regression coefficients and heteroscedasticity consistent P-values.

[Table 3 about here]

Panel A reports full details for regressions using minimally inclusive equal-weighted stability indexes. The index attracts significant negative coefficients in regressions explaining all three growth measures. That is, more stable dominant businesses are associated with slower economic growth, slower productivity growth, and slower capital accumulation. Our stability indexes can be interpreted as inverse measures of the marginalization of previously dominant businesses. This interpretation of our result implies that a greater marginalization of past leading businesses is significantly associated with faster growth, faster productivity growth, and even faster capital accumulation.

Panel B reports regression results using stability indexes based on each variant of our top ten lists. For brevity, the table reports only the regression coefficients on those indexes. In every case, big business stability is negatively and significantly related with both per capita GDP

growth and TFP growth. While the stability measures also attract negative coefficients in every regressions explaining capital accumulation, these are significant only intermittently.

Fig. 1 plots per capita GDP growth, TFP growth, and capital accumulation against the maximally and minimally inclusive labor-weighted indexes, respectively, in Panels A, B, and C. These figures partial out the control variables used in the regressions. That is, we regress the two graphed variables on the controls and plot the residuals of these against each other.

[Figure 1 about here]

Although some scatter is evident, the plots vividly illustrate the regression results from Table 3, Panel B. Robustness tests reject outliers and validate these plots.

Our findings are economically as well as statistically significant. To save space, and to be conservative, we discuss the results for indexes based only on the minimally inclusive top ten lists, which also have the least significant results. A one standard deviation increase in the labor-weighted stability index is associated with a per capita GDP growth drop of 0.227 x 0.199 or 4.5%. This is approximately 33% of the cross-country standard deviation in real per capita GDP growth. Similarly, a one standard deviation increase in the equal-weighted stability index is associated with a per capita GDP growth depressed by 5.79%, about 42% of the standard deviation of that variable. A one standard deviation increases in these same labor- or equal-weighted indexes is likewise associated with total factor productivity growth reductions of 30% or 41%, respectively, of the standard deviation of that variable. Likewise, a one standard deviation rise in these indexes is associated with per capita capital accumulation lower by 24% and 27%, respectively, of its standard deviation.

Finally, we consider a more generous stability definition, including all firms that still employ at least 10% of their 1975 labor forces in 1996. This reproduces the pattern of signs and significance in the tables. That is, growth is higher in countries where a larger fraction of leading

1975 firms are diminished by over 90%. Growth is associated with the drastic withering of leading firms, not merely with their eclipse by new giants.

In summary, there is no support for big business stability augmenting economy growth. Instead, the marginalization of old big businesses correlates with faster growth.

3.3. Robustness tests

These basic results in Tables 3 survive a battery of robustness checks. Reasonable changes in regression specifications and variable definitions 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 big business stability indexes. In robustness checks, we infer significance from P-levels $\leq 10\%$.

Although the general inclinations in Fig. 1 clearly illustrate our regression results, the scatter in these plots raises concerns about outliers affecting our results. Residual diagnostics tests reject this, for Cook's D and DFFITS tests indicate no outliers. Student residuals flag Ireland as a potential outlier. Because Ireland's status as a tax haven might bolster its growth, an economic argument for excluding it also has traction. However, rerunning our regressions without Ireland yields qualitatively similar results. We nonetheless successively eliminate observations with the worst Cook's Ds, first one-by-one and then two-by-two, rerunning our regressions after each elimination. Significance levels, signs, and rough coefficient magnitudes survive through the first few eliminations. Signs and rough coefficient magnitudes persist long after significance levels fall below standard thresholds.

Although generalized White tests reject heteroscedasticity, we use heteroscedasticity-consistent standard errors throughout.[9] Replicating the regressions with OLS standard errors generates qualitatively similar results to the tables.

We estimate stability from 1975 to 1996 and growth from 1990 to 2000, a ten-year

[9] We are grateful to an anonymous referee for suggesting we do this.

window around the stability window endpoint. A disjoint growth window is an obvious alternative, so we check robustness to [1996, 2000] and [1996, 2003] growth windows (Penn World Tables were extended from 2000 to 2003 recently), all with 1996 controls. Maximally inclusive stability yields qualitatively similar results for GDP growth, but its significance abates for TFP growth. Signs persist, but labor-weighted stability attains significance only for [1996, 2003] TFP growth, and the equal-weighted version fails for both TFP growth windows. Minimally inclusive stability loses significance throughout, though signs persist. Stability is uncorrelated with dummies for banking or economic crises in [1975, 1996], but Latin American and Asian turmoil around 1996 might distort the growth rates and per capita GDP controls based on 1996 data. Including crisis region dummies fully restores significance in both GDP growth windows and restores P-levels to 0.15 and 0.11 for labor- and equal-weighted stability, respectively, using the [1996, 2000] TFP growth window. As in the tables, stability is negatively related to capital accumulation, with intermittent significance across specifications.

To test general robustness to growth window endpoints, we rerun all regressions replacing the [1990, 2000] windows with all possible windows $[t_0, t_1]$ least three years long with $t_0 \in \{1990, \ldots, 2000\}$ and $t_1 \in \{1997, \ldots, 2003\}$. Pooling equal- and value-weighted regressions, maximally inclusive stability is significant in 84% and 70% of GDP and TFP growth runs, respectively. Somewhat surprisingly, it also explains capital accumulation significantly in 76% of runs. In regressions including crisis region dummies, minimally inclusive stability attains significance in 74% and 61% percent of GDP and TFP growth runs, respectively, but only in 34% of capital accumulation runs. In general, insignificant results cluster in windows beginning in the mid 1990s.

We wish to ensure that differences in country size do not affect our results. The biggest ten businesses in a small economy might be smaller in absolute size than those in a large economy and yet might constitute a larger part of the overall corporate sector. We control for this with country size, gauged by the logarithm total 1990 GDP, in 1996 dollars at purchasing power

parity, which we denote *ln(Y)*, from Penn World Table 6.1, and run

$$growth = \beta_0 + \beta_1 \ln(y) + \beta_2 \ln(k) + \beta_3 \ln(h) + \beta_4 \ln(Y) + \beta_5 \Omega + \varepsilon \,. \qquad (9)$$

The country size variable is uniformly insignificant, and its inclusion yields qualitatively similar results for the other variables. Using log of total population, or log area in square kilometers, to control for country size has the same effect.[10]

The biggest ten businesses in some countries, such as Sweden and South Africa, are essentially the population of large businesses. In others, such as the United States and United Kingdom, the top ten are merely the largest from a broad range of big businesses. Countries with only a few truly huge businesses might be qualitatively different from those with many roughly equally big businesses. To control for this, we include the labor force of the top ten businesses as a fraction of national population (or GDP) in 1975 as an additional control. This also generates qualitatively similar results to those shown.

Our results might also depend on the industrial structures of economies. Specifically, dependence on natural resources might affect big business stability and economic growth. Resource abundant countries could have long-lived resource extraction businesses that remain large to exploit economies of scale. Yet, for political and institutional reasons, these countries might also remain poor (Rodriguez and Sachs, 1999; and Sachs and Warner, 2001). However, including the resource dependence measure of Hall and Jones (1999) as an additional control variable again generates qualitatively similar results.[11]

We can also define big business stability in various ways. Defining stability as a 1975 top ten business remaining in the 1996 top ten list; retaining 50%, or 25%, or 10% of its 1975

[10] One alternative approach is to make the length of our lists of large businesses proportional to the size of the economy by including more firms in larger economies. However, this is operationally difficult because gleaning accurate corporate histories in remote countries is often involved. Moreover, the choice of the proportionality factor introduces a new degree of arbitrariness. We leave this to possible future research.

[11] Hall and Jones (1999) describe their mining variable as for 1988 "when possible or the closest available year." We follow their procedure, using 1975 and 1996 World Development Indicators data, to construct two sets of control for natural resource dependence using fuel, oil, and metals exports over merchandise exports (FOM). The first set includes two variables, the level of FOM in 1975 and its change from 1975 to 1996. The second set is the average of FOM in 1975 and again in 1996. Including either set preserves the magnitudes and significance levels of the stability variables in per capita GDP and TFP growth regressions.

employment in 1996; or a disjunction of the former with any of the later criteria all generate results qualitatively similar to those described above. The reported indexes capture the extent to which 1975 top businesses remain important; the alternative indexes gauge the extent to which they evade ruination.[12] All these alternatives yield results qualitatively similar to those shown.

One alternative stability index generates qualitatively different results. We construct a continuity of control index based on the family name of each company's top executive in 1975 and 1996. Our idea is to capture the fraction of the big business sector under the control of the same individuals or families over the two decades. We wonder if a change in control might rejuvenate an old firm. Labor-weighted and equal-weighted indexes of continuity of control are uncorrelated with GDP growth, productivity growth, and capital accumulation. One interpretation is that creative destruction requires more than a turnover of top management. A turnover of big businesses, and perhaps of their intangible corporate routines as well as physical assets, is needed. Another is that our continuity of control index is too noisy to be of use because different last names could correspond to continuity if chief executive officers are replaced by nephews, acolytes, and the like, and the same last name could correspond to discontinuity if a son's policies differ greatly from his father's. Further research is needed to clarify these issues.

A further set of robustness tests substitute alternative productivity growth measures for those in the tables. Proposed by Mankiw (1995) and Hall and Jones (1999), respectively, these include human capital as a factor of production.[13] Qualitatively similar results ensue.

We next replace real per capita GDP growth with real per capita gross national income (GNI) growth. GNI can be measured in two ways: the Atlas Method converting national currency to current US dollars or converting national dollars to international dollars at purchasing power parity. Both produce qualitatively similar results to those in the tables.

Finally, we gauge initial stock of human capital by the logarithm of the average number

[12] Because results based on these other versions of the continued importance indexes are similar to those in the tables, we do not report them to conserve space. These results are available upon request.
[13] See Beck, Levine, and Loayza (2000) for a comparison of the two methodologies.

of years of total education in the male population over 25 in 1990, instead of the general adult population (on the grounds that males are more likely to be in the workforce in many countries). Again, we obtain qualitatively similar results.

4. Causality

Section 3 establishes a robust negative relation between big business stability and growth, but its causal interpretation remains hypothetical. Growth might destabilize old big businesses, or the instability of old big businesses might fuel growth. Because the Schumpeter (1912) description of creative destruction explicitly implies both, while many alternative theories of economic growth imply neither, our result is useful without a clear delineation of causality. Nonetheless, ascertaining the predominant direction of causality during our sample period is intrinsically interesting, as is an exploration of possible latent factors.

4.1. Timing

One approach is Granger causality tests. If past corporate turnover correlates with current growth, the former "Granger causes" the latter; if current turnover correlates with past growth, the converse is indicated.

We relate past big business turnover to current end-of-period growth because the latter is an overarching policy objective. In contrast, growth measured analogously around the beginning of our window is uncorrelated with big business stability during it. This loosely suggests big business stability causing slow growth, more than the converse, during this period.

Formal Granger causality tests would require a long panel of country level data. Because Schumpeter (1912, 1939, 1942, 2002) specifically describes growth in the "very long run," with time measured in generations, not years, assessing economic growth and big business stability over higher frequency intervals within a relatively short window is not useful. Adding a meaningful time dimension requires constructing a panel of stability indexes at appropriately long

intervals into the deeper past. This is difficult because compiling the indexes in the tables took the better part of two years. Extending the data into the more remote past is beyond the scope of this study. Still, careful historical studies of individual countries might be useful in further exploring this issue.

4.2. Plausible alternative causality explanations

Another approach is to examine the economic plausibility of reverse causality. This approach requires modification here, for in most situations the purpose of ascertaining causality is to reject alternative theories in which the causality flows in reverse. Here, we distinguish alternative views of growth, both of which envisage bidirectional causality, with opposite implications for the sign on big business stability in regressions of economic growth.

We therefore evaluate alternative implications in other ways, chiefly by altering our definition of big business stability to accord more or less closely to different alternative explanations. Our robustness tests include big business stability constructed with steadily more generous definitions of a 1975 surviving in 1996. These culminate in saying a business survived if its 1996 employee count is at least 10% of that in 1975.[14] We find significantly faster economy growth in which more 1975 big businesses have withered by at least 90%.

Virtually any theory of economic growth links faster economy growth to more new firms, larger existing firms, or both. However, we find growth correlated with the demise of old big businesses.

Alternative explanations to creative destruction consistent with this are scarce. Might growth cause old big businesses to wither in some way unconnected with creative destruction? Conceivably, consumer tastes or worker job preferences might change with rising incomes in ways that harm old big businesses. Or growth might alter institutions so as to undermine old big businesses. We concede that such a theory might be developed, though none is prominent in the

[14] Using cut-offs even smaller than 10% becomes impractical because data are unavailable for very small firms in many counties, and name changes are also harder to verify.

literature to date. Further tests must await theoretical developments of this sort. For now, we rely on Ockham's razor favoring creative destruction as the most straightforward explanation of the correlations we find.

4.3. Instrumental variables regressions

Another alternative is instrumental variables (IV) regressions. These require valid instruments for big business stability: exogenous variables highly correlated with big business stability and correlated with economic growth solely through their effect on big business stability.

Beck, Demirguc-Kunt and Levine (2003) use *hierarchical religion*, *French legal origin*, and *ethnic fractionalization* as instrumental variables. A highly hierarchical religion could render people submissive to clerical elite unconcerned with growth and innovation (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997b). A French legal heritage (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997a) and ethnic fractionalization (Easterly and Levine, 1997) prefigure tenuous private property rights, which might discourage the pooling of resources to finance upstart firms and capture growth opportunities.

Instrumental variables regressions using these variables as instruments generate results similar to those in the tables. Big business stability is significantly associated with lower per capita GDP growth, TFP growth, and capital accumulation.

Unfortunately, these IV regressions cannot be used to ascertain a predominant direction of causality because all fail the weak instruments test of Staiger and Stock (1997) and therefore provide no more information about the direction of causality than OLS regressions in this context.[15]

Widening our search for useful instruments, we consider variants of those in Beck, Demirguc-Kunt and Levine (2003): substituting indicator variables for continuous ones, adding interaction terms, etc. In addition, we explore different indicators of legal origin (i.e., separate

[15] For more detail, see Greene (2007, Chapter 12).

socialist and Islamic origins), religion dummies, religious history, colonial history, years of independence since 1776, latitude, continent dummies, various land use measures, various climate-based variables, democratic experience, political rights, civil liberties, and many others. In every case, we consider a range of threshold indicator variables, as well as continuous measures and interaction terms. Wherever possible, we use values of these variables both circa 1975 and as early as available. In every case, the resulting IV regressions provide no additional information about the direction of causation because they fail standard weak instruments tests (Staiger and Stock, 1997).[16]

Reluctantly, we conclude that identification eludes us and the option of using instrumental variables cannot assist us in extracting a dominant direction of causality.

4.4. Latent variables

We must rely on economic reasoning, not econometric tests, to explicitly consider latent variables: factors that might cause both growth and big business turnover, but that are not necessarily associated with creative destruction.

The literature links a number of closely related factors to economic growth. We therefore check to see which of these might also correlate with big business stability. We then partial out effects of these variables to see if big business stability remains associated with growth.

To operationalize this, we run regressions of the form

$$\Omega = c_0 + c_1 \ln(y_0) + c_2 \ln(k)_0 + c_3 \ln(h_0) + c_4 \Phi + u \,, \qquad (10)$$

where Ω is one of our big business stability measures; the controls for initial income, physical capital, and human capital controls are as in Eq. (8) but for 1975; and Φ is one or more institutional variables. The institutional development variables we put in Φ measure government size and quality, financial system development, and openness to the global economy.

[16] The instruments might be noisy or inconsistently related to the main variables. See Subsection 4.4 on latent variables.

4.4.1. Government

The size and quality of the government sector correlate with economic growth and might plausibly also correlate with big business stability.

The literature linking government qualities to economic growth is too wide ranging to summarize fully here, so we focus on specific connections that might plausibly also involve big business stability.

One linkage pertains to a benevolent interventionist government that views enhanced corporate stability as a tool for stabilizing employment and promoting egalitarian goals.[17] For example, such a government might view big business stability per se as a public good.[18] Big businesses can also be handy channels through which interventionist governments can effect social and political policies, as in Högfeldt (2005), so politicians might protect big businesses to preserve their power to advance those policies.[19] Big government might also crowd out private investment, as in neo-Keynesian macroeconomics. And government intervention, no matter how benevolent, inevitably adds political risk to normal business risks, deterring fixed investment.

[17] For example, when the German government bailed out Philipp Holzmann, Finance Minister Hans Eichel declared 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." (See Edmund Andrews 'Navigating the Economy of a Changing Germany,' *New York Times*, electronic ed. December 7, 1999.) The same motive seems to underlie Chancellor Gerhard Schroeder's pressure on German banks to save the jobs of the 22 thousand employees of the bankrupt engineering firm Babcock Borsig AG with a $700 million to $800 million bailout. (See 'Schroeder Seeks Bailout Aid for Bankrupt Firm,' *International Herald Tribune*, electronic ed., July 6, 2002.)

[18] 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." See Jonathan Sprague and Murakami Mutsuko 'Tokyo's Sogo Shocker - A bailout and a reversal show no policy at all,' *Asiaweek*, electronic ed., 26(29), July 28, 2000. Note, however, that *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."

[19] For example, *Business Week* reports Malaysian prime minister Mahathir 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 saying, "We view Malaysia as a corporation, and the shareholders in the government are companies." and "To the extent you help the bigger guys, the smaller guys benefit." See Sheri Prasso, Mark Clifford and Joyce Barnathan, 'Malaysia: The Feud - How Mahathir and Anwar became embroiled in a class that threatens to send Malaysia into upheaval,' *Business Week*, electronic ed., October 28, 1998.

Red tape, delays, and other political fixed costs also block entry by new competitors, as in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2002), Krueger (1974), and Olson (1963, 1982). For these and other reasons, big benevolent government might correlate with both enhanced big businesses stability and slow growth.

A second set of arguments pertain to a government manipulated by its great businesses, as in Hayek (1960). Stigler (1971) argues that large businesses routinely capture their regulators, and Beason and Weinstein (1996), among others, present evidence of this. Rajan and Zingales (2003), Morck, Wolfenzon, and Yeung (2005), and others posit more generally that corporate elites invest in political influence to lock in a status quo that preserves the dominance of established big firms that they control. Olson (1963, 1982), Tullock (1967), and Krueger (1974) argue more generally that returns to political rent-seeking rise with the extent of state interventionism, retarding overall growth.[20] For these reasons, among others, big corrupt government might also correlate with both enhanced big businesses stability and slow growth.

Unfortunately, big government as a latent factor explaining both growth and corporate sector stability is not cleanly separable from creative destruction. This is because Krueger (1993), Murphy, Shleifer, and Vishny (1991, 1993), and others argue that, by making political rent-seeking more lucrative, big government, benevolent or not, diverts talent and resources towards influencing government and away from investment in innovation. This slows big business turnover and growth by slowing creative destruction.[21]

We gauge the sheer importance of government in the economies of each country with 1975 public sector consumption over GDP, as reported in *World Development Indicators*. As more nuanced measures of the role of the government in the economy, we use 1975 Gini coefficients from Deininger and Squire (1996) and the World Income Inequality database to gauge income inequality, which benevolent government intervention arguably reduces. We also

[20] Morck and Yeung (2004) argue that large, established, family-controlled corporate groups are especially able rent-seekers.

[21] Though Haber, Razo, and Maurer (2003) argue that government capture by the business elite could be an optimal second-best outcome absent the rule of law.

use a *legal origin indicator* variable, set to one for common law legal systems and to zero otherwise, and a measure of red tape barriers to entry. The legal origin indicator is from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997a), who link common law legal origins to better government institutions, especially an independent judiciary and reduced official corruption. The red tape barrier measure is the logarithm of the "time required to obtain legal status for new business" in days, from Djankov (2002, Table 3). Unfortunately, the last is measured as of 1999 and so might be a result of faster growth or big business instability, not a cause. We examine it because entry barriers are clearly relevant to our stability measures but concede that interpreting its coefficients is problematic.

Panel A of Table 4 shows that higher government consumption is significantly correlated with greater labor-weighted stability indexes; but only if they are based on Lists IV and V, which exclude financial companies and sometime SCEs. This is consistent with big government favoring the continued economic importance of established big businesses. Greater stability is usually negatively, but insignificantly, related to income equality, thus undermining the idea that big business stability might promote egalitarian goals. Civil code legal systems and longer delays in establishing new businesses legally are also associated with more big business stability, but only using indexes based on Lists I, II, or III, which include SCEs.

[Table 4 about here]

Other tests we perform searching for links between stability and laudable social outcomes are uniformly insignificant. Gini coefficients in 1996 are uncorrelated with stability, as are changes in Gini coefficients. Other equality or social policy outcome measures (unemployment, the variance of the unemployment rate, and indicator variables for various sorts of crises) are also unrelated to our stability indexes. The only exception is hardly breathtaking: Government crises are less frequent in rich countries with contemporaneously more stable large corporate sectors. If

governments stabilize their large corporate sectors to promote such social goals, these interventions seem of limited success.

Big business stability is thus associated with civil law legal systems and with worse red tape if we include SCEs in our top ten lists. Otherwise, only the sheer size of government is robustly related to larger stability indexes.

4.4.2. Financial system characteristics

Another potential latent factor is financial development, which affects growth and might plausibly affect big business turnover, too. [22]

The latter link might arise in a variety of ways. For example, a bank-based financial system might provide creditors more influence over corporate governance and induce lower risk strategies, curtailing both radical successes by newcomers and failures of established big businesses. [23] Or weak shareholder or creditor rights might undermine savers' willingness to invest in new firms, restricting firms to using retained earnings to finance new ventures and locking in the dominance of established firms.[24]

Again, financial development cannot be neatly severed from creative destruction. Wurgler (2000) and others posit a variety of channels ranging from more informed corporate strategies to better capital budgeting decisions to superior governance. Others argue that financial development has various cultural infrastructure antecedents.[25] But King and Levine (1993) argue

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[22] On the link between financial development and growth, see King and Levine (1993), Bekaert and Harvey (1998), Khanna and Palepu (2000), Morck, Stangeland, and Yeung (2000), Olsen (2000), Wurgler (2000), La Porta, Lopez-de-Silanes, and Shleifer (2002), Levine (2002), Rajan and Zingales (2003), Johnson and Mitton (2003), Morck, Wolfenzon, and Yeung (2005), and others.

[23] See also Rajan (1992) on bank- versus stock market-centered financial systems. Beck and Levine (2002) and Levine (2002) present evidence suggesting this is a second-order issue. But see also, e.g., Maurer and Haber (2004).

[24] See La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997a, 1997b, 1998, 1999, 2002), Levine, Demirguc-Kunt, and Beck (2003), and others. Rosenthal and Lamoreaux (2004, 2006), Aganin and Volpin (2005), and others argue that this cross-country relation is a recent phenomenon. For overviews, see Glaeser and Goldin (2006) and Morck and Steier (2005). For US evidence, see John, Litov, and Yeung (2007).

[25] La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997a, 1997b, 1998), Stulz and Williamson (2003), and others.

explicitly that financial development hastens growth by fomenting creative destruction; reiterating Schumpeter (1912), who also stresses this connection, noting that brilliant but impecunious innovators need a dynamic financial system to underwrite the development of their new technologies.

Nor can financial development be neatly distinguished from effects of government. For example, Rajan and Zingales (2003) link atavistic financial markets to rent-seeking by insiders of established big businesses aimed at weakening their countries' financial sectors precisely to stymie upstarts who might challenge their large established businesses.[26] Undermined financial systems thus block creative destruction much like any other government imposed barrier to entry.

We gauge financial development by the size of the financial system and the strength of investor protection. Financial system size is measured by 1975 credit to the private sector and by 1978 stock market capitalization, both as fractions of GDP, from Beck, Levine, and Loayza (2000) and the World Development Indicators database. We gauge investor protection, institutional quality measures of financial development, with the creditor and shareholder rights tallies assembled by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998).[27]

Panel B of Table 4 show that a large banking system (private sector credit is large relative to GDP) is associated with greater equally weighted stability indexes and with two of the five the labor-weighted stability indexes, too. In contrast, stock market size is unrelated to stability. Yet creditor rights appear unimportant, while shareholder rights are associated with reduced stability

[26] See Morck, Stangeland, and Yeung (2000), Pagano and Volpin (2001), Rajan and Zingales (2003), Perotti and Volpin (2007), Morck, Wolfenzon, and Yeung (2005), Acemoglu, Johnson, and Robinson (2005), Stulz (2005), and others.

[27] La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) index creditor rights from zero to four, assigning one point each when the country imposes such restrictions as creditors' consent or minimum dividends to file for reorganization; secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); secured creditors have first priority on distribution of proceeds from asset sales of a bankrupted firm; and management does not have to stay pending the resolution of a reorganization. Their shareholder right index ranges from zero to six, assigning one point each when proxy vote by mail is allowed; shareholders are not required to deposit their shares prior to the general shareholders' meeting; cumulative voting or proportional representation of minorities in the board of directors is allowed; an oppressed minority mechanism exists (meaning that minorities shareholders have legal mechanisms against perceived oppression by directors); the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting is less than or equal to 10%; and shareholders have preemptive rights that can be waived only by a shareholder vote.

indexes based on any lists that include sometime SCEs.

That a large banking system is associated with a more stable big business sector is consistent with other work. For example, Morck and Nakamura (1999) and Morck, Nakamura, and Shivdasani (2000) argue that Japanese banks use their corporate governance influence to induce stability in that country's large businesses, instead of growth and dynamism. This is because banks' primary concern is timely loan repayment, not firm value maximization. Likewise, Perotti and von Thadden (2003) argue that, when the median voter seeks stability to protect her human capital, so Social Democracy favors large influential banking systems precisely because banks act in this way.

Our shareholder rights measures are for the 1990s, not 1975, and thus might measure effects, instead of causes, of big business stability. For example, countries with large state-controlled sectors in 1975 might have enacted shareholder rights so that privatizations would fetch more for their treasuries. However, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997a, 1997b) argue that shareholder rights are intrinsically stronger under common law legal systems, which were all in place long before 1975. The finding in Panel A that common law systems are associated with reduced stability when SCEs are included in compiling those indexes suggests that SCEs are less durable in common law countries. One possibility is that governments in these countries are more prone to privatize SCEs when their social purposes cease, and these businesses are then taken over, merged, or fail. In civil code countries, with weaker shareholder rights, governments would find privatization less remunerative and so hold on to their SCEs.

4.4.3. Economic openness

Trade openness encourages businesses to specialize according to their countries' comparative advantages, while capital account openness lets domestic businesses access capital from abroad. Standard trade and investment theories imply that either form of openness should enhance growth. Bekaert, Harvey, and Lundblad (2005) show that capital account liberalization increases

subsequent real economic growth by about 1% per year on average. From 1975 through 1996, most economies grew more open, and this appears to have induced more rapid growth.[28]

But openness also exposes domestic industries to global competition and shocks. Lower stability indexes might thus reflect greater openness forcing more frequent corporate sector adjustments to changing comparative advantage, capital costs, and competitive pressures.

But again, openness intertwines with creative destruction. Innovations often arise abroad. Trade and capital barriers can limit inflow of all manner of foreign influences, including foreign innovations.[29]

Nor can openness be distinguished from effects associated with government or financial development. Benevolent governments might invoke protectionism as part of an overall platform of corporatist intervention, aiming at laudable social goals. Or, established big business insiders might lobby for protectionism to lock in a status quo biased in their favor.[30] Rajan and Zingales (2003) link openness to financial development and rent-seeking, arguing that the principals of large established businesses are less able to hobble the financial systems of more open countries. This might be because politicians' ability to serve special interests is more restricted in more open economies.[31]

We capture trade openness with exports plus imports over GDP and capital account openness with foreign direct investment inflow over GDP. Panel C of Table 5 shows less trade and capital account openness corresponding to greater stability of leading private sector businesses (Lists IV and V).[32]

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[28] See Sachs and Warner (1995), Henry (2000a, 2000b, 2003), Bekaert, Harvey, and Lundblad (2005) Bekaert, Harvey, Lundblad, and Siegel (2007), and others, but also Edison, Levine, Ricci, and Slok (2002).
[29] See Caves (1995) and Grossman and Helpman (1991).
[30] See Krueger (1993), Morck, Stangeland, and Yeung (2000), Johnson and Mitton (2003), Rajan and Zingales (2003), and others.
[31] *Ibid*.
[32] Nevertheless, the result on trade openness is weak. Our trade openness variable is for 1975. The impact of openness on stability could stem from both the level of openness and the increase in openness. The former is positively related to 1975 trade openness while the latter could behave in the opposite manner. Hence, the two forces could offset each other. We include change in trade openness from 1975 to 1996 as a

4.5. Further robustness checks

Generalized White tests reject heteroscedasticity, and residual diagnostics again show that outliers do not drive the results. As before, we report heteroscedasticity consistent T-tests nonetheless.

Substituting alternative variables likely to capture the same effects as those used yields qualitatively similar results. For example, using government spending instead of government consumption, or the cost of obtaining legal status for a new business as a fraction of per capita GDP instead of the number of days of delay all yield results qualitatively similar to those shown in Panel A of Table 5. Using total domestic credit, instead of total credit to the private sector, over GDP likewise yields similar results to those shown in Panel B. Using the modified index of trade openness recommended by Frankel (2001) generates results similar to Panel C.[33]

4.6. Isolating creative destruction?

It is tempting at this point to run instrumental variable (IV) regressions, but, again, IV procedures using any or all of these institutional variables fail standard weak instruments tests. More importantly, we cannot reasonably argue these variables to be exogenous or to affect growth only via corporate sector stability. We therefore instead use them to tease out further information about the economics underlying Table 3.

The results in Subsection 4.5 suggest that certain institutions (big government, financial system qualities, and protectionism) might mediate the link between slower growth and big businesses stability. We explore this by regressing growth on stability with the controls in Eq. (8) plus institutional variables, *viz*.

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right-hand-side variable, overlooking endogeneity. We still find little significance for both the change and the initial level of trade openness.

[33] Frankel (2001) points out that smaller countries are naturally more dependent on trade than larger ones and so recommends "imports over GDP minus all foreign countries' GDP over world GDP." Intuitively, 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.

$$growth = \gamma_0 + \lambda_1 \ln(y) + \gamma_2 \ln(k) + \gamma_3 \ln(h) + \gamma_4 \Omega + \gamma_5 \Phi + \varsigma \,, \qquad (11)$$

where Ω is either Ω_{L75}^{GDP} or Ω_{E}^{GDP} and Φ represents the institutional variables shown to be significant in Table 4: government as a fraction of GDP, a common law dummy, red tape, banking system size, and trade openness. Limited degrees of freedom preclude using the whole list of Table 4 variables, but the institutional variables are highly correlated so a representative measure for each economic effect suffices.

To conserve space, Table 5 reports only results for stability indexes based on maximally and minimally inclusive top ten lists. Even after including government size, a common law legal system indicator, the red tape measure, banking system development, and trade openness, stability retains its significant negative relation with GDP growth and productive growth. Its negative relation with capital accumulation remains significant only in regressions using equally weighted stability based on List V. Stability indexes based on List II, III, and IV (not shown) yield almost identical results if GDP and productivity growth are the dependent variables. In regressions explaining capital accumulation, stability retains a significant negative coefficient only if it is defined using top ten List II (value-weighted) or List III (both value- and equal-weighted).

[Table 5 about here]

These results are robust. Student residual statistics again highlight Ireland as a potential outlier in the TFP growth regressions, but dropping it changes neither signs nor significance. White general tests reject heteroscedasticity.

Table 5 thus suggests that stability per se has a negative relation with growth, even in the presence of these institutional control variables that arguable remove variation associated with possible latent variables and, most likely, much variation associated with creative destruction as

well. Because no list of latent variables can be exhaustive, these findings do not confirm creative destruction, but only exclude certain other plausible stories. Other latent effects could be shown in future research to explain our finding, but, at present, Ockham's razor again leaves us favoring creative destruction.

5. Subsample regressions

Aghion, Angeletos, Banerjee, and Manova (2005) argue that economic growth differs qualitatively in high- versus low-income countries. They posit that creative destruction is important in developed countries, where growth requires innovation to extend the production possibilities frontier outward. In contrast, they argue that growth in developing countries requires capital accumulation to apply known technologies, moving the economy from deep inside the production possibilities frontier toward its surface.

5.1. Stages of development?

Table 6 reproduces the Table 3 regressions for subsamples of high- and low-countries with above- versus below-median 1990 per capita GDP.

[Table 6 about here]

In high-income countries, slower per capita GDP and total factor productivity growth correlate significantly with more stable minimally inclusive (nonfinancial, private-sector, and domestically-controlled) big businesses. Including foreign-controlled enterprises generates similar results, with slightly less statistical significance; and including sometime SCEs renders all the indexes entirely insignificant, though negative signs persist in almost every case. Thus, for developed countries, the marginalization of top nonfinancial domestically-controlled private-sector businesses is most significantly associated with faster per capita GDP and TFP growth.

Capital accumulation, in contrast, is unrelated to any variant of the stability indexes in high-income countries.

In low-income countries, significant results obtain only if sometime SCEs are included in tallying the stability of large businesses.[34] In these cases, labor-weighted stability indexes are associated with slower real per capita GDP growth, total factor productivity growth, and capital accumulation. We ignore nationalizations and privatizations in calculating our stability indexes. Thus, our findings link faster growth in low-income countries to the accelerated marginalization of sometime SCEs.

Figs. 2 and 3 plot the growth measures against the maximally and minimally inclusive labor-weighted big business stability indexes for high and low-income countries, respectively. As in Fig. 1, we partial out control variables from the regressions. The plots plainly illustrate the results in Table 6. In high-income countries, the minimally inclusive index plainly aligns inversely with per capita GDP growth, TFP growth, and capital accumulation, despite the statistical insignificance of the last in Table 6. In low-income countries, the maximally inclusive index does the job.

[Figures 2 and 3 about here]

These results survive the battery of robustness checks applied to the earlier tables.[35] The main exception is high-income subsample regressions using growth windows beginning in 1996, which remain qualitatively unchanged only if the crisis region dummies are included. Low-income subsample regressions using [1996, 2003] growth and equal-weighted indexes preserve signs, but significance fades. All other robustness checks generate qualitatively similar results to

[34] Fogel (2008) reports SCEs accounting for significantly higher fractions of the big business sectors of countries with lower per capita GDP, and our data confirm this.

[35] The sole exception is that Cook's D statistics show Ireland to be an outlier, in the developed country subsample. Dropping it does not affect the results but exposes Singapore as a statistical outlier. Dropping this does not affect the results qualitatively. Continued outlier pruning, as in Subsection 3.3 eventually leaves the stability indexes insignificant, but negative signs and rough coefficient magnitudes persist.

those above. Restricting our attention to high or low-income countries does not resolve the identification problems discussed in Section 4. Weak instruments tests again preclude all plausible IV specifications. Replicating Tables 4 and 5 for high and low-income countries separately (not shown) preserve signs consistently, but significance levels only sporadically. Sharply curtailed degrees of freedom in this exercise render statistical inference problematic, so we are reluctant to press nuanced interpretations of these coefficients' magnitudes or significance.

Overall, these results support Aghion, Angeletos, Banerjee, and Manova (2005), who model creative destruction as more important in more developed economies. But our findings also link the demise of SCEs and sometime SCEs with growth in low-income countries.

5.2. Different roles for the state?

Table 6 and Figs. 2 and 3 suggest a different role for the state in countries at different stages of economic development. Our low-income countries do not include the "poorest of the poor" because data needed to construct stability indexes for many African and South Asian countries are unavailable.

The role of the state in very poor countries is therefore outside our scope. For example, many of the countries we consider low-income could have experienced successful state-run development that previously raised them from extreme poverty. If so, our results might support a well-timed and complete exit by the state once development gains momentum, not a reduced role in general, and suggest that some governments are better at this than others. For example, autocratic governments might assign a higher degree of importance to SCEs; and over time, entrenched elites associated with the state might capture these and turn the state's helping hand into a "grabbing hand" that hinders growth (Shleifer and Vishny, 1997). This imply a value to liberal democracy as a country graduates to a stage of development in which growth through creative destruction becomes important, as in Aghion, Angeletos, Banerjee, and Manova (2005).

To explore this further, we partition the sample into countries with democratic versus autocratic governments. To do this, we use *polity*, the well-known *polity2* autocracy-democracy score from the Polity IV Project of Maryland's Center for International Development and Conflict Management and George Mason University's Center for Global Policy.[36] This 21 point scale rates factors such as how the executive is chosen, how executive powers are checked, and the strength of political competition. To mitigate subsample selection endogeneity, we partition using *polity2* for 1950, or the first available year thereafter. We define *democracies* as countries with *polity2* scores above 6 and call other countries *autocracies*. Our sample of autocracies therefore also includes those defined as partially democratic in the Polity IV database.[37] Subsample regressions (not shown) analogous to Table 6 link the survival of large private sector firms to slow growth more strongly in democracies than in autocracies. The survival of sometime SCEs, in contrast, retards growth more clearly in autocratic states.

A detailed investigation into our 1975 and 1996 lists of top companies helps explain these results. First, in both 1975 and 1996, democracies see fewer SCEs among top businesses than autocracies. In 1975, about 33% of the top ten nonfinancial domestic businesses are sometime SCEs in democracies versus about 60% in autocracies. Second, many SCEs in democracies are infrastructure providers (e.g. roads and utilities), whereas many in autocracies are industrial conglomerates or groups. Thus, one interpretation of our regression results is that sometime SCEs, whether they fade away or not, do not significantly impede growth in democracies because they focus on public goods provision; but that long-lived sometime SCEs in autocratic countries do hinder growth, in part at least, because the lack that focus.

Because barriers to entry constitute a common concern throughout our discussions of government, financial development, and openness; we consider subsamples of countries with contestable versus noncontestable markets. A country's markets are contestable if its government

[36] See www.cidcm.umd.edu/polity.

[37] Other reasonable partitions, for example, negative versus positive *polit2y* scores, yield qualitatively similar results. We are grateful to an anonymous referee for suggesting democracy-autocracy and market contestability partitions.

permits new businesses to arise freely, and is well captured by variables such as the time required to register a new business, from Table 4. Because that variable is not available for earlier years, we partition our sample at the median 1980 quality of a country's bureaucracy, from Business Environment Risk Intelligence data. We say markets are contestable if bureaucratic quality is better than the sample median and noncontestable otherwise.[38] Regressions (not shown) analogous to Table 6 link slow growth to the persistence of large private-sector firms where markets are contestable, but to the survival of sometime SCEs where they are not.

These findings suggest investigating how the determinants of growth, or the lack thereof, differ for countries with different initial conditions. "Stages of development" is an old idea, but our findings suggest new possibilities. For example, Rostow (1971) suggests large SCEs might coordinate catch-up growth across sectors. We find no evidence of such an effect in our data, but instead that a stable SCE sector correlates with low growth. Our findings suggest that, if SCEs have such a role at all, it must at an earlier stage than found in our sample. Our findings better accord with less charitable views of SCEs: that they crowd out entrepreneurial investment (Kornai, 1986; and Murphy, Shleifer and Vishny, 1991, 1993), scorn innovation (Marshall, 1907; Shleifer and Vishny, 1994a, 1994b; and Shleifer, 1996), or manipulate public policy to stifle upstarts and entrench the status quo (Krueger, 1974; Helpman and Grossman, 2002; Rajan and Zingales, 2003; Roe, 2003; Morck, Wolfenzon, and Yeung, 2005; Acemoglu, Johnson, and Robinson, 2005).

Another intriguing 'stages of development' theory, due to Khanna and Palepu (2000), Morck and Nakamura (2007), and others, posits that large stable corporations or corporate groups controlled by prominent families play key roles in developing low-income economies. This is because these huge hierarchical structures circumvent such countries' corrupt or otherwise dysfunctional product, labor, and capital markets and arm's-length institutions. Again, our findings do not accord with these arguments. But like Rostow (1971), this theory could describe

[38] Partitioning at the median value of "the time required to register a new business," from Table 4, generates qualitatively similar results.

earlier stages of development and certainly might pertain to specific countries or other circumstances. Fully exploring these issues lies beyond the scope of this study, but we are pursuing them elsewhere.

6. Conclusions

Countries whose rosters of big businesses change less from 1975 through 1996 exhibit slower per capita GDP growth, TFP growth, and (in some specifications) capital accumulation in the 1990s. These findings reflect old giants waning and all but disappearing, not just being eclipsed as new ones wax large.

Big businesses melt away less often where governments are larger, civil codes hold sway, red tape is denser, banks are more dominant, and the global economy less immanent. The link from big business stability to growth is affected in part via these institutional factors, especially red tape and ingress to the global economy, but a large significant effect of stability per se on growth remains.

In high-income countries, slow growth correlates with more stable large private sector nonfinancial firms. In contrast, slow growth in low-income countries is linked to the persistent dominance of a cadre of SCEs or sometime SCEs, which leads us to speculate about a lingering drag on growth resulting from state intervention.

Without addressing causality directly, we can make inferences about economic growth. Our results – especially those linking growth to the demise of old big businesses, not merely the rise of new ones – support Schumpeter's (1912) thesis that sustained long-run growth entails new corporate giants arising and undermining old leviathans. They also validate efforts to formalize and extend Schumpeter (1912), such as Aghion and Howitt (1997). While we cannot speak to other time periods or specific industry or country settings, growth due to innovation by large established businesses, as in Schumpeter (1942), appears less generally important in recent decades.

Our findings raise the possibility that big business in some economies might be excessively stable, and that this might retard growth. Further work to clarify the directions of causation in the economic processes underlying these results would be useful. We welcome alternative interpretations of our findings and additional theoretical or empirical work that might illuminate these issues.

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Table 1 Stability indexes using maximally and minimally inclusive lists of top ten businesses. Maximally inclusive lists include all available enterprises. Minimally inclusive lists exclude financial, foreign-controlled, and state-controlled enterprises. Stability indexes are fractions of top ten 1975 firms still in the 1996 top ten or having grown at least as fast as total gross domestic product, weighted by 1975 employees, Ω_{L75}^{GDP}, or equally, Ω_{E}^{GDP}.

	Maximally inclusive top ten List (I)		Minimally inclusive top ten List (V)	
Country	Ω_{L75}^{GDP}	Ω_{E}^{GDP}	Ω_{L75}^{GDP}	Ω_{E}^{GDP}
Argentina	0.31173	0.2	0.39277	0.3
Australia	0.66851	0.6	0.73239	0.6
Austria	0.83342	0.5	0.22772	0.2
Belgium	0.40802	0.3	0.53091	0.5
Bolivia	0.74855	0.3	0.27430	0.3
Brazil	0.47057	0.5	0.29455	0.3
Canada	0.40118	0.4	0.57342	0.4
Chile	0.43968	0.4	0.27919	0.3
Colombia	0.28799	0.2	0.60121	0.5
Denmark	0.56300	0.4	0.72525	0.4
Finland	0.78035	0.7	0.57816	0.5
France	0.56400	0.4	0.55802	0.4
Germany	0.76277	0.7	0.73497	0.7
Greece	0.38197	0.3	0.07193	0.1
Hong Kong	0.60582	0.3	0.60582	0.3
India	0.12107	0.1	0.56486	0.4
Indonesia	0.31485	0.3	0.39913	0.3
Ireland	0.45014	0.3	0.39698	0.2
Israel	0.59483	0.6	0.74440	0.4
Italy	0.76126	0.4	0.78853	0.3
Japan	0.72527	0.7	0.59077	0.6
Korea	0.45119	0.5	0.34111	0.4
Malaysia	0.07326	0.1	0.12253	0.1
Mexico	0.76431	0.5	0.62523	0.5
Netherlands	0.83944	0.6	0.84228	0.6
New Zealand	0.20476	0.2	0.24253	0.3
Norway	0.30084	0.3	0.12190	0.1
Pakistan	0.22827	0.2	0.45168	0.4
Peru	0.45936	0.5	0.26775	0.2
Philippines	0.25999	0.2	0.07253	0.1
Portugal	0.34266	0.2	0.08388	0.1
Singapore	0.56019	0.4	0.06400	0.1
South Africa	0.57996	0.5	0.66960	0.6
Spain	0.46344	0.3	0.30168	0.3
Sri Lanka	0.07093	0.1	0.24317	0.2
Sweden	0.78482	0.5	0.78337	0.4
Switzerland	0.83344	0.7	0.83344	0.7
Taiwan	0.39190	0.2	0.62445	0.3
Thailand	0.74212	0.6	0.60927	0.5
Turkey	0.20833	0.1	0.38338	0.2
United Kingdom	0.23128	0.2	0.53862	0.4
United States	0.53122	0.5	0.53122	0.5
Uruguay	0.49031	0.3	0.40564	0.2
Venezuela	0.77755	0.5	0.40070	0.4

Table 2 Main variables. Stability indexes are fractions of top ten 1975 firms still in the 1996 top ten or having grown at least as fast as total GDP. Maximally inclusive lists include all available enterprises. Minimally inclusive lists exclude financial, foreign-controlled, and state-controlled enterprises. Samples are countries listed in Table 1. For Panel B, numbers in parenthesis are probability levels for rejecting the null hypothesis of zero correlation coefficients. GDP = gross domestic product; PPP = purchasing power parity; TFP = total factor productivity.

Panel A Univariate statistics

Variable		Mean	Standard deviation	Minimum	Maximum
Based on maximally inclusive List (I) of top ten firms					
Big business stability index, labor-weighted	$\left[\Omega_{L75}^{GDP}\right]$	0.495	0.223	0.0709	0.839
Big business stability index, equally weighted	$\left[\Omega_{E}^{GDP}\right]$	0.381	0.179	0.100	0.727
Based on minimally inclusive List (V) of top ten firms					
Big business stability index, labor-weighted.	$\left[\Omega_{L75}^{GDP}\right]$	0.460	0.227	0.0640	0.842
Big business stability index, equally weighted.	$\left[\Omega_{E}^{GDP}\right]$	0.354	0.166	0.0909	0.700
Growth measures					
Growth in per capita GDP in US dollars at PPP, 1990 to 2000	[$\Delta\ln(y)$]	0.223	0.137	-0.0827	0.624
Total factor productivity growth, 1990 to 2000	(ΔTFP)	0.144	0.100	-0.0415	0.467
Capital accumulation rate, 1990 to 2000	[$\Delta\ln(k)$]	0.263	0.207	-0.217	0.674
Control variables					
1990 per capita GDP in thousands of US dollars at PPP	(y)	12.9	7.59	1.68	26.5
Average years of total education for adults (age > 25, as of 1990)	(h)	7.24	2.40	2.29	12.0
1990 per capita capital assets in millions of US dollars at PPP	(k)	31.4	22.1	1.93	79.1
1990 total GDP in trillions of US dollars at PPP	(Y)	0.542	1.08	0.0161	6.62

Panel B Pearson correlation coefficients between stability indexes and growth variables.

Index		Maximally inclusive top ten List (I)		Minimally inclusive top ten List (V)	
		Ω_{L75}^{GDP}	Ω_{E}^{GDP}	Ω_{L75}^{GDP}	Ω_{E}^{GDP}
Growth measures					
Per capita GDP growth, 1990 to 2000	[$\Delta\ln(y)$]	-0.365 (0.02)	-0.302 (0.05)	-0.266 (0.08)	-0.382 (0.01)
Total TFP growth, 1990 to 2000	(ΔTFP)	-0.309 (0.04)	-0.250 (0.10)	-0.290 (0.06)	-0.391 (0.01)
Capital accumulation, 1990 to 2000	[$\Delta\ln(k)$]	-0.305 (0.04)	-0.262 (0.09)	-0.120 (0.44)	-0.211 (0.17)
Control variable					
Log of 1990 per capita GDP	[$\ln(y)$]	0.471 (0.00)	0.482 (0.00)	0.340 (0.02)	0.272 (0.07)
Log of 1990 per capita capital	[$\ln(k)$]	0.500 (0.00)	0.541 (0.00)	0.271 (0.08)	0.235 (0.12)
Log of over 25 population average years of schooling	[$\ln(h)$]	0.327 (0.03)	0.415 (0.01)	0.260 (0.09)	0.238 (0.12)
Log of 1990 total GDP	[$\ln(Y)$]	0.0907 (0.56)	0.244 (0.11)	0.382 (0.01)	0.467 (0.00)

Table 3 Ordinary least squares regressions of growth on big business stability indexes and controls. Growth is 1990 to 2000 per capita gross domestic product (GDP) growth, $\Delta\ln(y)$, total factor productivity growth, ΔTFP, or per capita capital accumulation, $\Delta\ln(k)$. ΔTFP is $\Delta\ln(y) - 0.3\Delta\ln(k)$. Stability indexes, Ω, measure the proportion of 1975 top ten firms still in the top ten in 1996 or growing no slower than GDP from 1975 to 1996. Control variables are the log of 1990 per capita GDP, $\ln(y)$, log of 1990 capital assets per capita, $\ln(k)$, and log average years of education for adults, $\ln(h)$. All financial variables are in 1996 US dollars at purchasing power parity. Numbers in parentheses are probability values for rejecting the null hypothesis of zero coefficients. Probability values are based on heteroscedasticity-consistent standard errors. In Panel A, stability index is equal-weighted and based on a list of top ten domestic private sector firms. In Panel B, only coefficient estimates on stability indexes are shown. List I covers all available firms; List II covers all firms from List I except financial firms; List III is List I less financial and foreign-controlled firms; List IV is List I excluding financial and state-controlled firms; and List V is List I excluding financial, foreign-controlled and state-controlled firms. Sample is countries listed in Table 1.

Panel A Regression coefficients of stability indexes and control variables

Stability indexes based on top ten firms, no financial, state-controlled, or foreign-controlled firms		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Constant		0.408	(.25)	0.442	(.09)	-0.113	(.80)
Stability index, equal-weighted	Ω_E^{GDP}	-0.349	(.01)	-0.249	(.01)	-0.333	(.10)
Log of per capita GDP, 1990	$\ln(y)$	0.0888	(.49)	-0.0507	(.60)	0.465	(.01)
Log of average years of education	$\ln(h)$	0.192	(.05)	0.166	(.02)	0.0863	(.50)
Log of per capita capital assets, 1990	$\ln(k)$	-0.125	(.20)	-0.00612	(.93)	-0.397	(.01)
F-statistic	F	2.45	(.06)	3.07	(.03)	2.80	(.04)
Adjusted R-squared	R^2	0.197		0.224		0.152	
Sample	N	44		44		44	

Panel B Regression coefficients of stability Indexes only

Stability indexes based on lists of top ten firms		$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
		Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
I Maximally inclusive	Ω_{L75}^{GDP}	-0.222	(.02)	-0.154	(.01)	-0.227	(.15)
	Ω_E^{GDP}	-0.253	(.05)	-0.204	(.03)	-0.161	(.48)
II No financial firms	Ω_{L75}^{GDP}	-0.248	(.01)	-0.159	(.02)	-0.295	(.03)
	Ω_E^{GDP}	-0.267	(.06)	-0.197	(.06)	-0.235	(.30)
III No financial or foreign-controlled firms	Ω_{L75}^{GDP}	-0.273	(.01)	-0.173	(.01)	-0.334	(.04)
	Ω_E^{GDP}	-0.377	(.00)	-0.257	(.00)	-0.401	(.12)
IV No financial or state-controlled firms	Ω_{L75}^{GDP}	-0.199	(.03)	-0.144	(.03)	-0.184	(.18)
	Ω_E^{GDP}	-0.330	(.01)	-0.254	(.01)	-0.253	(.15)
V No financial, state-controlled, or foreign-controlled firms	Ω_{L75}^{GDP}	-0.199	(.04)	-0.133	(.04)	-0.220	(.14)
	Ω_E^{GDP}	-0.349	(.01)	-0.249	(.01)	-0.333	(.10)

Table 4 Determinants of stability. Regressions are of the form: stability index = β_0 + β_1*stability determinant + β_2*ln(y) + β_3*ln(h) + β_4*ln(k) + ε. Dependent variables are labor- or equal-weighted measures of the proportion of top ten 1975 firms that either remain in the top ten list for 1996 or grew no slower than gross domestic product from 1975 to 1996. Control variables are the logs of 1975 per capita GDP, capital assets, and average years of education for adults. All financial variables are in 1996 US dollars at purchasing power parity. Only coefficient estimates on stability determinant variables are shown. Probability values are based on heteroscedasticity-consistent standard errors. List I covers all available firms; List II covers all firms from List I except financial firms; List III is List I less financial and foreign-controlled firms; List IV is List I excluding financial and state-controlled firms; *and* List V is List I excluding financial, foreign-controlled and state-controlled firms. Numbers in parentheses are probability levels for rejecting the null hypothesis of zero coefficients. Panel A reports political economy variables that include government size (total final government consumption over GDP in 1975), inequality (1975 Gini coefficient), a common law legal origin dummy, and red tape (days to obtain legal status as a new business in 1999). Samples are as listed in Table 1 less Taiwan for government size. Panel B reports financial development variables that include banking system (financial credit to private sector over GDP in 1975), stock market (total market capitalization over GDP in 1978), creditor rights, and shareholder rights, the latter two from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). Samples are as listed in Table 1 less Hong Kong and Taiwan for banking system size, less Ireland and New Zealand for stock market size, less Bolivia and Venezuela for creditor rights, and less Bolivia for shareholder rights**.** Panel C reports openness variables that include foreign direct investment (FDI inflows as a fraction of GDP in 1975) and trade openness (imports plus exports as fraction of GDP in 1975). Samples are as listed in Table 1 less Hong Kong, Switzerland and Taiwan for foreign direct investment, and less Taiwan for trade openness**.**

Panel A Political economy variables as determinants of stability

Stability indexes based on lists of top ten firms			Government size		Inequality		Common law		Red tape	
			Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
I	Maximally inclusive	Ω_{L75}^{GDP}	-0.00172	(0.69)	-0.0014	(0.75)	-0.109	(0.07)	0.0928	(0.02)
		Ω_{E}^{GDP}	0.00119	(0.76)	-0.0024	(0.38)	-0.0522	(0.29)	0.0511	(0.14)
II	No financial firms	Ω_{L75}^{GDP}	-0.00311	(0.44)	0.00045	(0.91)	-0.131	(0.02)	0.0874	(0.04)
		Ω_{E}^{GDP}	-0.00245	(0.46)	-0.0023	(0.33)	-0.0672	(0.16)	0.0413	(0.25)
III	No financial or foreign-controlled firms	Ω_{L75}^{GDP}	-0.00328	(0.38)	0.0021	(0.60)	-0.112	(0.06)	0.0881	(0.02)
		Ω_{E}^{GDP}	-0.00292	(0.35)	0.00027	(0.99)	-0.0407	(0.45)	0.0410	(0.19)
IV	No financial or state-controlled firms	Ω_{L75}^{GDP}	0.0118	(0.03)	-0.0071	(0.07)	0.0259	(0.70)	-0.0186	(0.67)
		Ω_{E}^{GDP}	0.00178	(0.65)	-0.0030	(0.31)	0.0229	(0.65)	-0.0204	(0.57)
V	No financial, state-controlled, or foreign-controlled firms	Ω_{L75}^{GDP}	0.0113	(0.04)	-0.0059	(0.21)	0.0276	(0.71)	-0.0075	(0.85)
		Ω_{E}^{GDP}	0.00102	(0.79)	-0.0025	(0.49)	0.0122	(0.83)	0.00023	(0.99)

Panel B Financial development variables as determinants of stability

Stability indexes based on lists of top ten firms			Banking system size		Stock market size		Creditor rights		Shareholder rights	
			Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
I	Maximally inclusive	Ω_{L75}^{GDP}	0.00215	(0.07)	-0.0338	(0.47)	-0.00419	(0.85)	-0.0570	(0.02)
		Ω_{E}^{GDP}	0.00269	(0.01)	-0.0172	(0.64)	-0.00689	(0.72)	-0.0321	(0.13)
II	No financial firms	Ω_{L75}^{GDP}	0.00159	(0.16)	-0.0467	(0.28)	-0.0141	(0.49)	-0.0534	(0.02)
		Ω_{E}^{GDP}	0.00279	(0.00)	-0.0173	(0.60)	-0.00964	(0.55)	-0.0210	(0.26)
III	No financial or foreign-controlled firms	Ω_{L75}^{GDP}	0.00130	(0.24)	-0.0381	(0.43)	-0.0117	(0.58)	-0.0547	(0.01)
		Ω_{E}^{GDP}	0.00257	(0.01)	-0.00279	(0.96)	-0.00714	(0.69)	-0.0213	(0.28)
IV	No financial or state-controlled firms	Ω_{L75}^{GDP}	0.00224	(0.10)	-0.0332	(0.65)	0.0283	(0.27)	-0.0204	(0.37)
		Ω_{E}^{GDP}	0.00257	(0.01)	0.0103	(0.85)	0.00790	(0.67)	-0.00107	(0.95)
V	No financial, state-controlled, or foreign-controlled firms	Ω_{L75}^{GDP}	0.00146	(0.25)	-0.110	(0.23)	0.0159	(0.61)	-0.0266	(0.26)
		Ω_{E}^{GDP}	0.00174	(.09)	-0.0592	(0.40)	0.000543	(0.98)	-0.0151	(0.43)

Panel C Openness variables as determinants of stability

Stability indexes based on lists of top ten firms			FDI openness		Trade openness	
			Coefficient	P-value	Coefficient	P-value
I	Maximally inclusive	Ω_{L75}^{GDP}	-0.0177	(0.60)	0.0000513	(0.90)
		Ω_{E}^{GDP}	-0.0283	(0.10)	-0.000390	(0.20)
II	No financial firms	Ω_{L75}^{GDP}	-0.0152	(0.65)	-0.000131	(0.71)
		Ω_{E}^{GDP}	-0.0279	(0.11)	-0.000490	(0.13)
III	No financial or foreign-controlled firms	Ω_{L75}^{GDP}	-0.0103	(0.76)	-0.000088	(0.81)
		Ω_{E}^{GDP}	-0.0164	(0.40)	-0.000393	(0.17)
IV	No financial or state-controlled firms	Ω_{L75}^{GDP}	-0.0598	(0.00)	-0.000430	(0.40)
		Ω_{E}^{GDP}	-0.0338	(0.04)	-0.000554	(0.10)
V	No financial, state-controlled, or foreign-controlled firms	Ω_{L75}^{GDP}	-0.0806	(0.00)	-0.00107	(0.07)
		Ω_{E}^{GDP}	-0.0539	(0.00)	-0.00101	(0.00)

Table 5 Regressions of growth on big business stability indexes, institutional environment variables and controls. Growth is 1990 to 2000 per capita gross domestic product (GDP) growth, $\Delta\ln(y)$, total factor productivity growth, ΔTFP, or per capita capital accumulation, $\Delta\ln(k)$. ΔTFP is $\Delta\ln(y) - 0.3\Delta\ln(k)$. Stability indexes, Ω, measure the proportion of 1975 top ten firms still in the top ten in 1996 or growing no slower than GDP from 1975 to 1996. Panel A uses stability based on List I, which covers all available firms. Panel B uses stability based on List V, which is List I excluding financial, foreign-controlled and state-controlled firms. Institution variables include a common law legal origin dummy, red tape (days to obtain legal status as a new business in 1999), government size (total final government consumption over GDP in 1975), banking system (financial credit to private sector over GDP in 1975), and trade openness (imports plus exports as fraction of GDP in 1975). Control variables are the log of 1990 per capita GDP, ln(*y*), log of 1990 capital assets per capita, ln(*k*), and log average years of education for adults, ln(*h*). All financial variables are in 1996 US dollars at purchasing power parity. Probability values, reported in parentheses, are based on heteroscedasticity-consistent standard errors.

Panel A Stability based on List I maximally inclusive top ten lists of leading businesses including financial, foreign-controlled, and sometime state-controlled firms

	Per capita GDP growth, $\Delta\ln(y)$						Productivity growth, ΔTFP						Capital accumulation, $\Delta\ln(k)$					
Stability, value-weighted	-0.204	-0.260	-0.222	-0.196	-0.212	-0.223	-0.141	-0.172	-0.154	-0.131	-0.148	-0.146	-0.211	-0.294	-0.226	-0.218	-0.213	-0.260
	(0.05)	(0.01)	(0.03)	(0.05)	(0.04)	(0.05)	(0.03)	(0.01)	(0.02)	(0.04)	(0.02)	(0.03)	(0.26)	(0.12)	(0.16)	(0.18)	(0.19)	(0.20)
Common law	0.027					0.068	0.019					0.043	0.024					0.085
	(0.60)					(0.32)	(0.56)					(0.39)	(0.78)					(0.46)
Red tape		0.030				0.066		0.014				0.039		0.053				0.092
		(0.21)				(0.05)		(0.36)				(0.17)		(0.16)				(0.01)
Govern-ment size			0.000			-0.002			0.000			-0.001			-0.002			-0.003
			(0.96)			(0.60)			(0.83)			(0.84)			(0.74)			(0.40)
Banking develop-ment				0.001		-0.002				-0.001		-0.001				-0.001		-0.001
				(0.18)		(0.20)				(0.10)		(0.13)				(0.74)		(0.71)
Trade openness					0.001	0.000					0.000	0.000					0.001	0.001
					(0.01)	(0.30)					(0.09)	(0.54)					(0.00)	(0.15)
Adjusted R^2	0.180	0.192	0.165	0.179	0.328	0.331	0.188	0.178	0.275	0.201	0.350	0.337	0.087	0.126	0.084	0.083	0.130	0.111

	Per capita GDP growth, $\Delta\ln(y)$						Productivity growth, ΔTFP						Capital accumulation, $\Delta\ln(k)$					
Stability, equal-weighted	-0.238	-0.266	-0.256	-0.203	-0.216	-0.190	-0.194	-0.210	-0.209	-0.162	-0.185	-0.159	-0.146	-0.188	-0.154	-0.138	-0.104	-0.103
	(0.07)	(0.04)	(0.06)	(0.13)	(0.11)	(0.18)	(.003)	(0.02)	(0.02)	(0.07)	(0.05)	(0.09)	(0.54)	(0.43)	(0.52)	(0.56)	(0.66)	(0.69)
Common law	0.041					0.082	0.028					0.051	0.043					0.101
	(0.038)					(0.22)	(0.37)					(0.29)	(0.58)					(0.35)
Red tape		0.017				0.058		0.007				0.034		0.035				0.080
		(0.43)				(0.07)		(0.66)				(0.22)		(0.25)				(0.02)
Govern-ment size			0.001			-0.001			0.000 1			0.000			-0.001			-0.003
			(0.78)			(0.71)			(0.58)			(0.94)			(0.80)			(0.44)
Banking develop-ment				-0.001		-0.001				-0.001		-0.001				-0.001		-0.001
				(0.23)		(0.25)				(0.15)		(0.18)				(0.70)		(0.67)
Trade openness					0.001	0.000					0.000	0.000					0.001	0.001
					(0.03)	(0.46)					(0.19)	(0.73)					(0.00)	(0.18)
Adjusted R^2	0.173	0.145	0.144	0.146	0.278	0.262	0.212	0.174	0.192	0.195	0.327	0.304	0.054	0.061	0.042	0.042	0.085	0.044

Panel B Stability based on List V minimally inclusive top ten lists including only private sector nonfinancial domestically controlled businesses.

	Per capita GDP growth, $\Delta\ln(y)$						Productivity growth, ΔTFP						Capital accumulation, $\Delta\ln(k)$					
Stability, value-weighted	-0.201 (0.03)	-0.198 (0.05)	-0.216 (0.04)	-0.186 (0.05)	-0.163 (0.07)	-0.174 (0.07)	-0.134 (0.03)	-0.133 (0.05)	-0.148 (0.04)	-0.121 (0.05)	-0.113 (0.05)	-0.123 (0.06)	-0.223 (0.12)	-0.218 (0.15)	-0.225 (0.16)	-0.215 (0.15)	-0.167 (0.27)	-0.167 (0.28)
Common law	0.051 (0.26)					0.088 (0.19)	0.036 (0.24)					0.056 (0.25)	0.049 (0.50)					0.107 (0.31)
Red tape		0.008 (0.70)				0.055 (0.10)		-0.001 (0.97)				0.031 (0.26)		0.028 (0.30)				0.079 (0.03)
Govern-ment size			0.002 (0.37)			-0.000 (0.99)			0.002 (0.37)			0.000 (0.87)			0.001 (0.92)			-0.002 (0.69)
Banking develop-ment				-0.002 (0.10)		-0.002 (0.14)				-0.001 (0.06)		-0.001 (0.10)				-0.001 (0.62)		-0.001 (0.62)
Trade openness					0.001 (0.02)	0.000 (0.69)					0.000 (0.18)	0.000 (0.95)					0.001 (0.01)	0.001 (0.28)
Adjusted R^2	0.223	0.168	0.197	0.195	0.285	0.290	0.254	0.193	0.242	0.242	0.324	0.335	0.079	0.074	0.062	0.062	0.095	0.053

	Per capita GDP growth, $\Delta\ln(y)$						Productivity growth, ΔTFP						Capital accumulation, $\Delta\ln(k)$					
Stability, equal-weighted	-0.353 (0.00)	-0.348 (0.01)	-0.351 (0.01)	-0.321 (0.01)	-0.308 (0.02)	-0.304 (0.01)	-0.252 (0.00)	-0.250 (0.01)	-0.252 (0.01)	-0.224 (0.01)	-0.230 (0.01)	-0.225 (0.01)	-0.336 (0.10)	-0.327 (0.11)	-0.330 (0.12)	-0.324 (0.11)	-0.259 (0.24)	-0.263 (0.20)
Common law	0.052 (0.22)					0.097 (0.13)	0.037 (0.20)					0.063 (0.19)	0.050 (0.47)					0.114 (0.26)
Red tape		0.006 (0.77)				0.054 (0.08)		-0.002 (0.88)				0.031 (0.24)		0.026 (0.32)				0.078 (0.03)
Govern-ment size			0.001 (0.79)			-0.001 (0.68)			0.001 (0.67)			-0.000 (0.90)			-0.001 (0.82)			-0.003 (0.42)
Banking develop-ment				-0.001 (0.20)		-0.001 (0.21)				-0.001 (0.10)		-0.001 (0.13)				-0.000 (0.80)		-0.001 (0.71)
Trade openness					0.0005 (0.10)	0.000 (0.91)					.0000 (0.40)	-0.000 (0.84)					0.001 (0.03)	0.000 (0.40)
Adjusted R^2	0.324	0.266	0.274	0.277	0.352	0.351	0.377	0.315	0.333	0.338	0.407	0.404	0.097	0.091	0.080	0.080	0.106	0.069

Table 6 High and low income countries. Ordinary least squares regressions of growth on stability and controls. Growth is 1990 to 2000 per capita gross domestic product (GDP) growth, Δln(y), total factor productivity growth, ΔTFP, or per capita capital accumulation, Δln(k). ΔTFP is Δln(y) – 0.3Δln(k). Stability indexes, Ω, measure the proportion of 1975 top ten firms still in the top ten in 1996 or growing no slower than GDP from 1975 to 1996. Control variables are the log of 1990 per capita GDP, ln(y), log of 1990 capital assets per capita, ln(k), and log average years of education for adults, ln(h). All financial variables are in 1996 US dollars at purchasing power parity. Only coefficient estimates on corporate stability are shown. List I covers all available firms; List II is List I less financial firms; List III is List I less financial and foreign-controlled firms; List IV is List I excluding financial and state-controlled firms; List V is List I excluding financial, foreign-controlled and state-controlled firms. Numbers in parentheses are probability levels for rejecting the null hypothesis of zero coefficients. Probability values are based on heteroscedasticity-consistent standard errors. In Panel A, sample includes 22 high-income countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Singapore, Spain, Sweden, Switzerland, United Kingdom, and United States. In Panel B, sample includes 22 low-income countries: Argentina, Bolivia, Brazil, Chile, Colombia, Greece, India, Indonesia, South Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Portugal, South Africa, Sri Lanka, Taiwan, Thailand, Turkey, Uruguay, and Venezuela.

Panel A Coefficients on stability indexes in high-income countries

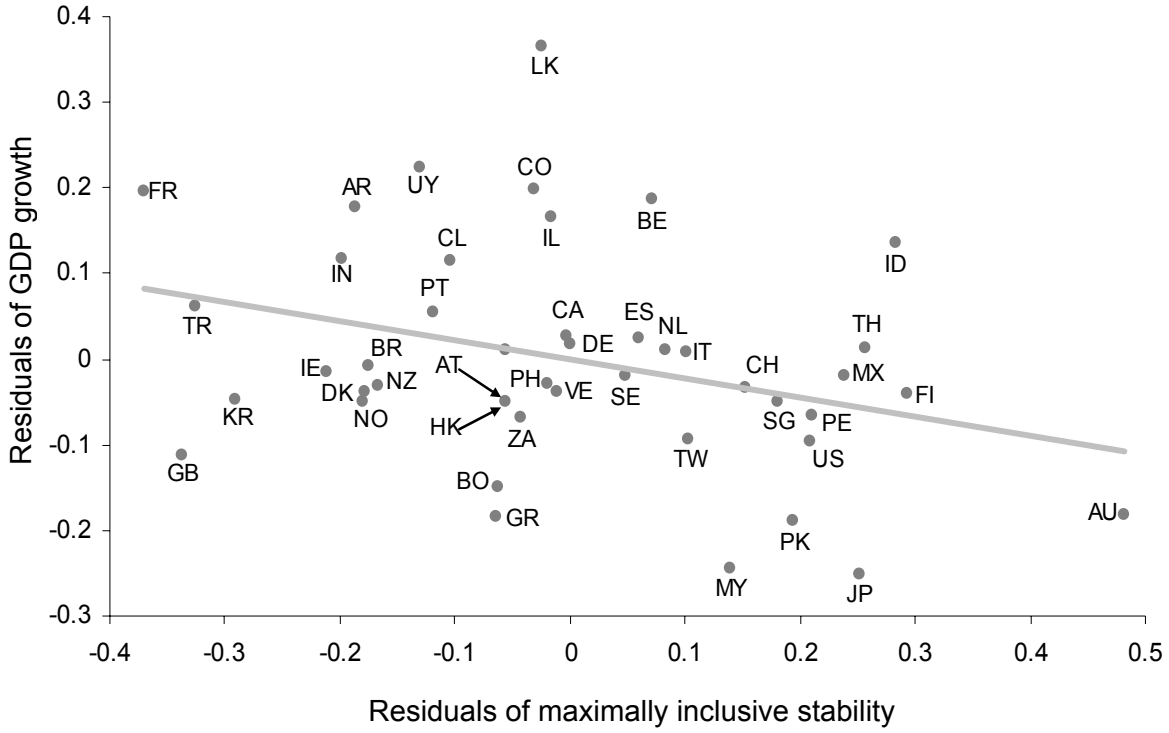
			$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Stability indexes based on lists of top ten firms			Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
I	Maximally inclusive	Ω_{L75}^{GDP}	-0.088	(0.47)	-0.073	(0.48)	-0.049	(0.70)
		Ω_{E}^{GDP}	-0.107	(0.43)	-0.108	(0.39)	0.003	(0.99)
II	No financial firms	Ω_{L75}^{GDP}	-0.084	(0.48)	-0.062	(0.53)	-0.075	(0.52)
		Ω_{E}^{GDP}	-0.093	(0.47)	-0.071	(0.54)	-0.072	(0.63)
III	No financial or foreign-controlled firms	Ω_{L75}^{GDP}	-0.127	(0.37)	-0.095	(0.41)	-0.106	(0.46)
		Ω_{E}^{GDP}	-0.162	(0.22)	-0.127	(0.32)	-0.116	(0.53)
IV	No financial or state-controlled firms	Ω_{L75}^{GDP}	-0.192	(0.07)	-0.154	(0.11)	-0.127	(0.22)
		Ω_{E}^{GDP}	-0.229	(0.07)	-0.199	(0.08)	-0.102	(0.35)
V	No financial, state-controlled, or foreign-controlled firms	Ω_{L75}^{GDP}	-0.207	(0.05)	-0.163	(0.08)	-0.146	(0.16)
		Ω_{E}^{GDP}	-0.305	(0.02)	-0.261	(0.03)	-0.149	(0.25)

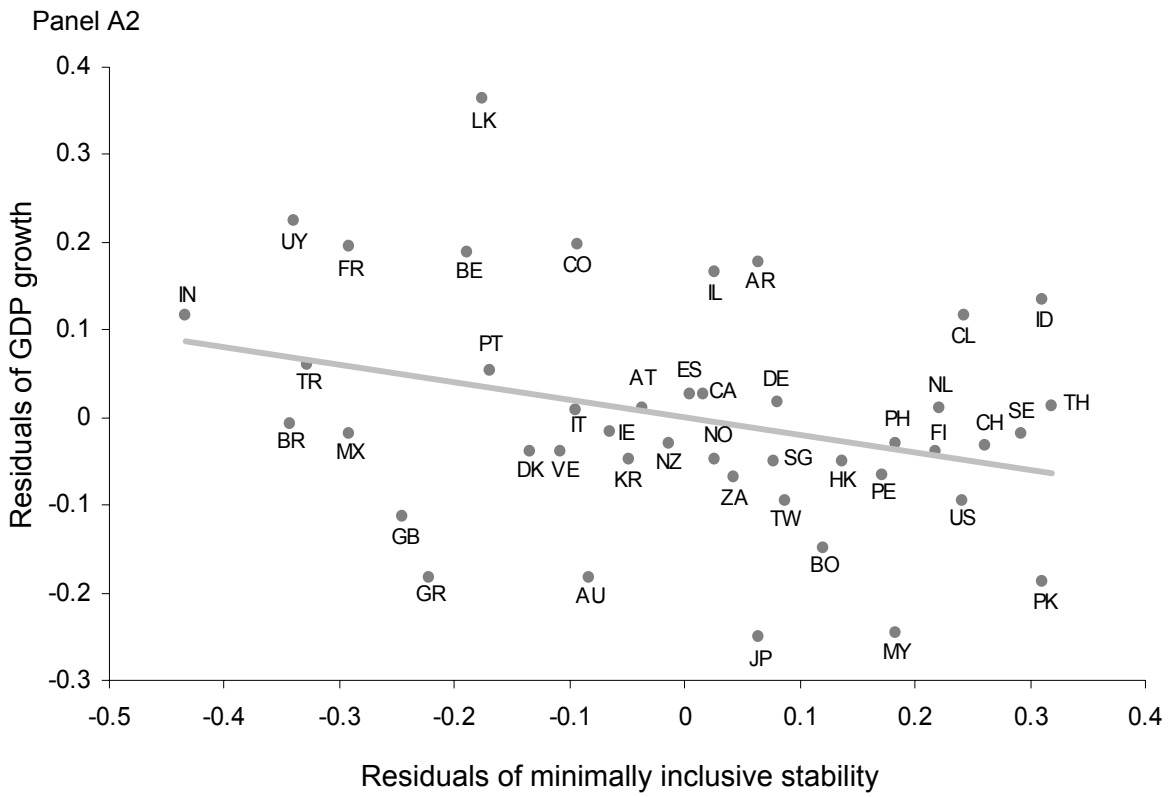
Panel B Coefficients on stability indexes in low-income countries

			$\Delta\ln(y)$		ΔTFP		$\Delta\ln(k)$	
Stability indexes based on lists of top ten firms			Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
I	Maximally inclusive	Ω_{L75}^{GDP}	-0.306	(0.04)	-0.197	(0.03)	-0.364	(0.21)
		Ω_{E}^{GDP}	-0.245	(0.35)	-0.186	(0.20)	-0.196	(0.73)
II	No financial firms	Ω_{L75}^{GDP}	-0.393	(0.00)	-0.238	(0.01)	-0.516	(0.02)
		Ω_{E}^{GDP}	-0.301	(0.32)	-0.210	(0.23)	-0.304	(0.65)
III	No financial or foreign-controlled firms	Ω_{L75}^{GDP}	-0.361	(0.01)	-0.214	(0.01)	-0.490	(0.05)
		Ω_{E}^{GDP}	-0.396	(0.04)	-0.245	(0.04)	-0.503	(0.31)
IV	No financial or state-controlled firms	Ω_{L75}^{GDP}	-0.028	(0.90)	0.002	(0.99)	-0.099	(0.83)
		Ω_{E}^{GDP}	-0.197	(0.54)	-0.129	(0.37)	-0.226	(0.75)
V	No financial, state-controlled, or foreign-controlled firms	Ω_{L75}^{GDP}	-0.050	(0.81)	0.007	(0.95)	-0.191	(0.63)
		Ω_{E}^{GDP}	-0.199	(0.45)	-0.091	(0.47)	-0.358	(0.50)

Figure 1 Growth versus big business stability. Residuals of economic growth and big business stability, after regressing each on logs of 1990 real per capita gross domestic product (GDP), real per capita capital stock, and education, are on the vertical and horizontal axes respectively. Maximally and minimally inclusive mean all available firms and domestically controlled nonfinancial big firms with no episode of state control, respectively. Countries are: Argentina (AR), Australia (AU), Austria (AT), Belgium (BE), Bolivia (BO), Brazil (BR), Canada (CA), Chile (CL), Colombia (CO), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Hong Kong (HK), India (IN), Indonesia (ID), Ireland (IE), Israel (IL), Italy (IT), Japan (JP), Malaysia (MY), Mexico (MX), Netherlands (NL), New Zealand (NZ), Norway (NO), Pakistan (PK), Peru (PE), Philippines (PH), Portugal (PT), Singapore (SG), South Africa (ZA), South Korea (KR), Spain (ES), Sri Lanka (LK), Sweden (SE), Switzerland (CH), Taiwan (TW), Thailand (TH), Turkey (TR), United Kingdom (GB), United States (US), Uruguay (UY), and Venezuela (VE).

Panel A1




Panel A2
Residuals of GDP growth
Residuals of minimally inclusive stability
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.5
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
LK
UY
FR
BE
CO
IL
AR
IN
ID
CL
PT
TR
AT
ES
CA
DE
NL
TH
SE
CH
PH
FI
IT
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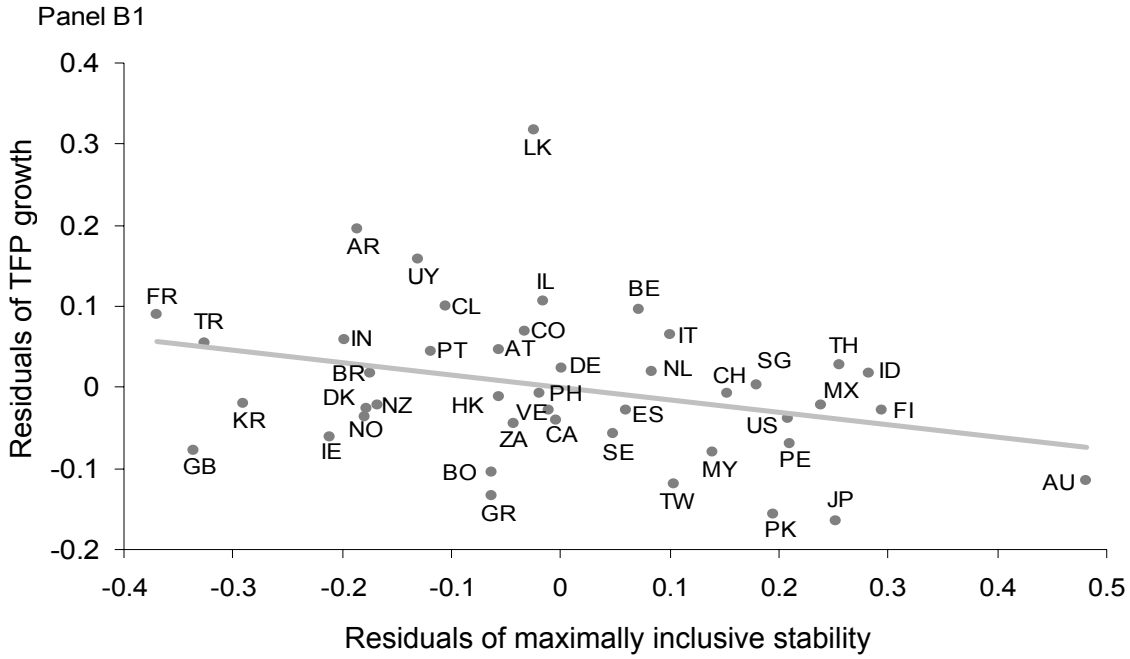
Panel B1
Residuals of TFP growth
Residuals of maximally inclusive stability
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
LK
AR
UY
IL
BE
FR
TR
CL
CO
IT
IN
PT
AT
TH
SG
DE
NL
CH
ID
BR
MX
DK
NZ
HK
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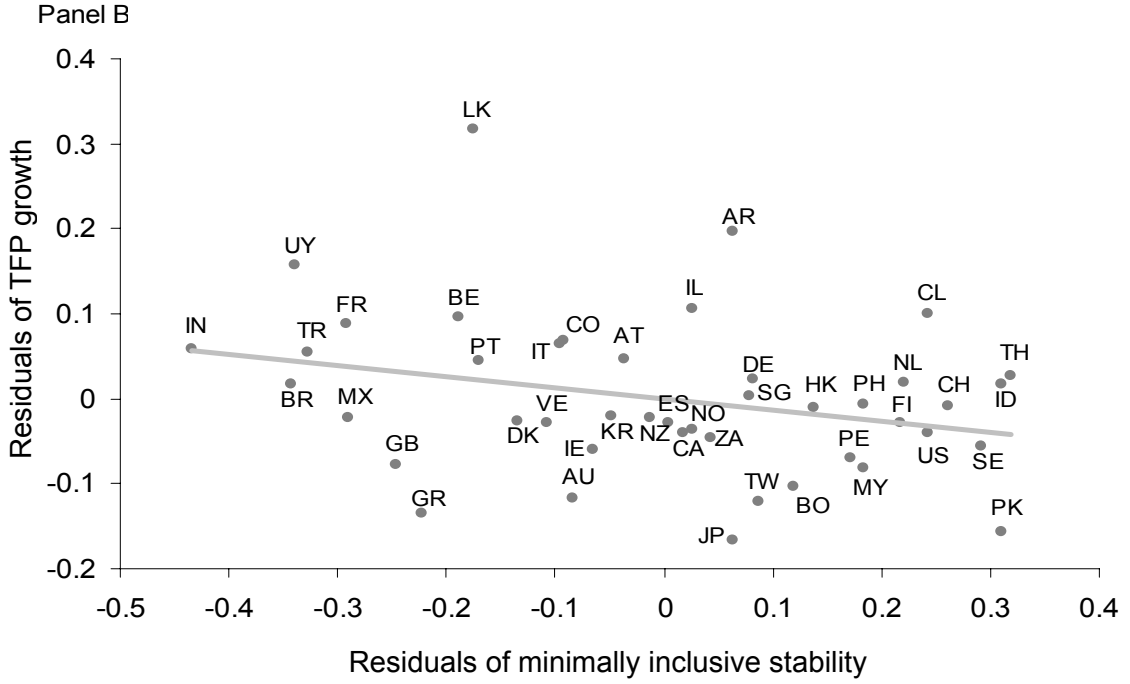
PK


Panel B
Residuals of TFP growth
Residuals of minimally inclusive stability
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.5
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
LK
AR
UY
IL
CL
BE
FR
IN
TR
CO
AT
PT
IT
TH
DE
NL
SG
HK
PH
CH
ID
BR
MX
VE
ES
NO
FI
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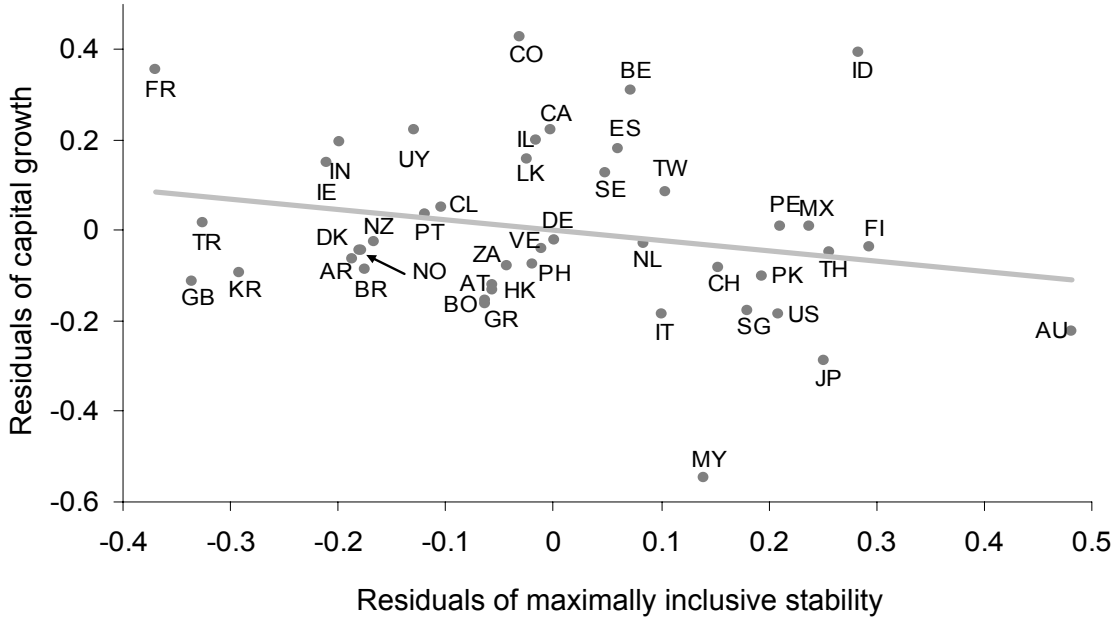
IE
AU
TW
MY
BO
GR
PK
JP

Panel C1



Panel C2

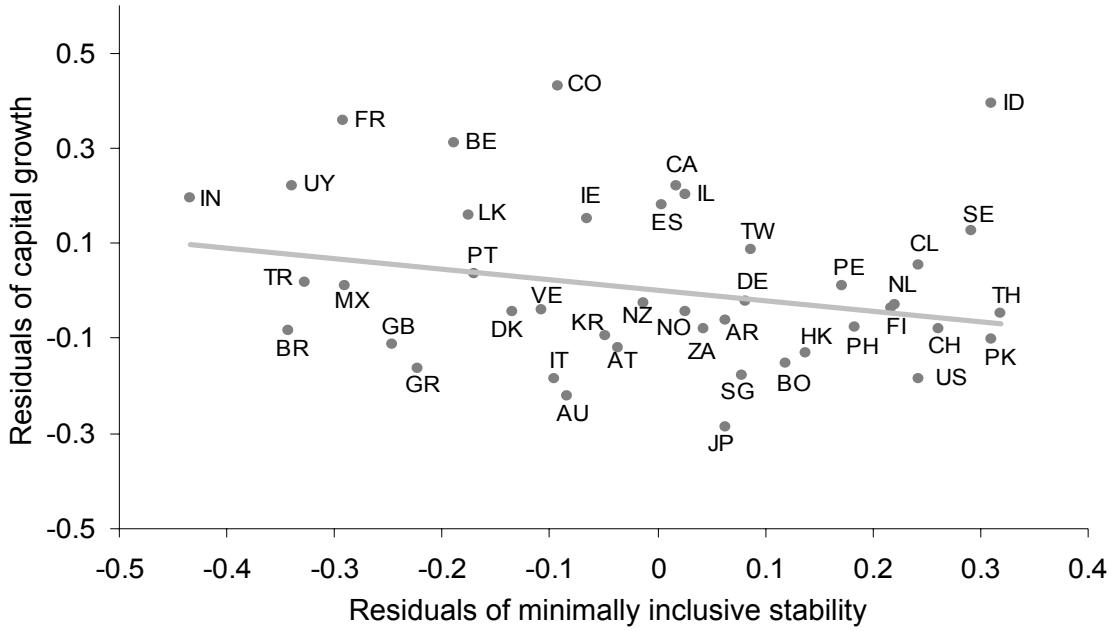


Figure 2 Growth versus big business stability in high-income countries. Residuals of economic growth and big business stability, after regressing each on logs of 1990 real per capita gross domestic product (GDP), real per capita capital stock, and education, are on the vertical and horizontal axes, respectively. Maximally and minimally inclusive mean all available firms and domestically controlled nonfinancial big firms with no episode of state control, respectively. High-income countries are: Austria (AT), Australia (AU), Belgium (BE), Canada (CA), Switzerland (CH), Germany (DE), Denmark (DK), Spain (ES), Finland (FI), France (FR), United Kingdom (GB), Hong Kong (HK), Ireland (IE), Israel (IL), Italy (IT), Japan (JP), Netherlands (NL), Norway (NO), New Zealand (NZ), Sweden (SE), Singapore (SG), and the United States (US).

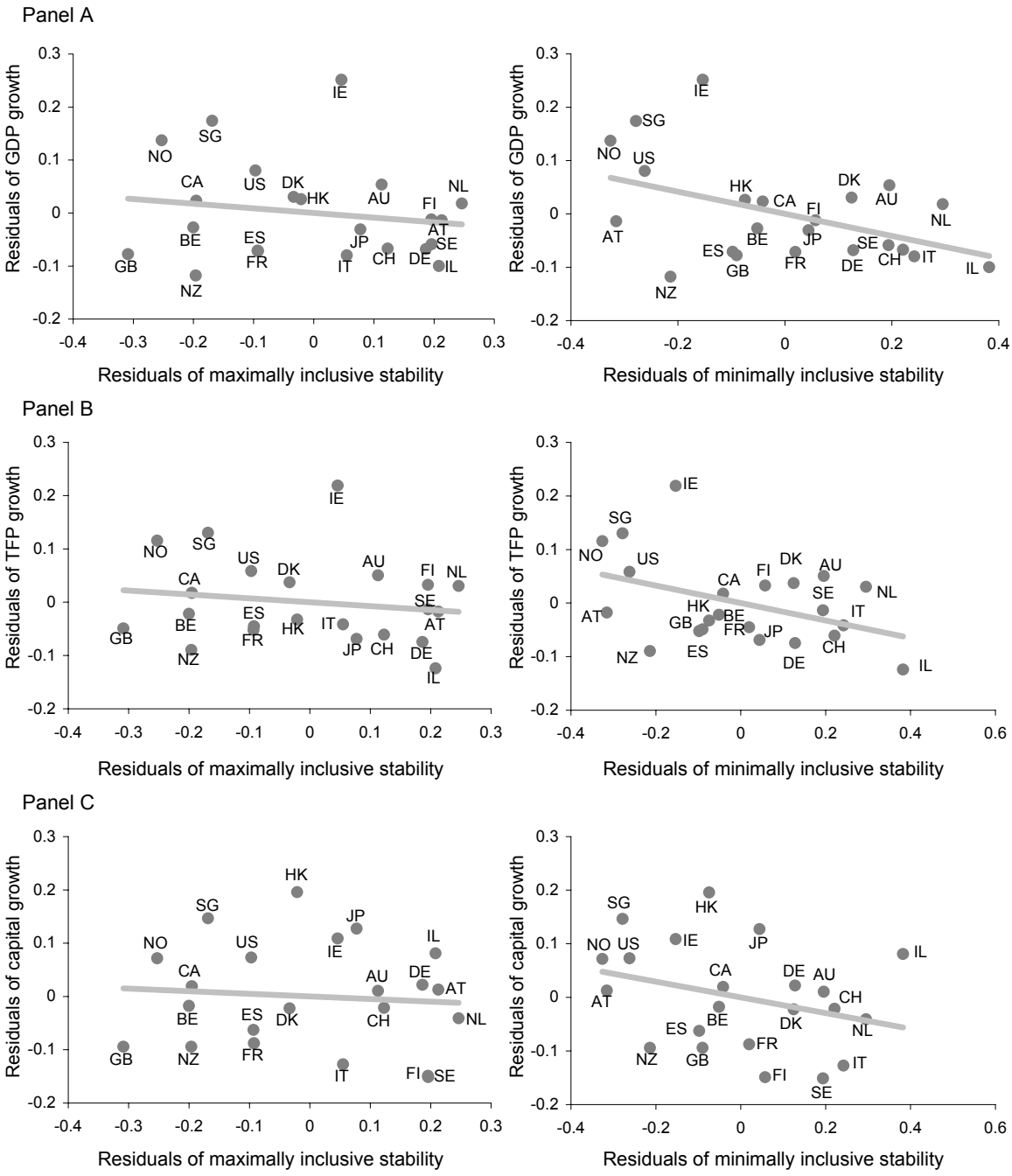


Figure 3 Growth versus big business stability in low-income countries. Residuals of economic growth and big business stability, after regressing each on logs of 1990 real per capita GDP, real per capita capital stock, and education, are on the vertical and horizontal axes respectively. Maximally and minimally inclusive mean all available firms and domestically controlled nonfinancial big firms with no episode of state control, respectively. Low-income countries are: Argentina (AR), Bolivia (BO), Brazil (BR), Chile (CL), Colombia (CO), Greece (GR), Indonesia (ID), India (IN), South Korea (KR), Sri Lanka (LK), Mexico (MX), Malaysia (MY), Peru (PE), Philippines (PH), Pakistan (PK), Portugal (PT), South Africa (ZA), Thailand (TH), Turkey (TR), Taiwan (TW), Uruguay (UY), and Venezuela (VE).