

The Winner's Curse

By Rob Arnott, Lillian Wu

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Much ink has been spilled on the perils of allowing some companies to become "too big to fail." This sentiment assumes that governments, hence taxpayers, must foot the bill when these top dogs become seriously ill, while reinforcing a view that the top dogs, whose failure might do systemic damage, should be heavily regulated to mitigate the damage that they might cause. The flip side of this view receives scant attention: Companies can become "too big to succeed."

Indeed, the "too big to fail" ethos may create head winds for these self-same companies that can impede their continuing success. When you are No. 1, you have a bright bull's-eye painted on your back. Governments and pundits are gunning for you, as are competitors and resentful customers. In a world that generally roots for the underdog, hardly anyone outside of your own enterprise is cheering for you to rise from world-beating success to still-loftier success.

For investors, top dog status—the No. 1 company, by market capitalization, in each sector or market—is dismayingly unattractive. We find a statistically significant tendency for top companies in each sector to underperform both the overall sector and the stock market as a whole. In an earlier U.S.-only study, we found that 59 percent of these top dogs underperformed their own sector in the next year, and two-thirds lagged their sector over the next decade. We found a daunting magnitude of average underperformance, averaging between 300 and 400 bps per year, over the next one to 10 years.

In this study, we have broadened the test to examine whether the "top dog" phenomenon is prevalent elsewhere. We find the same phenomenon in each and every market, with no exceptions. Indeed, outside the United States, the sector top dogs generally underperform their own sector even more relentlessly than in the United States!

It would appear that our top dogs, the most beloved and winningest companies in each sector or country, are typically punished—often severely—in subsequent market action.

Bubble, Bubble, Toil And Trouble

During the global financial crisis, several bellwether institutions found themselves facing insolvency. Government agencies, worried that these companies were "too big to fail," creating systemic risk for the market at large, reached for the elixir of public money to bail out these institutions, while reinforcing a view that stricter federal oversight is necessary to prevent the negative externalities created by large companies.

In the meantime, the widespread criticism over the "too big to fail" policy inevitably invites an exploration of the other side of the coin: the question of whether or not companies can become "too big to succeed."

Running a large business is not easy. As companies increase fixed costs, they often sacrifice the flexibility to respond nimbly to unforeseen challenges; they have more internal and external distractions; internal rivalries can derail growth; they can become the prey of smaller competitors, who are constantly innovating, in an attempt to slice vulnerable niche opportunities out of the top dogs' market share. The innovations that can loft a smaller competitor to new heights will barely move the needle for their top dog rivals.

Recent research confirms that larger companies typically exhibit a lower growth rate and earn a lower return on capital (e.g., Milano 2011) than smaller

companies. Therefore, in practice, what economists refer to as "dis-economies of scale" can be a dominating effect as large companies grow: As a behemoth company grows to dominate its sector in terms of production efficiency and scale, its rosy performance may become a thing of the past.

Being large puts the company under the scrutinizing lights of regulators. Arnott (2005, 2010) points out a potential connection between sector leaders' misfortunes and the increase in government regulation. In a world of intense regulation, the relentless success of the top companies makes them ever bigger targets for regulatory scrutiny.

Was Goldman Sachs targeted with civil and criminal fraud charges in 2009-2010 because it has criminal intent to defraud its clients, while its competition is pure as the driven snow? Or has Goldman become a symbol of success-to-excess, to an extent that prompts populists and pundits to want it to suffer?

Is Exxon Mobil regularly pilloried in Washington because its business practices are monopolistic, its profit margins obscene and its product viewed as polluting and distasteful (never mind that we all buy it)? Or is it because the company's relentless business success makes it a popular target?

Of course, none of this is new.

Initially, Bank of America management thought it would be lauded by the political elite for buying (and saving!) Merrill Lynch when Lehman imploded. Instead, it found itself on the proverbial horns of a dilemma when Merrill disclosed an extra \$20 billion of losses before the deal closed. Bank of America could have cancelled the deal by invoking the material adverse conditions (MAC) clause, or it could have proceeded and sought additional sources of capital. Threats were reportedly made, and Bank of America ultimately chose to proceed. Instead of being lauded for stepping up, it was pilloried for needing an infusion of capital, *which it repaid*, the CEO was driven out and the company was then sued for not cancelling the deal.

How much of this controversy was linked to the specific events surrounding the acquisition of Merrill, and how much was because Bank of America, by most measures, was the largest bank in the United States? How many of Citi's "moments in the spotlight" have been due to the fact that it was Bank of America's predecessor in the No. 1 spot?

We'll never know the answers to these questions, but the pattern is familiar. Microsoft's opportunity in the spotlight came a decade ago, when it was attacked on the grounds of "monopolistic" business practices, in a repeat of similar earlier battles for IBM in the prior decade. In the 1980s, AT&T was successfully dismantled on the same basis. This script is now being revived for Google, No. 1 among search engines.

Throughout this article, we're focusing on market capitalization as our measure of company size.¹ The very business practices that propel an organization to No. 1 in market cap—aggressiveness, focus, canny outmaneuvering of the competition—become unacceptable if you're wearing the yellow jersey.² Being No. 1 means always having to say you're sorry!

Being large also pushes the company into the headlines, "rewarding" the company with the highest coverage rate in mainstream media. Fang and Peress (2009) find that the coverage rate for NYSE stocks (mainly large stocks) is three to four times larger than for Nasdaq stocks. Too much media exposure is not always a blessing: *That same study concludes that stocks with no media coverage earn higher returns than those with high media coverage.*

Moreover, given that their top dog status is partly due to share price, a high price is often needed to get to the vaunted No. 1 rank by market cap. The largest market-cap companies are empirically likely to trade at higher multiples and higher prices. Existing literature documents various stock characteristics that empirically presage underperformance. For example, Basu (1977) studies the returns on the common stock of NYSE-listed firms, and suggests that high earnings-to-price (E/P) firms—or low price-to-earnings

(P/E) firms—have earned, on average, higher risk-adjusted returns than low E/P firms—or high P/E firms. Banz (1981) shows that stocks of small firms (measured by market cap) earned higher average returns than large-cap stocks. Further research, Basu (1983), concludes that small firms tend to have higher returns even after controlling for E/P. Fama and French (1992) argue that the superior returns of value strategies compensate for the higher fundamental risks these strategies are bearing.

An alternative behavioral explanation for the price-to-earnings ratio (P/E) anomaly, documented in Dreman (1977) and supported more recently in the "clairvoyant value" work by Arnott, Li and Sherrerd (2009a and 2009b), is that the mispricing of securities can be caused by a mismatch between market expectations and realized company performance. Specifically, market participants systematically overestimate the future earnings or growth of the low E/P firms, and systematically underestimate the future performance of the high E/P firms. This hypothesis is further supported by Lakonishok, Shleifer, and Vishny (1994), who show that naïve investors extrapolate firms' past performance into the future; these investors are often surprised when some out-of-favor (value) firms recover, and the stocks of these firms experience high returns.

Companies with high market cap are often "glamour" stocks, carrying high prices and valuation multiples, reflecting consensus expectations for lofty growth, low risk or both. As a company grows in size, its products become more visible and, therefore, subject to a larger pool of investors' judgments. Investors often tend to project their likes or dislikes about a company's products onto its stock. Apple successfully creates a near-cult following for its products; Apple fans are willing to stand in long lines overnight to get the newest product on the release date. Speculators seem to approach Apple's stock with the same zeal—they are eager to buy Apple stock regardless of how expensive the stock is relative to its underlying fundamentals.

Furthermore, many investors seem to ignore the fact that the forces that drove these companies to dominate their competitive landscape do not guarantee

sustained growth in the future, or a sustained position at the top. Said another way, these investors do not appear to expect mean reversion in their growth forecasts; they form biased expectations based on extrapolating past successes that are often not predictive of the future. While it is easy (in theory, at least!) to double market share when a company holds 1 percent or 2 percent of the market, it is impossible to double market share once the company has a 51 percent market share.³

Investors tend to ignore these simple facts and mistakenly price glamour stocks as if they were nimble enterprises whose past growth need never slow. The market becomes aware of such pricing errors only gradually, as the company fails to meet the unrealistic growth expectations imposed upon it. In short, size itself is becoming less of an advantage and more of a curse.

The organization with the No. 1 rank in market cap will often be a truly great company, but empirically is not necessarily a good investment. Therefore, investors should anticipate the underperformance of large companies relative to the overall market.

Too Big To Succeed?

In a short white paper and an earlier FAJ Editor's Corner, one of us (Arnott, 2005 and 2010) examined the performance of top companies (by market cap) in the U.S. market. The study shows that, on average, the sector leader underperforms the average stock (equally weighted⁴) in its own sector over the subsequent 1-, 3-, 5- and 10-year time horizons.

An updated version of that research is shown in Figure 1. The results are impressive.

Figure 1

Relative Performance For The Top Dogs, US Markets By Sector, 1952-2011									
Sectors	NO. OF TOP DOGS	PANEL A. RELATIVE RETURN VS SECTOR				PANEL B. FREQUENCY OF WINS VS SECTOR			
		1 Yr	3 Yr	5 Yr	10 Yr	1 Yr	3 Yr	5 Yr	10 Yr
Average, All Sectors	5.8	-4.2%	-4.5%	-4.1%	-3.7%	42%	36%	33%	28%
Standard Dev		2.9%	3.3%	2.7%	2.1%	6.6%	8.9%	10.9%	14.2%
Adj. t-Statistic		-5.02	-4.73	-5.22	-6.16	-4.28	-4.68	-4.28	-4.05
Nondurables	6	-1.1%	-1.7%	-1.6%	-2.7%	42%	45%	50%	33%
Durables	6	-6.8%	-7.7%	-6.7%	-6.1%	42%	31%	23%	14%
Manufacturing	7	-4.7%	-4.5%	-3.8%	-4.4%	45%	36%	38%	27%
Energy	1	0.2%	0.1%	0.2%	0.3%	52%	53%	52%	49%
Chemicals	3	-3.2%	-2.3%	-2.3%	-2.7%	53%	41%	38%	33%
Bus Equip	4	-4.2%	-3.8%	-3.9%	-3.7%	47%	36%	36%	31%
Telecom	4	-7.4%	-9.0%	-6.9%	-6.6%	35%	26%	23%	12%
Utilities (1953-2011)	8	-5.0%	-4.5%	-3.8%	-3.9%	32%	28%	20%	16%
Shops	2	-1.4%	-1.5%	-2.2%	-2.0%	43%	43%	38%	45%
Health Care	6	-3.6%	-3.4%	-3.1%	-1.5%	43%	31%	32%	49%
Finance	10	-3.0%	-4.3%	-6.0%	-5.3%	37%	33%	32%	22%
Other	13	-10.2%	-11.2%	-9.7%	-6.1%	35%	22%	18%	10%
US Nat'l Top Dog	7	-7.5%	-6.4%	-6.7%	-5.4%	40%	33%	23%	14%

Source: Research Affiliates
 Note: We use SIC codes to define the 12 sectors. These definitions may vary from the GICS definitions.

Do the added obstacles faced by winners hurt their investors? Yes. In fact, we find the leader in any sector underperforms the rest of its sector (equally weighted) by 4 percent in the next year ... and the next year ... and the next year. As Figure 1 shows, the damage doesn't really slow down for at least a decade, as the sector top dog lags its own sector by 3.7 percent *per year* for the next decade! Put another way, with compounding, the top stock in each of the 12 U.S. market sectors declined over 30 percent in value in 10 years, relative to the competition in its respective sector, over the past 60 years. Adjusting for overlapping samples, we find *t*-statistics ranging from 4.7 to 6.2, all highly significant.

These shortfalls are large and statistically significant. But were these results dominated by a few large outliers? For example, how *consistently* did these sector top dogs fall short relative to the average stock in their own sectors? On a one-year basis, only 42 percent of the sector top dogs were able to beat the average for their respective sector competitors. This anemic win rate keeps tumbling with time. On a 10-year basis, fewer than three of 10 were winners. For the one-year result, we have 719 samples (60 years of data for 11 sectors,

and 59 years for utilities), for which the top dog won in only 303 cases and lost in 416 cases. That's a pretty lopsided coin toss. On a 10-year basis, we have 611 samples; the sector top dog won in 174 cases, and lost in 437 cases.⁵

Our research also shows that sector top dog status changes frequently. In most sectors, the top dog is replaced several times over the 60-year time span. The average sector has seen six top dogs over that span, while the "other" sector (stocks that don't neatly fall into one of the other 11 sectors) has had a remarkable 13 different top dogs. With 13 different top dogs claiming and losing the No. 1 spot in the "other" sector, it's no wonder that the 1-, 3-, 5- and 10-year shortfall for these top dogs is nearly always worst on the list.

The title of "big loser" among the sectors has four contenders: telecom, with the demise of the Ma Bell monopoly; "other," which we just discussed; durables, with their existential crises in the early 1980s and during the recent financial crisis; and finance, with rolling crises toppling one top dog after another. For these sectors, the top dog lags the average competitor in its sector, over a subsequent *10-year* holding period by an *annual* average of 6.6, 6.1, 6.1 and 5.3 percent, respectively!

The "big winner" among sectors? Energy. Exxon Mobil (and its predecessors, Exxon and Standard Oil of New Jersey), never lost its top dog status, scoring an average of 0.3 percent outperformance per annum relative to the other energy stocks, over the subsequent decade. How did Exxon Mobil stay on top, when other sectors witnessed a revolving door of top dog contenders? Perhaps it remained a winner because it has always stuck to its core competencies, avoided the combative business practices that got other top dogs in trouble, was content with solid mainstream growth and profit margins, has not risen to the bait when under attack, and kept as low a profile as any top dog possibly could. The firm's persistence at the top was clearly also aided by the 1999 merger of Exxon and Mobil, which combined the Nos. 1 and 2 companies in that sector.

The national top dog in the United States, beginning with American

Telephone and Telegraph Company (AT&T) in 1952 and ending with Exxon Mobil in 2011, shows remarkable rotation at the top, with seven national top dogs in 60 years.⁶ Given the heavy rotation at the top, it's unsurprising that the shortfalls are bigger than for the sector top dogs. The average 10-year shortfall for the U.S. national top dog, measured against the other 999 stocks in the U.S. 1000 portfolio, is 5.4 percent, compounded annually. There were only seven times out of 51—14 percent of the time, in other words—in which the national top dog beat the subsequent 10-year performance of our portfolio of the remaining 999 U.S. stocks.

Other Countries Punish Their Top Dogs, Too

In this paper, we extend the top dog research to include the G-8 markets: Australia, Canada, France, Germany, Italy, Japan, the United Kingdom and (of course) the United States.⁷ With eight countries and 12 sectors, we now have 96 sector top dogs—the companies with the largest market capitalization, in each sector, for each country—every single year. It would be a painful overkill to scrutinize all of these, for each of the 30 years in our study. Accordingly, we create aggregates, first looking at the average spanning all 12 sectors for each country, then looking at the average across all eight countries for each sector. Viewed either way, the top dog performance shortfall in global markets is both larger and more reliable than it is in the United States.

As shown in Figure 2a, the 10-year average shortfall, spanning the 12 sector top dogs for each of eight countries over the 30-year sample period, ranges from just over 2 percent per year in Germany to an astonishing 11.5 percent in Canada. On a 10-year basis, sector top dogs underperform their equal-weighted sectors by a whopping 5.1 percent per year, on average, across 12 sectors and eight countries. The odds of sector top dogs outperforming their sector, over a subsequent 10-year span, are not promising—ranging from 45 percent in Germany to a horrific 19 percent in Canada. In all G-8 countries, over all four time spans—with no exceptions—the average sector top dog underperformed the competition in its sector, from 1982 to 2011. This is not to

say that this performance shortfall occurs in every starting year, or in every sector for all countries. But on average over time, these results are rather overwhelming, with all eight *t*-statistics comfortably significant.

An alternative way to look at this is to average across all eight countries for each of the 12 sectors. Figure 2b shows the same average results as Figure 2a, of course. As we observed in the United States, in most sectors and in most countries, the top company changes with some regularity. The average sector, in the average G-8 country, has seen anywhere between two and six top dogs, over the 30-year span. "Business equipment" has seen an average of nearly six different top dogs in each of the G-8 countries; this may go a long way toward explaining why the top dogs in "business equipment" have the most wretched results, lagging their intra-country competitors by an average of 12 percent per year over the subsequent decade. As in the U.S., energy top dogs fare best in the G-8, but this means they only hurt their investors by a bit less than 2 percent per year over the subsequent decade.

Figure 2a

Relative Performance For The Sector Top Dogs—Selected Global Markets, Average Of 12 Sectors, By Country, 1982-2011								
Sectors	PANEL A. RELATIVE RETURN BY COUNTRY, AVG, ALL SECTORS				PANEL B. FREQUENCY OF WIN BY COUNTRY, AVG, ALL SECTORS			
	1 Yr	3 Yr	5 Yr	10 Yr	1 Yr	3 Yr	5 Yr	10 Yr
Average, 8 Countries	-5.3%	-5.0%	-4.8%	-5.1%	44%	42%	39%	34%
Standard Dev	7.5%	6.6%	6.4%	7.2%	8.7%	12.3%	14.3%	22.1%
Adj. <i>t</i> -Statistic	-2.44	-2.62	-2.60	-2.45	-2.46	-2.30	-2.66	-2.47
Australia	-4.8%	-4.1%	-4.1%	-5.8%	48%	47%	48%	37%
Canada	-10.6%	-11.1%	-10.9%	-11.5%	40%	36%	28%	19%
France	-6.7%	-6.2%	-5.7%	-6.2%	42%	41%	38%	34%
Germany	-2.3%	-2.2%	-2.3%	-2.3%	47%	46%	44%	45%
Italy	-3.0%	-2.7%	-3.6%	-3.8%	48%	45%	43%	36%
Japan	-7.7%	-6.3%	-4.9%	-4.9%	38%	39%	35%	29%
United Kingdom	-3.1%	-3.2%	-3.3%	-3.7%	45%	47%	44%	41%
United States	-3.5%	-4.2%	-3.6%	-2.8%	43%	34%	33%	33%

Source: Research Affiliates

Note: We use SIC codes to define the 12 sectors. These definitions may vary from the GICS definitions.

Figure 2b

Relative Performance For The Sector Top Dogs—Selected Global Markets, Average Of 8 Countries, By Sector, 1982-2011									
Sectors	NO. OF TOP DOGS	PANEL A. RELATIVE RETURN VS SECTOR, AVERAGE ACROSS COUNTRIES				PANEL B. FREQUENCY OF WIN VS SECTOR, AVERAGE ACROSS COUNTRIES			
		1 Yr	3 Yr	5 Yr	10 Yr	1 Yr	3 Yr	5 Yr	10 Yr
Average, All Sectors	3.7	-5.3%	-5.0%	-4.8%	-5.1%	44%	42%	39%	34%
Nondurables	3.9	-3.9%	-2.5%	-1.5%	-1.0%	43%	46%	48%	46%
Durables	3.0	-7.9%	-6.8%	-6.1%	-6.5%	40%	34%	34%	26%
Manufacturing	4.9	-5.8%	-7.3%	-7.2%	-7.3%	39%	36%	28%	21%
Energy	2.1	1.0%	-0.4%	-0.9%	-1.9%	51%	48%	48%	43%
Chemicals	2.5	-2.5%	-3.0%	-3.6%	-4.7%	44%	46%	44%	36%
Bus Equip	5.8	-12.2%	-12.4%	-12.5%	-12.0%	43%	38%	35%	32%
Telecom	3.3	-6.1%	-6.6%	-6.5%	-8.5%	48%	42%	34%	19%
Utilities	3.1	-4.1%	-3.3%	-3.3%	-4.7%	43%	43%	37%	31%
Shops	3.1	-4.6%	-4.1%	-3.8%	-4.2%	45%	42%	41%	36%
Health Care	3.5	-5.5%	-5.5%	-4.8%	-4.7%	43%	40%	40%	39%
Finance	4.1	-4.1%	-3.1%	-3.5%	-2.8%	45%	45%	39%	42%
Other	5.1	-7.0%	-5.2%	-4.2%	-3.1%	41%	42%	41%	36%

Source: Research Affiliates. The individual results, country by country, are available upon request.
 Note: We use SIC codes to define the 12 sectors. These definitions may vary from the GICS definitions.

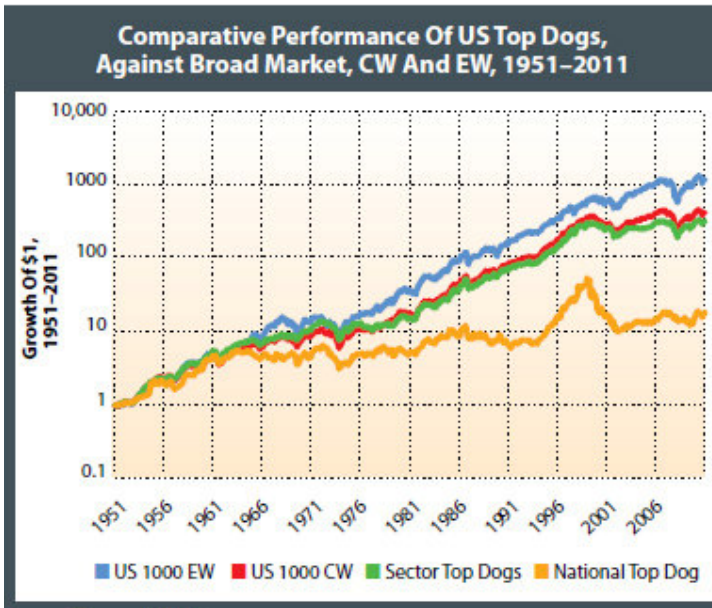
In Arnott (2010), we found an even stronger relationship for the overall top dog, the largest company in the U.S. stock market by market cap. For purposes of this article, we term this stock the "national top dog." In Figure 1, we saw that the average sector top dog in the United States underperformed the average stock in its own sector by over 3 percent per year over the next decade; also, we can see that the U.S. national top dog underperforms the average company in the U.S. stock market by an average of 5 percent per year, over the subsequent decade.

At this writing, the U.S. national top dog is Apple Inc.; however, there were six other companies wearing that crown over the past 60 years. Whether Apple disappoints is anyone's guess. But history is not encouraging; it's currently priced to reflect a consensus expectation that it will be the largest source of profit distributions to its shareholders of any company on the planet.

Figures 3 and 4 show the results of a strategy that concentrates on the top dogs. Here, we first identify the 1,000 U.S. stocks each year with the largest market cap, and the largest in each of the 12 sectors. We then either equal- or cap-weight the largest 1,000 stocks. We then look at the 12 sector top dogs, cap weighted, and the national top dog. These "portfolios" are reconstituted at the start of each year. Equal weighting trumps cap weighting by a hefty

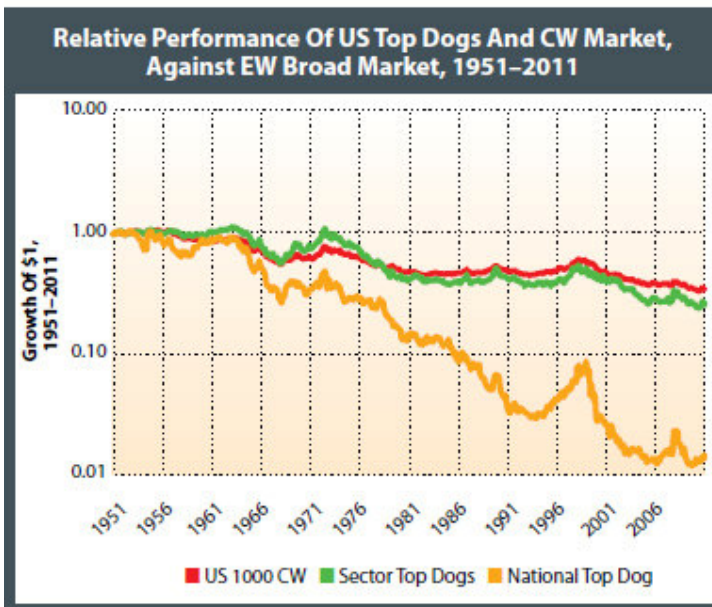
margin, as many others have already documented over the years. But we find that the cap-weighted roster of top dogs not only far underperforms the equal-weighted top 1,000, but even materially underperforms the cap-weighted market.

Figure 3



Source: Research Affiliates

Figure 4



Source: Research Affiliates

While Figure 1 shows the performance of these various portfolios—ignoring trading costs or implementation slippage—from 1951 through 2011, Figure 2 shows the magnitude of wealth that is forfeited by the lesser strategies. Cap weighting leads to just 35 percent of the final wealth of the equal-weight portfolio of the top 1,000 companies (selected by market cap). Holding the 12 sector top dogs, cap weighted, slices that to less than 20 percent of the equal-weight final wealth. And holding the national top dog leaves us with just over a penny of terminal wealth, relative to the investor with the equal-weighted 1,000. Sobering results, indeed.

The national top dog results in Figure 5 are less consistent than the results we observed in Figures 2a and 2b. This is unsurprising. The number shown at the top of each of the columns in Figures 2a and 2b is an average of 96 samples for up to 30 years (for the one-year results, this means nearly 3,000 independent samples). Even the multiyear entries in Figures 2a and 2b represent up to 300 independent samples. But the entries in Figure 5 have only one national top dog in each country for each year; hence, far fewer independent samples. This also means that the results for the *individual* countries offer up to 30 independent samples for the one-year results, and as few as three nonoverlapping independent samples, for the 10-year results, based on anywhere from just two to eight individual companies. So, naturally, the results exhibit much more dispersion and much lower statistical significance.

Figure 5

Relative Performance For The National Top Dog, Largest Market-Cap Company In Each Country ,1982-2011									
Sectors	NO. OF TOP DOGS	PANEL A. RELATIVE RETURN BY COUNTRY				PANEL B. FREQUENCY OF WIN BY COUNTRY			
		1 Yr	5 Yr	5 Yr	10 Yr	1 Yr	5 Yr	5 Yr	10 Yr
Average, 8 Countries		-5.8%	-5.7%	-5.9%	-4.7%	45%	39%	36%	38%
Standard Dev	5.4	5.8%	4.4%	5.1%	6.0%	9.8%	15.2%	18.1%	18.8%
Adj. t-Statistic		-2.85	-3.64	-3.25	-2.22	-1.56	-1.90	-1.94	-1.06
Australia	2	0.6%	-1.2%	-2.1%	-1.0%	40%	54%	50%	43%
Canada	6	-8.3%	-7.3%	-10.5%	-17.7%	50%	46%	31%	43%
France	7	-2.0%	-11.4%	-12.5%	-1.0%	50%	14%	4%	67%
Germany	8	-14.6%	-10.5%	-8.9%	-7.2%	40%	32%	23%	14%
Italy	3	2.8%	1.7%	3.1%	1.6%	63%	61%	65%	57%
Japan	6	-8.2%	-6.0%	-6.3%	-4.4%	43%	29%	38%	14%
United Kingdom	6	-9.0%	-4.4%	-2.6%	-1.9%	30%	46%	38%	33%
United States	5	-7.8%	-6.2%	-7.2%	-5.9%	43%	32%	35%	29%
Global Dev Top Dog, vs. All Dev 1,999 Index	6	-12.5%	-11.5%	-11.2%	-10.5%	33%	18%	15%	5%

Source: Research Affiliates

Note: We use SIC codes to define the 12 sectors. These definitions may vary from the GICS definitions.

In Australia and Italy, the national top dog managed to beat the rest of the country's market over the full 30 years, but only by a small margin, and only Italy shows a gain for the investor who chooses to retain the Italian top dog for 10 years. In Canada, Germany, Japan and the United States, the national top dog performed far worse than in other countries, exhibiting a subsequent 10-year shortfall, relative to the broad market for the country, of 4 to 17 percent per year, compounded. It would seem that the national top dogs are much more likely to underperform their own countries' stock market averages than outperform them.

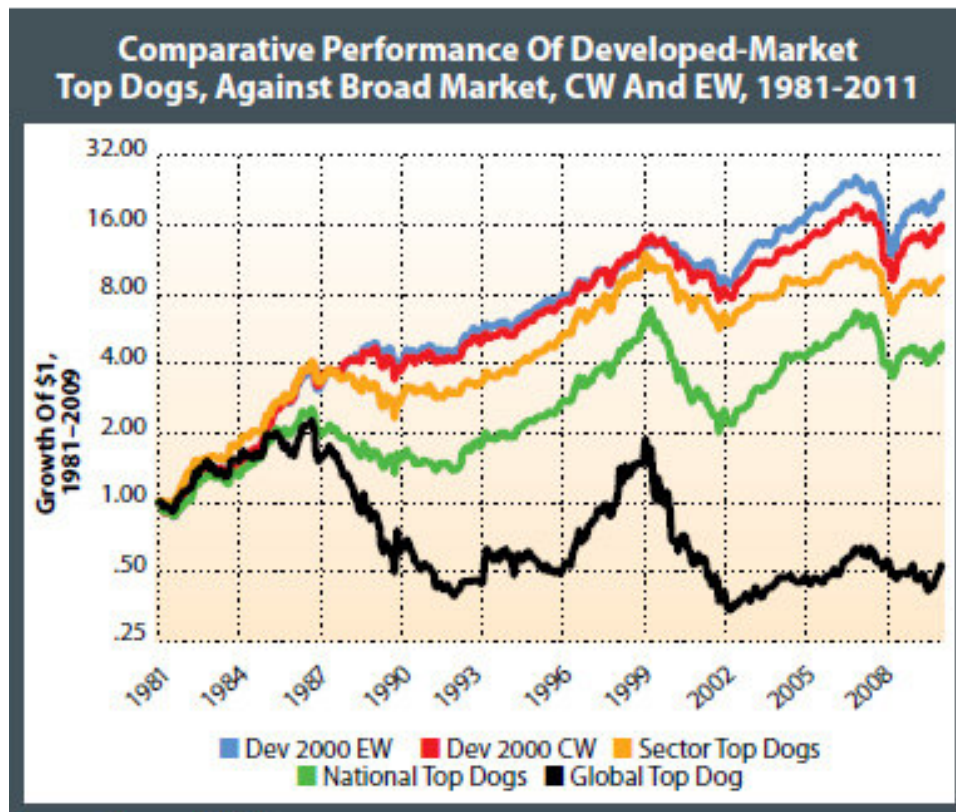
On the bottom row of Figure 5, we look at the global developed top dog—the largest market-cap company in all developed markets—as compared with the average stock in the All Developed Index.⁸ The global developed top dog underperforms the other 1,999 stocks in the developed market universe, by 12.5 percent in one year, fading only slightly to 10.5 percent *per annum* over a 10-year span. This global developed top dog beat its comparative universe in just one of 21 ten-year spans. On average, an investor in the global developed top dog lost two-thirds of his or her wealth, relative to the investor who simply held the other 1,999 largest market-cap stocks in the developed markets, and rebalanced once a year. While this outcome lacks statistical significance (we

have just 30 independent one-year results, and only three independent 10-year results), the numbers are impressive.

Finally, Figures 6 and 7 document the portfolio results for *all 24* of the developed economies' top dogs. At the beginning of each year, we first select four portfolios, selected by market capitalization:

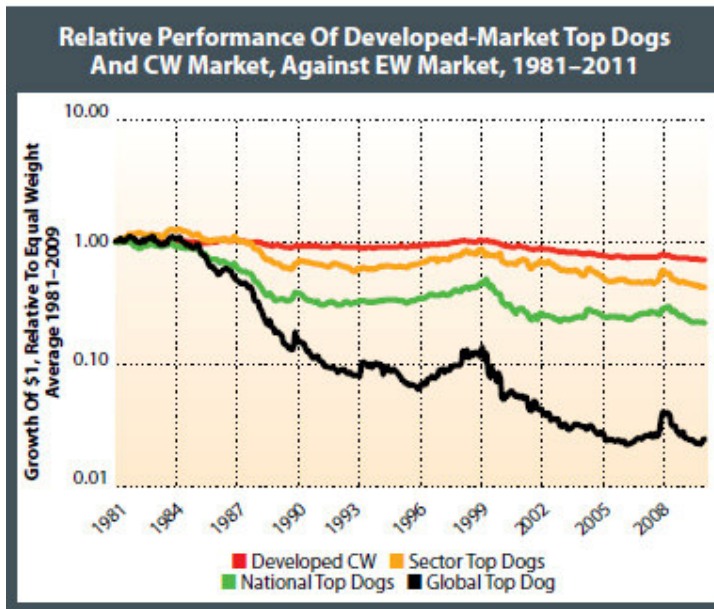
- the largest 2,000 developed stocks, both equal-weighted and cap-weighted
- the national top company in each of the 24 countries, equal-weighted
- the top company in each of the 12 global sectors, equal-weighted
- the largest-cap company among all 24 developed markets (a one-stock portfolio)

Figure 6



Source: Research Affiliates

Figure 7



Source: Research Affiliates

Similar to what we observed in the United States, various cap-weighted top dog portfolios all underperform either a cap- or equal-weighted broad market index. As shown in Figure 6, if we invest \$1 into each of these portfolios at the end of year 1981 and hold through year 2011, the equal-weighted top 2,000 global developed companies would yield the highest ending wealth—over \$22 for each \$1 invested, after 30 years—while the one-stock global top dog portfolio, the largest market-cap company in the whole developed-markets universe, would only leave us with a scant 55 cents of terminal wealth. This portfolio would have lost half of its wealth in 30 years, despite reinvesting all of the dividends. Net of inflation, this portfolio is down about 90 percent. And relative to the equal-weighted top 2,000, the global dog portfolio suffered an opportunity cost of 97.5 percent of its potential wealth.

These results clearly suggest that most top dogs have a very serious problem. They are usually priced to reflect a consensus view that they will remain on top, and will continue to grow handily, but they often don't. They are usually high-multiple growth stocks and popular "safe havens." If they continue to grow, they can justify current values and can perform as well as their peers. If

they attract unwelcome attention from regulators, or if their competitors gang up on them, they cannot maintain that perch indefinitely. Unfortunately, these underperforming top dogs are indeed big: They comprise a substantial share of the cap-weighted indexes. For this reason, these companies—and their propensity to disappoint—*matter*.

We document this top dog concentration in Figure 8. Consider the column for the United States. On average, the top dog in durables, energy and chemicals (over most of this span, these would be GM, Exxon Mobil and DuPont) has comprised over one-fourth of its sector, while the largest of the utilities and finance comprised just 6 percent of that heavily regulated sector. Across all sectors in the United States, the average concentration puts 17 percent of our cap-weighted dollars into the single largest-cap company.

Figure 8

Sectors	Australia	Canada	France	Italy	Germany	Japan	United Kingdom	United States	Avg. Across Countries
Avg Across Sectors	42%	32%	40%	50%	43%	20%	32%	17%	34%
Nondurables	33%	41%	27%	25%	22%	12%	19%	16%	24%
Durables	52%	65%	44%	72%	45%	24%	34%	26%	45%
Manufacturing	34%	19%	21%	22%	16%	7%	20%	23%	20%
Energy	31%	21%	57%	97%	91%	34%	48%	28%	51%
Chemicals	62%	51%	59%	58%	52%	11%	46%	27%	46%
Bus Equip	23%	25%	25%	59%	58%	11%	30%	18%	31%
Telecom	71%	40%	49%	45%	80%	64%	60%	21%	54%
Utilities	70%	30%	86%	45%	35%	26%	44%	6%	43%
Shops	36%	23%	27%	49%	40%	11%	19%	16%	27%
Health Care	44%	40%	51%	67%	41%	20%	45%	12%	40%
Finance	19%	14%	18%	24%	20%	9%	14%	6%	15%
Other	27%	13%	14%	34%	23%	7%	11%	7%	17%
Nat'l Top Dog Avg.	11%	6%	7%	14%	8%	4%	6%	3%	7%

Source: Research Affiliates

Note: We use SIC codes to define the 12 sectors. These definitions may vary from the GICS definitions.

National top dogs naturally dominate their country market less than the sector top dogs dominate their country-specific sectors. On average, in the United States, the national top dog comprises 3 percent of the entire U.S. stock market. In other countries, the indexes are more reliant on their top dogs than that in the United States; only Japan shows concentration similar to the United States. For most countries, the concentration is two to three times as great. In the G-8 developed economies in this study, the largest single stock

comprises an average of 7 percent of the country index, and the sector top dogs comprise an average of 34 percent of their own sector.

The 96 sector top dogs—each of which is the single largest company in its sector-country combination—lag the performance of the average stock in their own sectors by an average of 5.3 percent in the subsequent year. As these companies comprise an average of 34 percent of their respective sectors, simple arithmetic suggests that the sector top dogs pull down investment performance—for the cap-weighted market portfolio for each of these countries—by about 1.8 percent per year, globally. Put another way, we could have historically beat the cap-weighted market portfolio in most countries by 1.8 percent per year, through the simple expedient of excluding the single largest-cap stock in each sector.

Furthermore, because the performance drag for the sector top dogs tends to persist for at least a decade, an investor might do even better by leaving out *all* of the companies that have been sector leaders *any* time in the past 10 years.

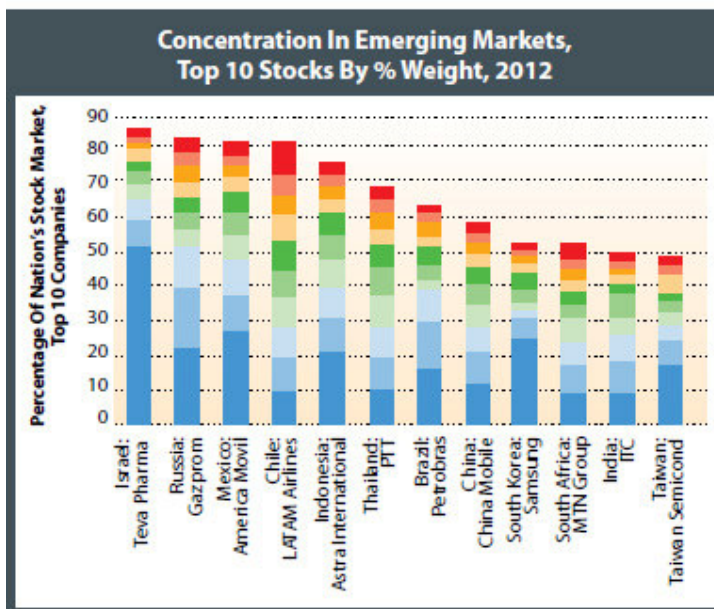
Looking At Emerging Markets

Sector and national top dogs clearly fare badly across the developed world. But what of the ostensibly less-efficient emerging markets? The "top dog" effect should arguably be more powerful in less efficient or less developed markets. On the other hand, do the (typically) superb political connections of the emerging market top dogs with their respective nations' leadership insulate them from the "too big to succeed" syndrome? As we saw with Yukos in Russia—a particularly vivid example—political connections can cut both ways.

There are challenges with these tests. First, the emerging economies are very concentrated. The single largest-cap stock in each country is pretty dominant in that country's economy. Figure 9 shows how very concentrated these markets are, even today. In even the larger, and more diversified, emerging

market economies, the top 10 stocks by market capitalization comprise an average of over 60 percent of the entire stock market. The national top dog comprises an average of over 20 percent of the stock market, in these, the largest and best diversified of the emerging markets. By contrast, for the G-8 developed economies that comprise the core of our study, the national top dog is typically 9 percent of the country's stock market. This concentration in the emerging markets does not weaken the effect that we've documented in this paper, but it does lead to more erratic results.

Figure 9



Source: Research Affiliates

Naturally, this kind of concentration at the top does no harm to these companies' investors, *if* this concentration is a consequence of the companies' business dominating the economy, *and* that the long-term growth prospects of the national top dogs continue to match or exceed that of the nation's economy, *and* the share price for these top dogs does not exceed whatever the future growth would justify. If these conditions do not hold true, then we should see the same "top dog drag" in the emerging markets as we do in the developed markets. And, indeed, we do.

Secondly, emerging markets data do not extend as far back as the developed

markets: We have good data on 24 emerging market countries, and their constituent stocks, back to about 1995, so our study must begin in 1996. Thirdly, because some of the smallest emerging market economies comprise a dozen or fewer companies, the tests of the 12 sector top dogs in each country will be far less meaningful.⁹ Especially with the smaller markets, this concentration makes our tests essentially meaningless. So, we begin by identifying the 12 countries with the largest average market cap from 1996 through 2011; these countries have comprised an average of 88 percent of the emerging markets total, by market cap. Our universe each year was the 1,000 largest-cap stocks domiciled in these 12 countries.¹⁰

As we can see in Figure 10, the top dog effect is even more impressive in emerging economies than in the developed world. Even though our history for emerging economies is much shorter than for the developed world, we see the same rotation among the top dogs as we find in the developed world. In just 16 years, there are anywhere from two to eight "national top dogs," averaging nearly five per country. This means that the average national top dog stays on top for only about three years.

Figure 10

Relative Performance For The Country Top Dogs, Largest Stocks In Selected EM Markets, 1996-2011							
Sectors	NO. OF TOP DOGS	PANEL A. RELATIVE RETURN BY COUNTRY			PANEL B. FREQUENCY OF WIN BY COUNTRY		
		1 Yr	3 Yr	5 Yr	1 Yr	3 Yr	5 Yr
<i>Avg, All 12 Countries</i>		-3.6%	-6.7%	-7.2%	42%	36%	36%
<i>Standard Deviation</i>	4.7	8.4%	8.6%	8.1%	13.9%	20.8%	17.5%
<i>Adj. t-Statistic</i>		-1.49%	-2.72	-3.08	-2.07	-2.28	-2.74
Brazil	2	2.6%	-12.2%	-13.3%	44%	64%	58%
Chile	4	-0.7%	1.3%	-2.9%	56%	43%	50%
China	7	3.1%	-2.0%	-2.2%	56%	50%	42%
India	6	-18.2%	-21.6%	-18.9%	19%	7%	8%
Korea	3	1.3%	-1.5%	-6.4%	56%	50%	33%
Malaysia	6	-11.1%	-10.1%	-9.4%	25%	14%	17%
Mexico	2	3.8%	4.6%	3.9%	56%	43%	50%
Russia	5	0.8%	-21.6%	-23.9%	38%	14%	17%
South Africa	8	-8.5%	-7.2%	-4.0%	31%	14%	25%
Taiwan	2	2.2%	1.3%	1.4%	50%	64%	58%
Thailand	6	0.4%	-3.0%	-4.2%	44%	50%	50%
Turkey	5	-19.1%	-8.8%	-6.2%	25%	21%	25%
EM Top Dog, vs EM Top 999 Index	9	-20.1%	-20.1%	-16.7%	25%	14%	0%

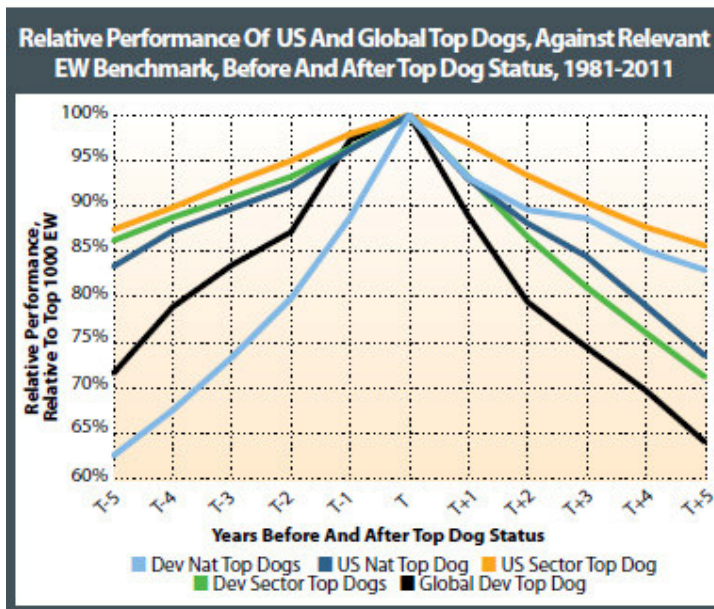
Source: Research Affiliates

For seven of the 12 countries, the national top dog beats the equally weighted average of all other stocks over the next year. But the seven winners were small winners (averaging just 2 percent outperformance), and the five losers were big losers (averaging 11.5 percent underperformance). For just two countries—Mexico and Taiwan—the "win" extends an average of five years.¹¹ That's scant comfort, even in those two markets, because past is not prologue; the "normal" pattern may well be evident in the years ahead. The portfolio of 12 national top dogs lags the average of all other stocks in that country by 3.6 percent in its first year, with the shortfall accelerating over the subsequent four years, so that the average *annual* shortfall over a five-year span was 7.2 percent.

The overall emerging markets top dog—the company with the largest market cap in the entire emerging markets 1000 universe—turns out to be astoundingly wretched. There were nine overall emerging markets top dogs in 16 years, which means that on average, an emerging markets top dog lasted less than two years. The underperformance over a single year—measured relative to the equally weighted average of the other 999 companies in our emerging markets universe—averaged 20.1 percent, which continued for five years. The average five-year shortfall was 16.7 percent per year. Over our brief 16-year history, an investment in the overall emerging markets top dog would have turned \$1 into 9 cents, a 91 percent loss, while an investment in the equally weighted emerging market universe would have gained 161 percent.

We saved our most surprising exhibits for last. Figure 11 should be troubling to advocates of efficient markets. For each of our top dogs, we examine performance relative to a relevant benchmark, before and after their selection for one of our top dog portfolios.

Figure 11



Source: Research Affiliates

In the United States, we compare our 12 sector top dogs each year with the equal-weighted performance of their respective sectors, over the previous and subsequent five years; our national top dog is compared with the equal-weighted top 1,000 companies in the United States. In the global developed markets, we compare our 288 sector top dogs for each year (12 sectors, times 24 countries) with the equal-weighted performance of their respective sectors in their respective countries, over the previous and subsequent five years. Similarly, our 24 national top dogs are compared with their own equal-weighted national returns (drawn from companies that are in the top 1,000 market-cap companies in the United States and the top 1,000 in the world outside of the United States). Finally, the global top dog is compared with the remaining 1,999 companies in the Developed World Index, equally-weighted. Of course, for the earliest years, we'll have less than five prior years, and for the latest years, we'll have less than five subsequent years. So, Figure 11 aggregates all of the data that we have.

It should surprise no one to see that our top dogs outperformed in the five years leading up to their selection for that title. At some stage, superior

performance is necessary in order for any company to become No. 1 in its sector, or its country or the world. It came as a shock to us to find that the subsequent *under*performance is a mirror image of the prior *out*performance. Country, sector and global top dogs lose from 17 to 36 percent of an investor's wealth, over the subsequent five years, relative to a relevant equally weighted peer comparison.

Conclusion

In a world of intense regulation and furious competition, companies can become "too big to succeed." For the No. 1 company with the largest market share and largest market capitalization, the top dog crown not only makes it a popular target for regulatory scrutiny, but also can prevent its continuing lofty success. For investors, the most beloved top dog in any sector or country is often a truly impressive company, with a remarkable *history*, but it's often not a profitable *prospective* investment. The diminishing agility and flexibility as a company grows, the natural human tendency to punish the winners, the media coverage—arguably with a bias against the biggest winners—along with often-lofty starting valuation, all may contribute to our empirical evidence for subsequent disappointing results.

Our previous studies suggested that top dog status is of no advantage in the United States; indeed, it's often something of a curse. As we globalize this study, the results confirm the global relevance of "too big to succeed." In the G-8 test of developed economies, we find the same phenomenon in each and every market: a statistically significant performance shortfall for top companies, relative both to the companies' sectors and the stock market as a whole, *with no countries immune to the effect*.

Less extensive tests for stocks from all 24 developed countries and the 12 largest-cap emerging markets confirms the effect. These tests also suggest that top dogs typically suffer a larger performance shortfall in the smaller developed and emerging economies outside the United States than in the United States. We see no indication that companies that rise to the top of their

sector can long continue to dominate their sector to an extent that would justify their often-lofty stock price.

One sobering observation, for those who merely dismiss these top dog results as a direct consequence of the well-documented size and value effects, is that our *average* top dog, whether a sector top dog or a national top dog, or a global top dog or an emerging markets top dog, historically delivers a return that is considerably lower than domestic cash yields. We know of no argument in neoclassical modern finance theory that supports a persistent negative equity risk premium for any category of stocks, including the top dogs.

One simplistic solution would be to index, using whatever weighting scheme one chooses, but to omit either the largest-cap company in the country or the largest in each sector. While either rule would assuredly not work 100 percent of the time, the results are pretty jarring. Such a portfolio would win, over long periods of time, with statistical significance, in most markets around the world.

Based on chance alone, we would expect to find many sector or national top dogs that can reliably outperform over long spans. We do not; they are barely more common than unicorns. Said another way, the very business practices that drive an enterprise to the top might not necessarily make the company a good investment. Bigger is not always better.

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Endnotes

1. We could have used measures of economic footprint, popularized by the growing interest in the Fundamental Index® concept, such as sales, book value, profits, dividends, buybacks, number of employees, and so forth. Market capitalization is, of course, a product of economic footprint and valuation multiples. For instance, company sales times the price/sales ratio gives us market cap. So one might argue that we're looking at a blend of company size and company popularity. Indeed, we are. For purposes of this paper, our "top dogs" are the companies that—with very few exceptions—are *both* a dominant player within their business *and* popular enough to carry a premium multiple. If a company has the largest market cap in its sector (or country), this tacitly implies a consensus expectation that it will deliver larger profit distributions to its shareholders in future decades than any other company in its sector (or country). These companies are also expected to continue to increase their dominance.
2. In the Tour de France bicycle race, the leader after each day's race wears a yellow jersey the next day so that competitors can recognize the leader from a distance.
3. Observers may sensibly suggest that a company with 51 percent market share can still double if its market doubles. Of course, growing the market helps competitors in like proportion.
4. In countless empirical studies (e.g., see Chow et al. 2011), equal weighting tends to beat cap weighting by 1-2 percent per year. Equal- or cap-weighting will not change the basic findings in our research. It bears mention that we do not exclude the top dog from its own sector return or country return. So while some might argue that equal-weighting our benchmarks will lead to a larger shortfall, we would counter that including our top dogs in the benchmarks will have the opposite effect. In any event, the top dog effects that we explore in this article are much more powerful than the effects of benchmark construction.

5. The 719 one-year samples were statistically independent, both cross sectionally and intertemporally. The 611 10-year samples were based on rolling 10-year results, so they are roughly equivalent to 60 independent samples.
6. Now that Apple has taken over at the top, we now have eight U.S. national top dogs in 61 years!
7. We also carry out additional tests on the sector top dogs for 24 developed economies; these are handled separately, because most of the 24 countries are much less diversified, with much stronger dominance by their top dogs than the G-8 primary countries that we tested. The data is "noisier," with big outliers, so we compile averages across these markets. Still, we are interested to test whether the "too big to succeed" story applies globally.
8. This index spans the 1,000 largest-cap stocks in the US market and the 1,000 largest-cap stocks in the Developed ex-US markets, hence comprising 2,000 stocks. We refer to this list as the "top 2,000," although it's actually the combination of two top-1,000 lists.
9. We don't show the sector results here. But they are impressive, albeit with considerable variability.
10. Even relying on the 12 countries with the largest average market cap, this leads to remarkable concentration in some years. As one example, for Russia in 1996, only four companies ranked in the top 1,000 in the emerging markets, by market cap. In 1997 and 1999, only six made the cut.
11. For purposes of this paper, we ignore the 10-year results, as there are not even two independent samples.