Long-term shareholder returns: Evidence from 64,000 global stocks[*]

Current Draft: March 2023

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Financial Analysts Journal, Forthcoming

Abstract

We study long-run shareholder outcomes for over 64,000 global common stocks during the January 1990 to December 2020 period. We document that the majority, 55.2% of U.S. stocks and 57.4% of non-U.S. stocks, underperform one-month U.S. Treasury bills in terms of compound returns over the full sample. Focusing on aggregate shareholder outcomes, we find that the top-performing 2.4% of firms account for all of the $US 75.7 trillion in net global stock market wealth creation from 1990 to December 2020. Outside the US, 1.41% of firms account for the $US 30.7 trillion in net wealth creation.

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1. Introduction

The literature includes hundreds of empirical studies that report on rates of return to equity investors. These studies typically focus on returns measured over relatively short horizons such as monthly or quarterly, and often describe long-term outcomes based on arithmetic means of shorter-term returns.[1] In this study we aim to provide broader insights into the nature of the returns realized by shareholders in the long run. To do so, we consider a broad global sample consisting of over 64,000 individual common stocks and measure long-term shareholder outcomes both in terms of compound returns and enhancements to shareholders' wealth.

Many of the empirical outcomes documented here are attributable to the fact that the distribution of compound returns is positively skewed. Such skewness arises even if the distribution of short-horizon returns is symmetric, as first pointed out by Ariditti and Levy (1975) and explored further by Bessembinder (2018) and Farago and Hjalmarsson (2022). Indeed, the assumption often employed for modeling purposes that stock returns conform to the log-normal distribution implies positive skewness at any horizon except instantaneous, with greater skewness at longer horizons. The results we present illustrate the practical implications of such positive skewness. To the extent that the findings here are surprising, the cause may be that the empirical literature tends to focus on parameter estimates that describe the short-horizon return distribution, where the effects of skewness are modest.

We document that the majority of compound (buy-and-hold) long-term returns measured for our January 1990 to December 2020 sample, including 55.2% of U.S. stocks and 57.4% of non-U.S. stocks,

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[1] Many studies report unconditional arithmetic mean returns to characteristic-sorted portfolios, while many others estimate conditional arithmetic mean returns by implementing regression analyses with short-horizon returns as the dependent variables.

Electronic copy available at: https://ssrn.com/abstract=3710251

fall short of returns to one-month U.S. Treasury bills over matched time horizons.[2] This finding does not contradict the evidence (see, for example, Dimson, Marsh, and Staunton, 2002) that returns to broad stock *markets* handily outperform the returns earned on Treasury instruments in the long run. Indeed, the mean buy-and-hold return across stocks in our sample greatly exceeds the U.S. Treasury bill return at each horizon we study. Rather, the distinction between the positive return premium for the broad stock markets and the negative premium for most individual stock returns is a manifestation of the strong positive skewness in the distribution of returns to individual stocks, particularly at longer horizons.[3] This skewness in turn implies that the positive mean excess long-run returns observed for stock portfolios are driven by very large returns to a relative few stocks.

We measure for each sample firm the dollar amount by which the wealth of shareholders in aggregate was enhanced by their decision to take on the risk of stock investing rather than low-risk U.S. Treasury bills. Summing across the 63,785 firms that issued common stock contained in the January 1990 to December 2020 sample, we calculate net global stock market wealth creation of $US 75.7 trillion, measured as of December 2020. Wealth creation is highly concentrated. The five firms (0.008% of the total) with the largest wealth creation during the January 1990 to December 2020 period (Apple, Microsoft, Amazon, Alphabet, and Tencent) accounted for 10.3% of global net wealth creation. The best performing 159 firms (0.25% of total) accounted for half of global net wealth creation. The best performing 1,526 firms (2.39% of total) can account for all net global wealth creation.

Bessembinder (2018) previously studied long-term shareholder outcomes for U.S. stocks.[4] Here, we show that the practical implications of skewness in compound returns are even stronger outside the

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[2] We focus on returns and wealth measured in U.S. dollars to provide a common yardstick that can be compared across stocks traded in currencies with differing inflation rates. The comparison to the short-term U.S. Treasury rate reflects that this rate is often viewed as the best available proxy for the "risk-free" interest rate envisioned by theory.
[3] The positive skewness arises in part because the distribution of monthly individual stock returns is positively skewed, but mainly due to the effects of compounding. See, for example, Simkowitz and Beedles (1978), Albuquerque (2012), Heaton, Poulson, and Witte (2017), Bessembinder (2018), Fama and French (2018), and Farago and Hjalmarsson (2022), all of which focus on the U.S. markets.
[4] Fang, Marshall, Nguyen, and Visaltanachoti (2021) document that the majority of *monthly* local-currency stock returns in a global sample are less than *local currency* short-term interest rates in the same months. However, they do not study compound returns, nor do they study wealth creation outcomes. Further, their "Treasury bill" proxies are local currency interest rates as diverse as the Luxembourg 10-year Government Bond Yield, the Peru Time

U.S. The present sample includes 46,723 non-U.S. stocks. Of these, 42.6% generated buy-and-hold returns measured in U.S. dollars that exceed one-month U.S. Treasury bill returns over matched horizons. By comparison, 44.8% of the 17,776 U.S. stocks in the present sample outperformed Treasury bills.

The positive skewness in distribution of compound returns is of substantial practical importance. While, as noted, most empirical analyses of stock markets focus on arithmetic means and other parameters of returns measured over short (e.g., monthly) horizons, the investment and decision horizons of individuals or fund managers can stretch to decades, and can differ across investors. The strong positive skewness in the distribution of long-horizon stock returns implies a cautionary lesson that is particularly relevant for financial planning. The assessment of whether pension funds are adequately capitalized, for example, is often based on assumptions regarding mean returns and the mean of the distribution of possible future outcomes. Distinct from the ongoing debate as to whether the assumed means are appropriate, the (potentially large) majority of individual future outcomes in a positively skewed distribution can be less than the mean. Our results highlight that it is important for financial planners to explicitly consider the skewed distribution of compound long-horizon returns.

Utility-maximizing investors may also rationally prefer to seek out or to avoid the strong positive skewness that is present in long-horizon returns. This can be accomplished by selecting portfolios with greater or less short-horizon return volatility, which Farago and Hjalmarsson (2022) show is a main determinant of long horizons skewness. A useful benchmark is provided by Samuelson (1969), who shows that long-horizon investors will optimally select portfolio weights based on the parameters of the short-horizon return distribution, and then rebalance each period to the same constant weights. For the investors on which he focuses, the skewness induced by compounding is not relevant. Samuelson obtains these implications while assuming that successive returns are independently and identically distributed (iid), and that investors maximize the expectation of a power utility function. Investors with skewness

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Deposit Rate, and the Zimbabwe 3-month Time Deposit Rate. We convert all returns to U.S. dollars to allow comparisons of returns across stocks from different markets and to the common U.S. Treasury bill interest rate, which arguably comprises the best global proxy for the risk-free interest rate envisioned in theory.

preference that differs as compared to that implied by power utility will generally not be indifferent to the skewness induced by compounding.[5] It is also important to note that Samuelson's prescription cannot apply all to investors. If some investors sell (buy) stocks that have appreciated (depreciated) in relative terms in order to return to constant portfolio weights, then other investors necessarily trade in the opposite direction. These investors, as well as the market as a whole, will be subject to more return skewness over multiple periods as compared to the rebalancing investors he focuses on, and hence will indeed be concerned with the skewness implicit in the multi-period investing.

The results obtained here are also relevant to the debate regarding the selection of relatively narrow portfolios vs. the passive holding of broadly diversified portfolios. The results here confirm in a global sample that the wealth created by stock market investing is largely attributable to extreme positive outcomes to a relatively few stocks. We report that the modal long-horizon return to individual stocks involves a complete or near-complete loss of capital. However, the prospect of some -100% returns may not be as daunting in light of the documented frequency with which longer-term returns to individual stocks exceed benchmarks such as 1,000%.[6] That is, the results here highlight the magnitude of the potential gains to a long-horizon investor with a comparative advantage in identifying *ex ante* those stocks that will generate large long-run returns, even while they also illustrate how the odds of underperformance loom large for an investor who selects a narrow portfolio in the absence of such a comparative advantage. Of course, our study does not clarify which, if any, investors possess the requisite comparative advantage.

While the results reported here verify that positive skewness characterizes the distribution of compound global stock returns, we also compare the observed outcomes to a simple benchmark. In particular, we use simulation methods to estimate the degree of skewness (and related statistics) implied

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[5] Indeed, Samuelson (1969) acknowledges (his footnote #1) that his results hold **only** under the assumption of power utility. For other utility functions outcomes will depend on the preference for skewness relative to other moments of the return distribution (e.g. kurtosis) which also depend on horizon, as Farago and Hjalmarsson (2022) show.
[6] In addition, while the issue is not skewness per se, Bessembinder, Cooper, and Zhang (2022) show that alpha and beta parameters (and estimates thereof) differ when returns are measured over long vs. short horizons.

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by the widely-used lognormal distribution, when assuming iid monthly returns that are calibrated to the observed mean and variance of actual monthly returns, as well as to observed distribution of stock lives. The simulation actually implies *more* skewness and *lower* rates of outperformance relative to benchmarks as compared to outcomes observed in the actual data. An intriguing question for future research is to assess what features of the actual data lead to less skewness in the empirical distribution of compound long-run returns as compared to that implied by this simple benchmark.

2. Sample and Measures Employed

2.1 Data sources and sample overview

We identify securities as common stocks using methods described in detail in the Internet Data Appendix. The data required to compute monthly returns, market capitalization, and trading volume for U.S. stocks are obtained from CRSP, and for non-U.S. stocks from the Compustat Global and Compustat North America databases.[7] Our study includes forty-two markets. These are the markets with the largest average GDP during the sample interval, except that we exclude Iran (since return data is available for only ten years) and include Singapore and New Zealand due to their relative economic prominence. Many common stocks are listed and traded in more than one market. To avoid double counting, we assign each common stock to a single market, as described more fully in the Internet Data Appendix.

Our sample includes twenty-six developed and sixteen developing economies. In addition, we compute outcomes for 239 firms that are traded in the U.S. as American Depository Receipts (ADRs), but are not listed on any other exchange during the sample period.[8] We categorize these "homeless" ADRs as

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[7] The Compustat data upon which we rely for non-U.S. stock returns does not include information regarding post-delisting share values or post-delisting payments to shareholders. Following Shumway (1997), we set the final return on non-U.S. stocks with an incomplete return series, as well as stocks indicated to be delisted for reasons of bankruptcy or liquidation, to -30%. For U.S. stocks we incorporate CRSP delisting returns where available, while setting the final return to -30% in the few cases where the delisting return is missing and the CRSP delisting code is 500, 520, 551-573, 580, 574, or 584.

[8] Examples of "homeless ADRs" include Baidu, Inc. and BioNTech, SE. Firms that were formerly listed only as ADRs, but also listed on a local market before the end of the sample (e.g., Alibaba Group) are included with the relevant local market.

a separate market, and hence refer to outcomes across forty-three markets. The markets included in the sample represent approximately 88% of global stock market capitalization as of the end of 2020.

We begin our study as of January 1990 (as Compustat coverage is thin prior to this date) or at the first date when monthly return data for each stock is available, and end the study at December 2020. The CRSP and Compustat data pertains to publicly-listed stocks. Our study should therefore be viewed as summarizing return outcomes and wealth creation in the publicly-accessible stock markets. We do not capture the pre-IPO experience of private (e.g., venture capital, private equity, and founder) investors, or returns from the IPO price to the first end-of-month price contained in the databases. We exclude stocks listed on minor stock exchanges, where an exchange is deemed to be minor if its share of own-market trading volume (measured in U.S. dollars) during the sample period is less than two percent.

In our view a meaningful comparison of investment outcomes across stocks that are traded in multiple markets requires that all results be measured in a common currency. The alternative of comparing local currency returns across currencies could be misleading, particularly if inflation rates differ across markets. Further, the reliance on local currency returns necessitates comparisons to benchmark interest rates denominated in the same currency, which can vary substantively across markets in terms of default risk. To ensure a common yardstick for firms traded in multiple currencies, returns, market capitalizations, and trading volumes for non-U.S. stocks are all converted to U.S. dollars. In untabulated results, we verify that our conclusions are uniformly unaltered when outcomes are measured in British Pounds instead.

Stocks are tracked through time based on the CRSP PERMNO variable (for U.S. stocks) and the Compustat GVKEY and IID variables (for non-U.S. stocks). We compute returns separately by share class for firms with multiple classes. We also compute separate return series for Chinese stocks that are traded in Hong Kong as H-shares and in China as A-shares. However, we aggregate dollar wealth creation to the firm level by summing across share classes, based on the PERMCO variable for firms contained in the CRSP database and the Compustat GVKEY variable for other firms.

Visual examination indicates that the data for non-U.S. stocks contain occasional but substantial data errors. Prior authors have addressed this problem by either excluding or winsorizing extreme observations.[9] While these methods may be adequate for studies that consider returns to value-weighted portfolios, our focus is on the distribution of long-horizon returns to individual stocks. While we also eliminate from the sample some observations that are likely to reflect potentially influential errors, we attempt to retain large but accurate observations and to repair some data errors, e.g., those that result from an erroneous temporary shift of the decimal. Our filtering and correction algorithms are described in the Internet Data Appendix. After implementing these filters, the sample contains 8.37 million monthly observations on 64,738 stocks issued by 63,785 firms.

Table 1 lists the markets included in the study, along with descriptive statistics. Data is available from January 1990 for most markets, but the earliest data pertains to 1991 for China, 1993 for Brazil, Nigeria, and Poland, 1994 for Israel, 1995 for Russia, 2000 for Saudi Arabia, and 2001 for the United Arab Emirates. End-of-period market capitalization for sample stocks ranges from $US 42 billion for Greece to $US 41.0 trillion for the US. The ratio of average market capitalization to GDP provides an indication of the importance of stock markets in each sample market, and ranges from 0.08 for Nigeria to 5.51 for Hong Kong.[10]

Table 2 provides information regarding the stock exchanges studied in each market. In each case, the count refers to the Exchange where a stock first appeared in our sample. The U.S. sample includes 3,224 New York Stock Exchange stocks, 1,556 American Stock Exchange Stocks, and 12,996 NASDAQ stocks, while the China sample includes 1,719 stocks listed on the Shanghai Stock Exchange and 2,333

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[9] See, for example, Chui, Titman, and Wei (2010), Hou, Karolyi, and Kho (2011), and Fama and French (2017).
[10] Hong Kong and Singapore are exceptional in terms of market capitalization relative to GDP, with many large firms listed on their exchanges. A number of large Chinese firms in particular are listed in Hong Kong, and five members of the Jardine Group, which is headquartered in Hong Kong, shifted from Hong Kong to Singapore in 1994 (Chan, Hameed, and Lau, 2003). Prior to the change in listing, Jardine comprised about 10% of the total market capitalization in Hong Kong.

listed on the Shenzhen Stock Exchange. Table 2 also reports the percentage of dollar trading volume that occurs on each exchange within each sample market.[11]

2.2 **Measuring long-term shareholder outcomes**

A common method of assessing shareholder outcomes over multiple time periods is to focus on the arithmetic mean of short-horizon (e.g., monthly) returns. In particular, many studies form portfolios of stocks based on observable characteristics and then compare arithmetic mean returns across portfolios. Other studies estimate linear regressions where the dependent variable is a series of returns to stocks or portfolios of interest.[12] Fitted values from such regressions estimate arithmetic mean returns conditional on specific explanatory variable outcomes. However, it is well known (and discussed in most corporate finance and investment textbooks) that arithmetic mean returns are potentially misleading, in the sense that compounding the arithmetic mean return will, in any sample with a non-zero standard deviation, overstate the actual compound return earned by a passive, i.e. "buy-and-hold" investor. We therefore focus on investor's buy-and-hold returns, inclusive of reinvested dividends. If R_t is the time t return to shareholders inclusive of capital gains and reinvested dividends, then the buy-and-hold return from time 0 to T is simply $BHR_t = (1 + R_1) \times (1 + R_2) ... \times (1 + R_T) - 1$.

We also measure outcomes to shareholders in aggregate in dollar terms, which following Bessembinder (2018), we refer to as the amount of wealth creation. This figure can be interpreted as the premium, in terms of end-of-sample wealth, earned by the shareholders who exposed themselves to the risk of investing in company stock, as compared to the wealth they would have attained if they had invested in one-month Treasury bills. Aside from the distinction that wealth creation is measured in dollars while the buy-and-hold return is a percentage, wealth creation differs conceptually. In particular, the wealth creation calculation (i) explicitly allows for the fact that shareholders in aggregate do not

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[11] Percentages can sum to less than 100%, since minor exchanges are excluded from the study.
[12] As three examples among many, Fama and French (2017), Jacobs and Muller (2020), and Bartram and Grinblatt (2021) study arithmetic mean portfolio returns and estimates regressions with returns as dependent variables in their international stock market studies.

reinvest dividends (while the buy-and-hold return calculation assumes dividend reinvestment), and (ii) incorporates the fact that shareholders in aggregate fund new equity issuances and receive the proceeds of share repurchases, while the buy-and-hold return excludes the effects of net equity issuances. When summed across firms, wealth creation is similar to a value-weighted return in the sense that it captures the reality that large companies are more important than small in determining aggregate investor outcomes. Bessembinder (2018) shows that the enhancement in aggregate shareholder wealth from investing in a given stock as opposed to Treasury-bills, measured as of the end sample (time T) and denoted WC_T can be obtained as:

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\begin{aligned}
WC_T = I_0(R_1 - R_{f1})FV_{1,T} + I_1(R_2 - R_{f2})FV_{2,T} + \cdots \\
+ I_{T-2}(R_{T-1} - R_{fT-1})FV_{T-1,T} + I_{T-1}(R_T - R_{fT}),
\end{aligned}
\tag{1}
$$

where I_t is the value of shareholders' common stock investment at time t, R_{ft} is the time t return on a one-month Treasury bill, and $FV_{t,T} = (1 + R_{ft+1})(1 + R_{ft+2}) \dots (1 + R_{fT})$ is a compounding factor. Since it seems natural to measure aggregate investor experience at the firm level we sum wealth creation outcomes across classes for those firms that issued more than one class of common stock. We implement expression (1) using the firm's market capitalization (the product of shares outstanding and price per share) to measure aggregate I_t at each time t.

3   Returns to Investing in Individual Global Common Stocks

In this section we report on the distribution of returns in the sample of 64,738 individual global common stocks over the period January 1990 to December 2020.

3.1   Monthly returns

The sample includes 8.37 million monthly returns on the 64,738 sample stocks, as stocks are included in the database for an average of 129 months each. Figure 1 displays the frequency distribution

of monthly returns (rounded to 1%, to a maximum of 200%), separately for U.S. and non-U.S. stocks.[13]

Panel A of Table 3 shows that the mean monthly return for the pooled sample is 1.05%. In contrast to the anticipated positively monthly means, the median monthly return is zero (to four digits) for the full sample as well as the developed economies and North American subsamples. The median monthly return ranges from -0.18% per month for the Asia Pacific region to 0.05% for the Europe region. The percentage of monthly returns that exceed zero is 49.4% for the full sample, and ranges in subsamples from 48.9% in emerging markets to 50.3% in Europe.

The facts that (i) the median monthly return is approximately zero even while the mean monthly return is positive and (ii) only a minority of monthly returns are positive are attributable to positive skewness in the pooled distribution of monthly returns. The standardized skewness coefficient is 8.71 for the full sample, and in subsamples ranges from 6.52 for the Europe region to 9.50 for the North American region. By comparison, Bessembinder (2018) reports a skewness coefficient of 6.96 for monthly U.S. stock returns during the 1926 to 2016 period. The data therefore indicates somewhat greater skewness in the monthly returns to international stocks in the recent January 1990 to December 2020 sample as compared to the sample of U.S. stocks he studied. For the global sample, 48.7% of monthly common stock returns exceed the U.S. Treasury interest rate. The percentage of stocks that outperform Treasury bills ranges from 48.2% in Emerging markets and the Asia Pacific region to 49.2% in Europe and North America.

The positive skewness in compound returns also manifests itself in the observation that most individual stocks' returns are lower than the mean return computed across all stocks. For each month we compute the cross-sectional average stock return, weighted by firm values (market capitalization in dollars) as of the end of the prior month. The right column of Table 3 Panel A reports on the percentage of individual stock returns that exceed the value-weighted average stock return in the same month. For

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[13] A notable feature of the distribution of monthly returns to U.S. stocks is the peak at zero, which is presumably attributable to non-trading and price rounding. For non-U.S. stocks the peak at zero is less notable, which reflects that a zero return in local currency may not equate, even with rounding, to a zero return in U.S. dollars.

the full sample, 45.9% of monthly stock returns exceed the value-weighed mean return in the same month. This percentage ranges from 44.9% for the Asia-Pacific region to 47.5% for North America.

3.2 Annual and decade buy-and-hold returns

Panels B and C of Table 3 report on buy-and-hold returns computed over annual and decade horizons, respectively.[14] Each buy-and-hold return is obtained by simply compounding the individual monthly returns inclusive of reinvested dividends. In those cases where a stock enters or departs the dataset within a calendar year or decade, the return is computed based on the partial year or partial decade when data is available, thereby avoiding survivorship bias. Farago and Hjalmarsson (2022) show that empirical estimates of the stock return skewness coefficient (the standardized third central moment) can be severely downward biased when returns are compounded over long horizons. Thus, while positive skewness remains the driving feature, we focus this discussion more on the observable implications of such skewness rather than the estimated skewness coefficients themselves.

Figure 2 displays the frequency distribution of annual buy-and-hold returns, rounded to the nearest one percent and to a maximum of 400% (i.e., to a maximum gross return of five times the initial investment). Figure 3 displays the frequency distribution of decade buy-and-hold returns, rounded to the nearest five percent and to a maximum of 900% (i.e., to a maximum gross return of ten times the initial investment). The contrast between Figures 2 and 3 is notable. The most frequently observed annual returns are clustered in the vicinity of zero. In contrast, on Figure 3 the most frequently observed returns for both U.S. and non-U.S. stocks at the decade horizon (rounded to 5%) are -95% and -100%, and frequencies of decade horizon returns decline almost monotonically for higher returns.[15]

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[14] We define decades as January 1990 to December 1999, January 2000 to December 2009, and January 2010 to December 2020.

[15] The data on Figures 3 and 4 indicate that returns very close to -100% are more frequently observed for U.S. as compared to non-U.S. stocks. However, this observation is likely an artifact of the fact that CRSP provides actual delisting returns for U.S., while in the absence of accurate delisting returns we follow the prior literature in imputing a -30% return when non-U.S. firms exit the database.

The data on Table 3 verifies the simple intuition that the mean buy-and-hold return across all global stocks naturally increases with return horizon, from 1.05% at the monthly horizon to 14.77% at the annual horizon and 116.67% at the decade horizon. However, reflecting the positive skewness, full-sample median returns are far lower: zero at the monthly horizon, 1.74% at the annual horizon, and 1.47% at the decade horizon. The percentage of stocks in the full sample that generate a buy-and-hold return that exceeds the compound return to the one-month U.S. Treasury bill over the same period is 48.7% in monthly returns, 50.0% in annual returns, and 46.5% in decade returns. Within the decade-horizon results, the percentage of stocks with returns that outperform Treasury bills ranges from 44.1% for the emerging economy subsample to 48.5% for the North America subsample. The percentage of stocks in the full sample that generate buy-and-hold returns that exceed the value-weighted average stock return over the matched time period is 45.9% in monthly returns, 43.2% in annual returns, and 35.4% in decade returns.

3.3   Full sample buy-and-hold returns

Panel D of Table 3 reports on buy-and-hold returns to global common stocks, based on the full January 1990 to December 2020 sample period. Figure 4 displays the frequency distribution of full-sample buy-and-hold returns (rounded to the nearest 5%, to a maximum of 900% or a gross return of ten times the initial investment). The mean full-sample buy-and-hold return across all 64,738 sample stocks is 366.83%. However, the median buy-and-hold return for the full sample is -6.8%, and only 48.2% of sample stocks have a positive full-sample buy-and-hold return. Only 43.2% of global common stocks have a full-sample buy-and-hold return that exceeds the return to one-month U.S. Treasury bills over the matched time horizons. Across subsamples, the percentage of individual stocks with buy-and-hold returns that exceed the time-matched one-month U.S. Treasury bill return ranges from 41.6% for emerging markets to 44.9% for North American stocks.

The results described in the previous paragraph show that the positive mean buy-and-hold return for the full sample of stocks is attributable to large returns to a relatively few stocks, while the majority of

stocks generate buy-and-hold returns that fall short of returns to one-month Treasury bills. The skewness of returns also manifests itself in the fact that less than one third (29.3%) of individual common stocks have a full-sample buy-and-hold return that exceeds the value-weighted average stock return over the matched time horizon. That is, most stocks underperform their own cross-sectional (value-weighted) average.

The data reported in Table 3 verifies (i) that the positive skewness in the distribution of individual common stock returns is a global, not a US-specific, phenomenon and (ii) that the effects of skewness are actually stronger for non-U.S. than for U.S. stocks. Focusing on the 46,723 non-U.S. stocks in the sample, the mean across stocks of the full-sample buy-and-hold return is 322.1%, while the median is -7.6%. Only 47.7% of non-U.S. stocks have positive buy-and-hold returns over the full sample, and only 42.6% have buy-and-hold returns that exceed returns to one-month U.S. Treasury bills. On balance, the evidence supports the conclusion that the positive skewness in long-run returns for non-U.S. common stocks is even more pronounced than for U.S. stocks. Positive skewness is empirically important for common stocks in both developed and emerging economies. Slightly less than three of every seven (41.6%) of emerging economy stocks have full-sample buy-and-hold returns that exceed returns to one-month U.S. Treasury bills, while 43.0% of non-U.S. developed economy stocks have full sample buy-and-hold returns better than one-month U.S. Treasury bills.

Turning to individual markets, the cross-sectional mean buy-and-hold return for the full January 1990 to December 2020 sample period is positive in all forty-three markets, ranging from 40.7% for Greek stocks to 1,055.1% for Irish stocks. In contrast, the cross-sectional median buy-and-hold return is negative, implying negative outcomes for more than half of the individual stocks, in twenty-one of the forty-three markets. The median buy-and-hold return is notably small (i.e., less than -30%) in Nigeria (-70.6%), Greece (-70.0%), Australia (-43.2%), Poland (-41.3%), Indonesia (-38.8%), India (-33.6%), South Africa (-33.4%), Germany (-31.9%), and Russia (-31.6%). The divergences between mean and median buy-and-hold returns reflect positive skewness in the return distribution in every market. The

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standardized skewness coefficient for full-sample buy-and-hold returns ranges from 2.57 in Saudi Arabia to 39.37 in Hong Kong and 40.67 in India.

The effects of positive skewness can also be observed in the fact that less than half of individual stocks outperform the value-weighted market over their full lifetimes in forty-one of the forty-three markets(the only exceptions are Columbia, where 51.5% of the sixty-six firms outperformed the value-weighted market, and Finland, where 52.4% of the 275 stocks outperform the value-weighted market), including 16.8% in Greece, 17.3% in Nigeria, 17.7% in Japan, 18.3% in Malaysia and the UAE, 18.7% in Indonesia, 19.0% in Poland, 21.1% in Hong Kong, 23.9% in China, 25.5% in Germany, and 26.2% in the United Kingdom.

While the majority of global common stocks have full-sample buy-and-hold returns that fail to match one-month U.S. Treasury returns, this finding does not extend to each individual market. In twelve sample markets more than half of individual common stocks outperformed U.S. Treasuries, and in four markets, Saudi Arabia, Israel, Switzerland, and Finland, more than sixty percent of stocks outperformed U.S. Treasuries. In contrast, less than 25% of stocks outperformed U.S. Treasuries in sixteen markets, including ten of the sixteen emerging markets in the sample. We assess in Section 5 the extent to which differences in outperformance rates across markets are random, or have systematic explanations.

While the global stock market performed strongly during the full 1990 to 2020 sample, market returns were negative over some shorter time periods. Some sample stocks may have low returns simply because the months they were included in the database were characterized by disappointing returns globally. We compile results separately for the 57,850 sample stocks where the overall market return exceeded the U.S. Treasury bill return during the period the stocks were contained in the database, and for the 6,888 stocks where the overall market return fell short of the U.S. Treasury bill return during the period the stocks were contained in the database. Not surprisingly, stocks in the latter group performed poorly, with a mean and median lifetime returns of -22.0% and -72.2%, respectively. Results for the former group are more informative. Even though the overall market outperformed Treasury bills during

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the periods that these stocks are included in the sample, the median return is barely positive (equal to 3.26%), only 45.7% delivered lifetime returns that exceeded those to Treasury bills, and less than one third (29.7%) outperformed the value-weighted average returns. We conclude that positive skewness is an empirically important feature of long-run stock returns, even during periods when the ex-post market return is favorable, and that only a minority of stocks outperform Treasury-bills at these times as well.

3.4 A comparison of observed outcomes to a simple benchmark

The data reported in Table 3 verifies that the effects of positive skewness in compound individual stock returns exist as a global phenomenon, and indeed are slightly stronger for non-US. Stocks. Of course, models of compound stock returns generally imply that such positive skewness should be observed. As noted, to the extent that the results reported here are surprising the cause may be the fact that most studies focus on short horizon returns, not on the compound long horizon returns that can be computed from the short-horizon return data or that are implied by existing models.

In particular, many models assume that stock returns conform to the log-normal distribution, which displays positively skewness at all horizons except the instantaneous. The positive skewness of log-normally distributed returns depends only on, and is strictly increasing in, the variance of the log returns. This variance is, assuming iid return increments, proportional to the return horizon, so the implication that the positive skewness of log normal returns increase with return horizon immediately follows. We next assess how the indications of skewness observed in the sample data, as reported in Table 3, compare to what would be observed in a simple setting where each monthly return is a draw from a log-normal distribution with time-invariant parameters.

To do so, we create simulated log returns for a number of stocks equal to our sample size. Parameters are selected so that the mean and standard deviation of simulated monthly log returns are

matched to the actual data.[16] We incorporate a block diagonal covariance structure that accommodates observed average correlations of stocks within each of ten industries (based on stock SIC codes and industry definitions on Ken French's website) as well as the dependence of all stock returns on common market outcomes.

The skewness of compound returns depends in part on the number of months over which returns are compounded. While our sample spans 31 years, individual stocks are present in the data for a widely varying number of months (or "lives"). To accommodate this feature of the actual data in our simulation, we assign a lifetime to each simulated stock as a random draw from the distribution of lifetimes for sample stocks in the same industry. We generate simulated log returns for each sample stock for each month of its assigned life, convert the log returns to simple returns, and compound over the indicated horizons. The entire simulation is repeated 1,000 times to obtain a distribution of simulated compound returns at various horizons. Additional details regarding this simulation are contained in the Internet Data Appendix.

Table 4 reports average outcomes by horizon, when the simulation includes stocks calibrated to the full sample of 64,738 stocks, as well as to the subsamples of U.S. and non-U.S. stocks. The main implication of this exercise is that the iid log-normal benchmark implies *more* skewness in compound returns as compared to that observed in the data. Focusing, for example, on the global sample, the percentage of simulated stocks with compound returns that exceed matched-period returns to U.S. Treasury bills is 46.1% at the annual horizon, 40.4% at the decade horizon, and 38.0% at the lifetime horizon. By comparison, a higher proportion of sample stocks outperform U.S. Treasury bills: 50.0% at the annual horizon, 46.5% at the decade horizon, and 43.2% at the lifetime horizon (from Table 3).

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[16] The match of simulated and actual monthly log returns is almost perfect in terms of these parameters. In particular the monthly mean log return across all stocks is -0.3% and the standard deviation of monthly log returns is 16.2%, in both the simulated and the actual data. However, skewness is not as well matched. The average skewness in simulated monthly log returns is zero by construction, while the average skewness of monthly log returns in the sample is -0.78. This discrepancy reflects that the sample monthly returns do not conform to the log-normal assumption.

Similar results are observed when focusing on benchmarks of zero or the value-weighted market, and for the U.S. and non-U.S. subsamples.

These results pose an intriguing challenge for future research. Is the more modest effect of skewness in the actual compound return data attributable to the fact that actual returns deviate from the log-normal assumption, because actual returns deviate from the iid assumption in terms of non-zero serial dependence and non-constant volatility, or for other reasons?

3.5   Outcomes across all sample years for stocks and portfolios of stocks

We study returns over thirty-one calendar years, 1990 to 2020. However, for most stocks the lifetime return pertains to a much shorter period. The median period that stock is included in our sample is 102 months, or 8.5 years.

To obtain evidence regarding the long-term performance of individual stock positions that spans the full sample, we follow Bessembinder (2018) and implement a bootstrap procedure. In particular, for each month from January 1990 to December 2020, we select one stock at random from those available in the sample that month, and then compound the resulting returns across months. The result is one possible outcome from a strategy of holding a random stock in each month of the sample, ignoring any transaction costs. We conduct the bootstrap simulation when stocks are drawn from the full global sample, from US stocks only, and from non-US stocks only. We compare compound returns from the single-stock strategy realized over five-year, decade, and full-sample horizons to the benchmarks of zero, the accumulated return to holding one-month U.S. Treasury bills over the same interval, and the accumulated return on the value-weighted portfolio of all common stocks in the sample over the same interval. We repeat the procedure 1,000 times to obtain a bootstrap distribution of possible returns to single-stock strategies at each horizon.

The results, reported on the first three rows of Table 5, indicate that the effects of return skewness are stronger when considering individual stocks over the full thirty-one year sample as compared to those in the actual sample data, where individual stock lives are shorter. Focusing, for example, on global

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stocks and the full sample period, only 37.2% of single-stock strategies have a positive return, as compared (Table 3, Panel D) to positive lifetime returns for 48.2% of sample stocks. In the same sample, 28.4% of single-stock strategies have returns greater than those to U.S. Treasury bills over the full 31 years, compared to 43.2% of sample stocks, and just 15.2% of single-stock strategies produce returns that exceed the value-weighted market, compared to 29.3% of sample stocks. That is, the full-sample results reported on Table 3 actually understate the effects of skewness over a three-decade horizon, because of the fact that the available return series for most individual stocks pertain to shorter periods.

Also following Bessembinder (2018) we repeat the bootstrap simulations to assess the effects of portfolio diversification. In particular, for each month from January 1990 to December 2020 we select sets of five, 25, 50, and 100 stocks at random from the set of stock with available return data. Within each month, we compute the value-weighted return to the selected portfolio, and we then link these monthly returns over horizons of five years, ten years, and the full thirty-one sample years. The procedure is repeated 1,000 times.

Farago and Hjalmarsson (2022) show that the skewness in long-horizon returns depends mainly on the volatility of short horizon returns. Since diversification reduces portfolio return volatility, it can be anticipated that compound portfolio returns will be less positively skewed than single stock returns. The data in Table 5 illustrates the extent to which this is true.

Focusing on the five-year horizon and the global sample excluding U.S. stocks, the percentage of portfolio returns that exceed returns to one-month US Treasury bills increases from 42.3% for single stock portfolios to 53.4% for 5-stock portfolios, 60.8% for 25-stock portfolios, 64.0% for 50-stock portfolios, and 66.1% for 100-stock portfolios. Corresponding outcomes at the full sample (31-year) horizon, still focusing on the non-US sample, outperformance rates relative to US Treasury bills are 26.8% for single stock portfolios, 53.3% for 5-stock portfolios, 75.9% for 25-stock portfolios, 83.2% for 50-stock portfolios, and 89.0% for 100-stock portfolios. The effects of skewness are stronger for portfolios formed from non-US stocks. For example, at the full-sample horizon, 99.7% of the US

portfolios containing fifty stocks outperform US Treasury bills, compared to 83.2% of the non-US stock portfolios.

Despite the fact that the diversification reduces the degree of skewness and the attendant effects in long-horizon returns, the effects of skewness remain noticeable even at the full sample horizon and in the 100-stock portfolios. The percentages of bootstrapped 100-stock portfolios that outperform the value-weighted portfolio at the 31-year horizon are 39.6% in US stocks and 45.4% in non-US stocks. Long-term financial planning, e.g. at pension funds, often incorporates assumptions regarding mean returns that are based on evidence for overall market proxies. Positive skewness implies that the majority of possible future outcomes, even to a diversified portfolio, are less than outcome to the fully-diversified portfolio.

4   Stock Market Wealth Creation

We measure stock market wealth creation by implementing expression (1) for each of the 63,785 companies in the sample, using all available data during the January 1990 to December 2020 sample period. As noted, expression (1) can be viewed as quantifying the increase in end-of-period wealth to shareholders because they earned on their invested capital the stock's actual returns rather than one-month Treasury bill returns. Wealth creation is distinguished from a simple examination of firms' end-of-sample market capitalization by the fact that it considers all prior cash flows to or from shareholders. In particular, share repurchases and dividends reduce market capitalization, while these transactions do not similarly decrease calculated shareholder wealth creation. For many firms that made substantive shareholders distributions in the form of dividends or share repurchases wealth creation outcomes exceed the firm's end-of-sample market value.

4.1   The top wealth creating companies

We compute that sample companies collectively created $US 75.66 trillion in shareholder wealth between January 1990 and December 2020 (Table 8). The sample includes 26,967 firms (42.28% of total) with positive wealth creation, and 36,818 (57.72% of total) with negative wealth creation. Focusing

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only on those firms for which wealth creation was positive, the sum is $US 97.75 trillion in wealth creation (Table 8). This total was offset by $US 22.09 trillion in wealth reduction by the remaining sample firms. We will refer to the sum of wealth creation across firms with positive outcomes as "gross wealth" created and to the sum across all firms as "net wealth" created.

Table 6 reports on the fifty firms that created the most wealth during the sample period. The table also reports the first month and the last month that the firm appears in the database, and the annualized internal (or dollar-weighed) rate of return to shareholders in aggregate.[17] The firm ranked first in terms of wealth creation during the January 1990 to December 2020 period is Apple, with wealth creation of $US 2.67 trillion. The rest of the top-five firms are Microsoft ($US 1.91 trillion in wealth creation), Amazon ($US 1.57 trillion), Alphabet ($US 979 billion), and Tencent ($US 692 billion). Amazon entered the sample in 1997, while Alphabet and Tencent both entered 2004. In contrast, Apple and Microsoft were present since the beginning of the sample in January 1990. The youngest firms among the top 50 wealth creators include Facebook, which entered the sample in 2012, Alibaba, which entered in 2014, Tesla, which entered in 2010, and remarkably, the Saudi Arabian Oil Company, which was present in the sample only during the year 2020.

Thirty-five of the top fifty wealth creating firms listed on Table 6 are American. The non-U.S. firms include Tencent, Samsung, Taiwan Semiconductor, Nestle, Kweichow Moutai, Roche Holding, Alibaba, LVMH Moet Hennessy Louis Vuitton, Novartis, Toyota, L'Oréal, the Saudi Arabian Oil Company, China Construction Bank, Industrial and Commercial Bank of China, and ASML Holding.

The dollar-weighted return to Tesla shareholders during the sample period was 65.4%, which was the highest among the top fifty wealth creating firms listed on Table 6. Other firms that generated

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[17] The dollar-weighted return corresponds to the calculated wealth creation figure more cleanly than the buy-and-hold return, as it also allows for net equity issuances and the fact that dividends are not, in aggregate, reinvested in stock. See Dichev (2007) and Dichev and Zheng (2020) for discussion the computation of dollar-weighted returns.

shareholder returns that exceed 30% per year include Tencent (48.1%), PayPal (39.2%), Kweichow Moutai (39.0%), Netflix (38.7%), Mastercard (33.0%), Amazon.com (31.1%), and Facebook (30.4%).

As noted, Apple created $US 2.67 trillion in stock market wealth during the January 1990 to December 2020 sample. Thus, Apple alone accounted for 3.53% of the $US 75.66 trillion in net global wealth creation and 2.74% of the $US 97.75 trillion in gross global wealth creation. Table 6 also reports the percentage of global net (across all firms) and gross (across firms with positive outcomes) wealth creation during the January 1990 to December 2020 sample period accounted for by the indicated firm and those listed above it. The top five firms (Apple, Microsoft, Alphabet, Amazon, and Tencent), which comprise 0.008% of the 63,785 firms in the sample, accounted for 10.34% of global net wealth creation and 8.00% of global gross wealth creation. The top 20 firms (0.031% of the firms in the sample) accounted for 19.86% of global net wealth creation and 15.38% of global gross wealth creation. The top 50 firms (0.078% of the firms in the sample) accounted for 30.87% of global net wealth creation and 23.89% of global gross wealth creation.

Figure 5 displays the cumulative percentages of gross and net wealth creation when firms are ranked from highest to lowest wealth creation, for all 63,785 firms in the sample. The net wealth creation curve ends at 100% by construction, and reaches a maximum of 129%, which reflects that gross wealth creation (summed across only firms with positive wealth creation) was 29% larger than net wealth creation (which includes the effects of wealth reduction at the majority of firms). The gross wealth creation curve reaches a maximum of 100% by construction.

Figure 6 displays the same data as Figure 5, but only for the 1,600 firms with the greatest wealth creation. The net wealth creation curve reaches 25% at 32 firms (0.05% of the total), 50% at 159 firms (0.25% of the total), 75% at 505 firms (0.79% of the total), and 100% at 1,526 firms (2.39% of the total). That is, the top-performing 2.4% of firms in the sample created net wealth of $US 75.66 trillion, equivalent to the wealth creation of the entire sample of global firms, while the remaining 97.6% of firms collectively matched the returns to one-month U.S. Treasury bills. By comparison, Bessembinder (2018)

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reports that 4.1% of stocks contained in the CRSP (U.S.) database account for all net dollar wealth creation during the 1926 to 2016 sample period.

In addition to the 1,526 firms that created wealth equivalent to the full sample, another 25,441 firms (39.9% of the total) generated positive wealth for their shareholders. However, the wealth creation of these firms just offset the wealth reduction of the remaining 36,818 (57.7% of firms), such that the 62,259 firms (97.6% of total) not included amongst the top 1,526 best performers collectively generated returns on invested capital that just matched one-month Treasury bills. The finding that just 2.4% of firms generated wealth (measured in dollars) equivalent to total global stock market wealth creation can be attributed to several interrelated factors, including dispersion in firm sizes and in the length of time that firms are included in the sample, and purely random outcomes. It also reflects the practical importance of positive skewness in the distribution of long-horizon stock returns.

We report in Tables 1 to 43 of the Internet Global Appendix the top 20 firms in terms of full sample wealth creation for each of the individual markets included in this study. The data in these Tables indicate that the single top-performing firm often explains a substantial portion of gross wealth creation in each market. Prominent examples include Anheuser-Busch Inbev (28.5% of gross wealth creation in Belgium), Novo Nordisk (26.5% in Denmark), Samsung Electronics (33.5% in South Korea), Taiwan Semiconductor (36.6% in Taiwan), Nestle (21.4% in Switzerland), and Saudi Arabian Oil Company (33.4% in Saudi Arabia). By comparison, Apple, with the largest wealth creation of any individual firm in the sample, accounts for 5.3% of gross wealth creation among U.S. firms.

Table 7 reports on the twenty firms with the most negative wealth creation in the global sample. We calculate that Petro China was responsible for the largest wealth destruction, $US 553 billion. Nine of the bottom eleven firms are Japanese, including six banks (Industrial Bank of Japan, Bank Tokyo-Mitsubishi, Fuji Bank, Dai-Ichi Kangyo Bank, Sakura Bank, and Sanwa Bank), as well as Sumitomo-

Mitsui Financial Group, Nippon Telegraph and Telephone, and Tokyo Electric Power Company.[18] The worst-performing American firms were WorldCom, Viavi Solutions, Lucent Technologies, and Wachovia.

4.2   How concentrated is wealth creation?

We show in the prior section that five firms account for over 10% of the net shareholder wealth created by the 63,785 firms in our 1990 to 2020 sample. We next report additional information on the degree to which wealth creation is concentrated for subsamples and individual markets. In Table 8 we report on the percentage of net wealth creation (summed across all firms) and gross wealth creation (summed across firms with positive wealth creation) accounted for by the best-performing 0.25%, 0.5%, 1.0%, and 5.0% of firms in each sub-sample.

The data on Table 8 shows that net wealth creation is more concentrated among non-U.S. firms than among U.S. firms. The top-performing 0.25% of U.S. firms accounted for 44.3% of net wealth creation for all U.S. firms while the top-performing 0.25% of non-U.S. firms accounted for 51.2% of net wealth creation in the non-U.S. sample. The top-performing one percent of U.S. firms accounted for 70.2% of U.S. net wealth creation, while the top-performing one percent of non-U.S. firms accounted for 90.1% of net wealth creation among all non-U.S. firms in the sample.

Stock market wealth creation, as well as the degree to which wealth creation is concentrated, varies considerably across markets. Net wealth creation at the national level (obtained by summing firm-level wealth creation across all firms in a market) is *negative* during the sample period for Greece and Japan in the developed markets and Nigeria in the emerging markets. In Japan, wealth creation aggregated across all 3,983 sample firms was -$US 2.22 trillion.

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[18] The Japanese stock market performed very well in the years preceding 1990 (the Nikkei Index reached its all-time high on December 29, 1989), so the result that the worst-performing firms were predominantly Japanese would differ over a longer sample period.

For markets with negative net wealth creation the calculated percentage contribution would be negative for all firms that created positive wealth. Further, a focus on the concentration of net wealth creation (obtained as the sum of both positive and negative wealth firm-by-firm wealth creation outcomes) can be misleading in those cases where net wealth creation is a modest positive number.[19] While this is a minor consideration at the global level, where net wealth creation for the current sample exceeds \$75 trillion, it can be an issue for specific markets. These considerations support the desirability of also studying the concentration of gross wealth creation, obtained by summing wealth creation for those firms with positive outcomes only.

Focusing on the top-performing 1% of firms in each market, the least concentration is observed in Columbia, where the best performing firms accounted for 22.5% of gross wealth creation. In contrast, the percentage of gross wealth creation accounted for by the top-performing 1% of firms exceeded sixty percent in the US, France, Australia, Hong Kong, South Korea, Taiwan, India, Indonesia, Poland, and Saudi Arabia. Focusing on the top-performing 5% of firms in each market, the percentage of gross wealth creation explained ranges from 46.1% in Columbia to 92.1% in India. Wealth creation is more concentrated in the Asia-Pacific region (one percent of firms account for 65.1% of gross wealth creation) as compared to North America and, particularly, Europe, where the top one percent of firms account for 62.1% and 54.1%, respectively, of gross wealth creation.

As noted, we measure shareholder wealth creation by implementing expression (1). The term I_t in equation (1) denotes the time t value of shareholders' investment in the firm, which we measure as the firm's market capitalization. However, in those cases where one sample firm owns shares in another sample firm the sum of market capitalizations across firms exceeds the actual investment by external

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[19] The issue, described for example by Ellenberg (2014), is that a few observations can explain far more than 100% of a figure that is obtained by summing across positive and negative observational outcomes, particularly when the sum is itself modest in magnitude. Ellenberg goes so far as to suggest that one should not report percentages when studying the sum of positive and negative outcomes. It is, however, unclear how far this reasoning should be pushed when studying stock market outcomes, where the natural object of interest is the gain to the investor as defined by the net of many individual up and down price movements. For example, focusing on accumulated outcomes from only those days with positive price changes would be of little or no practical interest.

shareholders. As a consequence, our calculations may double count wealth creation to some degree. Duchin, Gilbert, Harford, and Hrdlicka (2017) document that S&P 500 firms in aggregate hold equity investments amounting to only 0.30% of the market value of their own equity. However, the degree of double counting could be greater in some markets and for some specific firms.[20]

To address the double counting issue, we obtain from Refinitiv ownership data on the number of shares in sample firms held by firms that also appear in our sample, and compute wealth creation outcomes that are adjusted to avoid double counting. Since we are concerned with cross-holdings *within* our sample, we exclude from consideration holdings by non-sample entities such as mutual funds, hedge funds, and individual investors.[21] We are able to obtain data regarding the shareholdings of 55,966 firms. These firms account 96% of the market valuation of the sample, and they hold positions in 29,692 stocks that are also included in the sample. For each pair of such firms, we compute on a quarterly basis the percentage of shares held by each other firm contained in the sample.[22] As examples, the Refinitiv ownership data indicates that Berkshire Hathaway held positions in Apple stock ranging from 0.18% of Apple's outstanding shares in the first quarter of 2016 to 5.67% of Apple's outstanding shares in the first quarter of 2020, and that Nippon Steel held positions in Kobe Steel stock ranging from 1.80% to 6.89% of Kobe's outstanding shares at various times from 2003 to 2020. We then sum this percentage across all investing firms to obtain the portion of the shares in each sample firm that are held by other sample firms. Let Pc_t denote this percentage as of time t. The pooled value-weighted average Pc_t for the full sample is 4.9.[23] We compute wealth creation adjusted for in-sample cross holdings by modifying expression (1) to replace I_t with $I_t(1 - Pc_t)$ in each period. Note that the adjusted wealth creation calculation credits each

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[20] Note that the double counting issue arises only due to the ownership of equity in sample stocks by other companies also included in the sample. The fact that a given non-corporate shareholder may hold positions in multiple companies does not lead to double counting in our setting.

[21] More specifically, we focus on the holdings of firms with owner type codes equal to Bank and Trust (101), Finance company (103), Investment advisor (107), Insurance company (108), Brokerage firms (200), Research firm (201), Independent research firm (202), Corporation (301), and Holding company (302).

[22] The Refinitiv ownership data begins in the first quarter of 1997. We back fill the initial data to earlier quarters.

[23] Perhaps the most striking observation in the cross-holding data concerns Naspers' holdings of Tencent, which averaged over 30% of outstanding shares. Tencent's full sample wealth creation for non-sample shareholders was $463 billion, as compared to $692 billion for all shareholders (including Naspers).

firm in each period only for portion of the enhancement in market value that accrues to shareholders that are not also sample firms.

Table 44 of the Internet Global Appendix contains wealth creation outcomes after allowing for cross-holdings, in a format identical to Table 8, which contains unadjusted wealth creation outcomes. The results on balance indicate that cross holdings have a relatively minor effect on wealth creation totals. Gross wealth creation for the global sample is $US 93.49 trillion with adjustment for cross-holdings as compared to $US 97.75 trillion without the adjustment (Table 8). The adjustment for cross-holdings reduces net wealth creation for the global sample from $US 75.66 trillion (Table 8) to $US 72.44 trillion. Similarly, the effect of cross-holdings on the degree to which wealth creation is concentrated is also minor.[24] The top-performing 0.25% of firms account for 50.14% of global net wealth creation without the adjustment for cross-holdings (Table 8), compared to 50.64% of global net wealth creation with the adjustment for cross-holdings. Similarly, the top-performing 1% of firms account for 80.44% of global net wealth creation without the adjustment for cross-holdings (Table 8), compared to 80.80% of global net wealth creation with the adjustment for cross-holdings. Thus, the adjustment for cross-holdings indicates slightly more concentration in wealth creation as compared to the unadjusted figures.

5.   Assessing Cross-Market Variation in Underperformance Rates and Concentration of Wealth Creation

The results reported in the preceding sections show that, long-run returns to the majority of global common stocks are less than matched-horizon returns to one-month US Treasury bills, and the net wealth creation revealed by stock market prices is attributable to a relatively few stocks. However, the degree to which these results hold varies across markets. For example, the percentage of stocks with long-run

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[24] Despite the fact that Berkshire Hathaway obtained a substantive position in Apple just before the end of the sample, outcomes for Apple are also little affected. Apple's wealth creation outcome was reduced to $US 2.57 trillion (from $US 2.67 trillion) and its share of global net wealth creation was reduced to 3.40% (from 3.53%).

returns that exceed those of US Treasury bills varies from 25.5% in Greece and 36.1% in Australia to 67.6% in Switzerland and 65.2% in Columbia. We next assess the empirical determinants of cross-market variation in outcomes.

The key findings in this paper are attributable to the empirical fact that the distribution of long horizon return outcomes is positively skewed across stocks. Farago and Hjalmarsson (2022) show theoretically that long horizon returns will be positively skewed, even if short horizon return are distributed symmetrically and returns are independent across time, and that the skewness in long horizon resulting from compounding is greater if the volatility of short horizon returns is higher. We therefore include in our cross-sectional analysis the average, across stocks within each market, of the standard deviation of the time series of monthly returns to each stock.

It is intuitive that, other things equal, positive skewness in the distribution of short horizon returns will lead to greater skewness in long horizon outcomes. We therefore also include in our cross-sectional analysis the average, across stocks within each market, of the skewness of the time series of monthly returns to each stock. We also include the cross-sectional average of the time series mean return to the individual stocks in each market. While it is somewhat self-evident that a higher mean return across stocks will be associated with a greater rate of outperformance relative to Treasury bills, this inclusion allows for the assessment of robustness of outcomes regarding volatility and skewness.

In addition, we control for the potential effects of macroeconomic performance by including in the cross-sectional analysis 2020 GDP per capita in US dollars as well as the annual growth rate from beginning to end of sample in real GDP. Further, we follow Chui, Titman, and Wei (2010), who report that the measures of individualism provided by Hofstede (2001) have explanatory power across markets for the degree of momentum in stock returns, and we propose that investor risk taking behavior may also be associated with our outcome variables. We obtain the Global Preference Survey (GPS) risk taking preference from Falk, Becker, Dohmen, Enke, Huffman, and Sunde (2018).

We consider the possibility that individualism is associated with overconfidence, and that markets with more overconfident and risk-taking individuals would be willing to invest to a greater extent in uncertain projects with the potential for high payoffs. If so, we expect individualism and risk taking to be associated with fewer stocks outperforming Treasury bills, and greater concentration of wealth creation. The Hofstede individualism measure is available for thirty-eight sample markets, while the GPS risk-taking measure is available for thirty-three sample markets. We use an indicator variable set equal to one in the multiple regressions in those cases where a Hofstede variable or the GPS risk-taking measure is missing.

On Table 9 we report the results of cross-sectional regressions estimated across the forty-two sample markets ("homeless ADRs" are excluded). We focus on explaining the proportion of stocks in each market whose long-term returns exceed matched-horizon returns to US Treasury bills (Panel A) and the proportion of total gross wealth created in each market by the 0.5% best-performing firms (Panel B). Since we seek in each case to explain a proportion that is necessarily bounded by zero and one, the dependent variable in each case is the logistic transformation of the original variable (X), $ln(X/(1-X))$.

In column (1) of Panels A and B we report results obtained when the only explanatory variables are the average standard deviation and average skewness of monthly returns. The resulting coefficient estimates support the implication of Farago and Hjalmarsson (2022) that the volatility of short horizon returns is a determinant of the degree of positive skewness in long horizon returns. In particular, the average standard deviation of monthly returns is negatively associated (*t*-statistic = -2.28) with the proportion of stocks that outperform US Treasury bills in the long run. The results also indicate that fewer stocks outperform US Treasury bills at long horizons in markets where short-horizon returns are more highly skewed (*t*-statistic = -2.56).

In column (2) of Panels A and B we report results obtained when the cross-sectional regression also includes the average across stocks of the time-series mean monthly return to each stock in the market. As would be anticipated, a higher average stock return in a given market is associated (column 2

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of Panel A) with more stocks outperforming the US Treasury bill benchmark (*t*-statistic = 6.92). The mean stock return in a market is only a marginally significant predictor (*t*-statistic = -1.77) of the degree of concentration in wealth creation. More informative, inclusion of the average stock return in the regression only strengthens the result that the average standard deviation and skewness of stock returns have significant explanatory power for the percentage of stocks that outperform Treasury bills.

Column (3) of Panels A and B on Table 9 reports estimates obtained when we use the two macroeconomic variables as explanatory variables. We find that national GDP per capita has significant explanatory power (*t*-statistic = 2.17) for the proportion of stocks in a market with cumulative returns that exceed US Treasury bills, but that neither variable has significant explanatory power for the degree of concentration in wealth creation.

Column (4) of Panels A and B on Table 9 reports results obtained when the Hofstede (2001) individualism variable and the risk-taking measure are included, along with an indicator variable for developed economies. In contrast to our conjectures, none of these variables have significant explanatory power for either the proportion of stocks that outperform the US Treasury bill benchmark or the concentration of wealth creation.

Finally, to assess robustness, we report in column (5) of Panels A and B results obtained when all explanatory variables are simultaneously included in the regressions. The results confirm that the average standard deviation of monthly returns continues to have significant explanatory power for both dependent variables, and that the average monthly return and the skewness of monthly returns continue to have significant explanatory power for the proportion of stocks that outperform the US Treasury bill benchmark. Other variables, including measures of macroeconomic performance, and the cultural variables are largely insignificant.[25] That is, the results confirm that, aside from the somewhat self-

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[25] We note that the individualism variable is marginally significant when explaining the concentration of wealth creation (t-statistic = -2.04), and that the dummy variable indicating the individualism variable to be missing is marginally significant when explaining the percentage of stocks that outperform Treasury bills, but it is unlikely that either of these results would survive an adjustment for multiple testing of the set of Hofstede variables.

evident result that higher mean returns in a given market are associated with greater rates of outperformance for stocks in that market, the main determinants of the percentage of stocks with long-run returns that exceed US Treasury bills are the volatility and skewness of short-horizon returns and the degree to which wealth creation is concentrated is mainly driven by the volatility of short-horizon returns.

6.   Conclusions

We rely on a broad sample consisting of over 64,000 global common stocks, to assess long-term outcomes to shareholders. We focus in particular on compound buy-and-hold returns and on the enhancement in shareholder wealth as a result of investing in the public stock markets, as compared to a U.S. Treasury bill benchmark. We obtain several insights. First, we document that the majority of compound long-term returns measured for our January 1990 to December 2020 sample, including 55.2% of U.S. stocks and 57.4% of non-U.S. stocks, fall short of returns to one-month U.S. Treasury bills over matched time horizons. The fact that the majority of publicly traded stocks underperform Treasury bills even while the stock markets in aggregate enhanced shareholder wealth by many trillions of dollars is attributable to the strong positive skewness in compound stock returns. This positive skewness is attributable, in turn, to both skewness in the distribution of monthly stock returns and to the effects of compounding.

Second, we show that stock market wealth creation is highly concentrated; just five firms (Apple, Microsoft, Amazon, Alphabet, and Tencent) account for 10.3% of the $US 75.66 trillion in global public stock market net wealth creation in our sample. The best performing 0.25% of firms accounted for half of global net wealth creation and the best performing 2.39% of firms accounted for all net global wealth creation. The concentration of wealth creation in a relatively few firms is attributable to several, potentially interacting, explanations, including cross-sectional variation in firm size, variation in the number of months that stocks are present in the database, the aforementioned positive skewness in compound returns, as well as purely random outcomes.

The results reported here are important from a number of perspectives. While most empirical analyses of stock markets focus on arithmetic means of returns measured over short (e.g., monthly) horizons, the investment and decision horizons of individuals or fund managers (particularly pension funds) can stretch to decades, and no doubt differ across investors. The results here show that the properties of stock returns compounded over long horizons differ substantially from those of short-horizon returns. These results are somewhat more pronounced for non-U.S. as compared to U.S. stocks.

The results are also relevant to the debate regarding active vs. passive investing. The results here show that the wealth created by stock market investing is largely attributable to large positive outcomes to a relatively few stocks. For those investors without a comparative advantage in identifying the few stocks that will create the most wealth (or in selecting a manager with the ability to do so) and without a substantial preference for positive skewness, the results reinforce the desirability of investing in a broad passive index. On the other hand, for investors with a sufficiently strong preference for positive skewness or for the (presumably few) investors with the appropriate comparative advantage in identifying stocks poised to deliver outsized long-run returns, the results highlight the degree to which successful stock selection can enhance wealth.

The strong positive skewness in the distribution of long-horizon stock returns is particularly important for financial planning. For example, the assessment of whether pension funds are adequately capitalized is typically based on assumptions regarding mean returns and the mean of the distribution of possible future portfolio values. Distinct from the ongoing debate as to whether the assumed means are appropriate, the (potentially large) majority of individual future outcomes in a positively skewed distribution will be less than the mean. It is therefore important that financial planning explicitly accounts for the skewness nature of the distribution of long-horizon returns.

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Figure 1: Percent of Stock/Months with Indicated Return
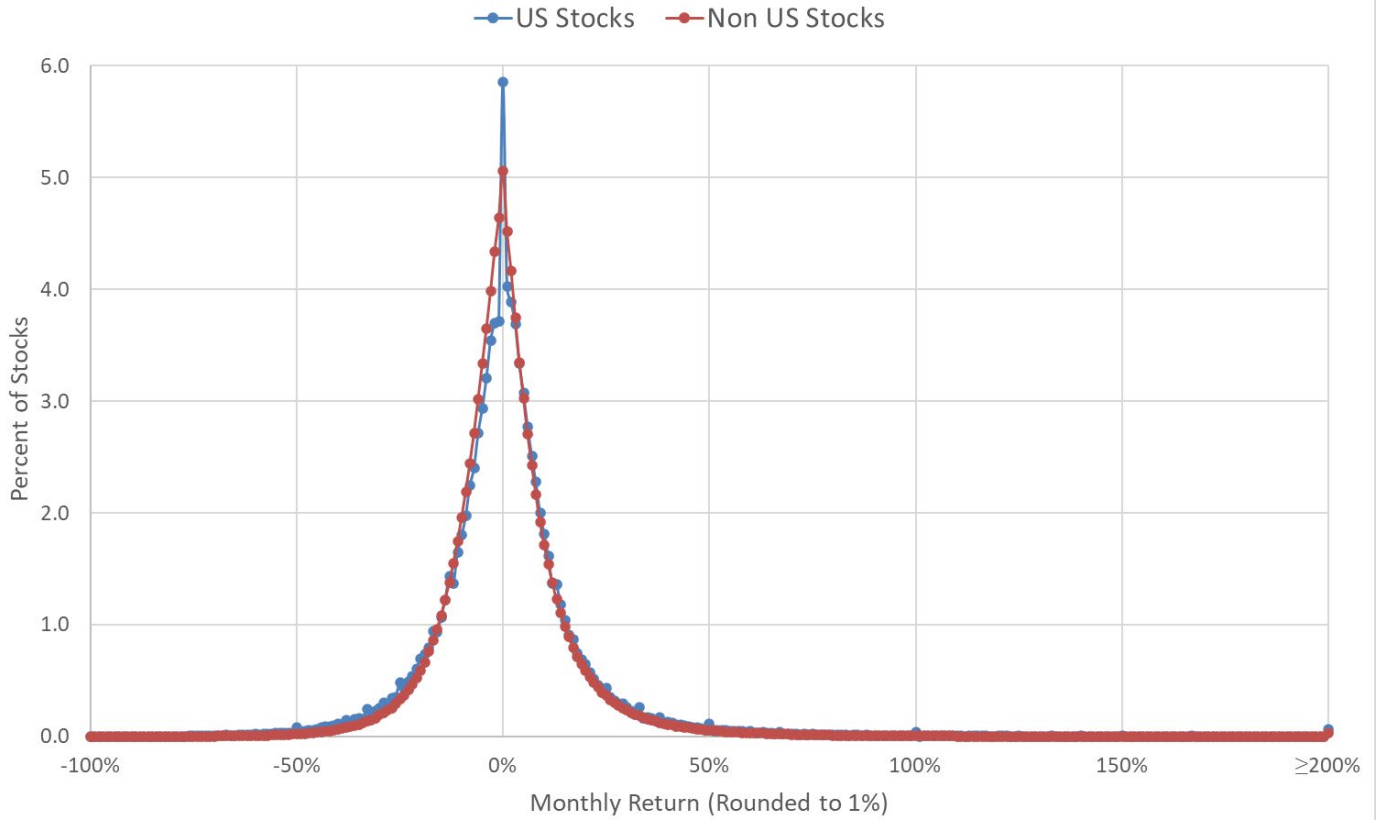
Figure 2: Percent of Stock-Years with Indicated Buy-and-Hold Return
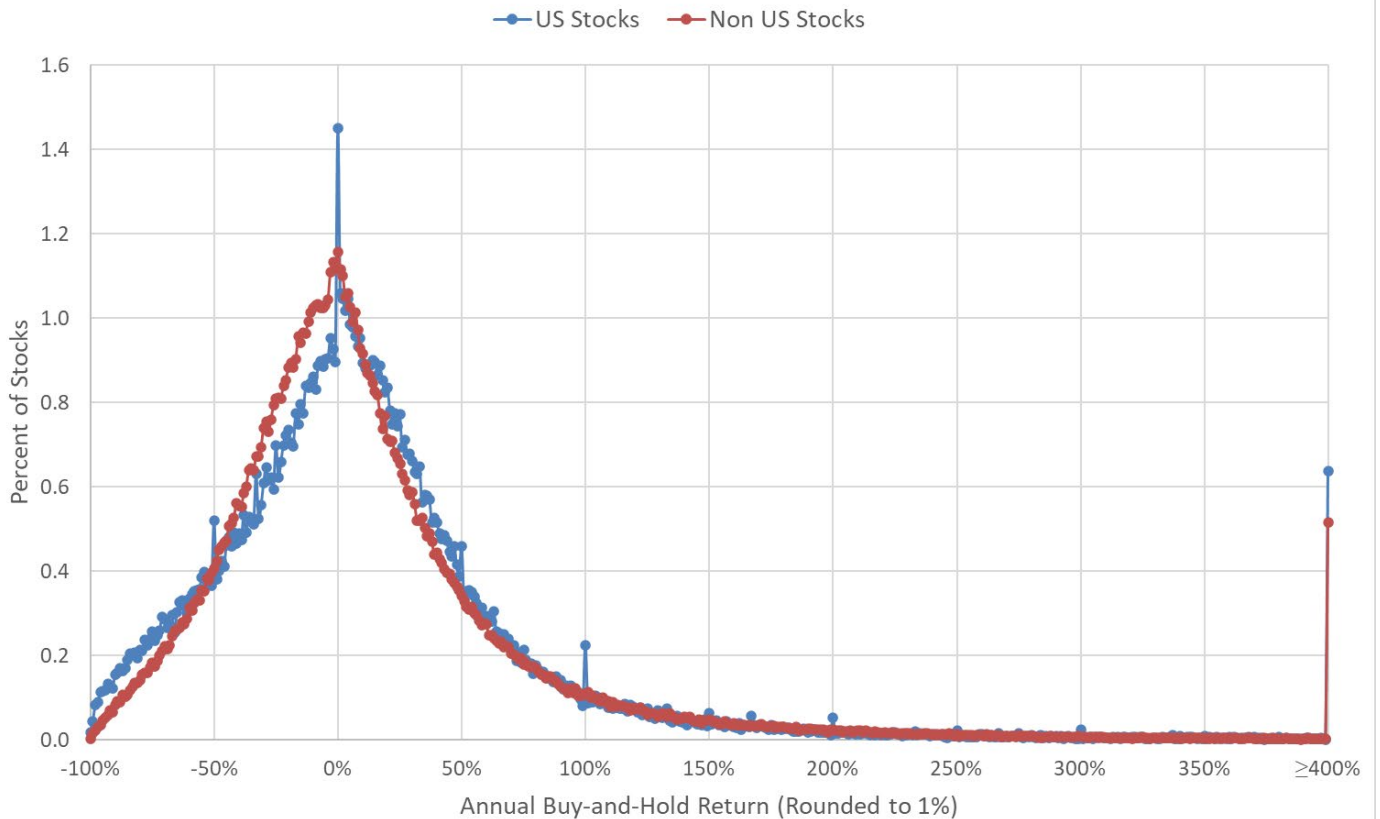
Figure 3: Percent of Stock-Decades with Indicated Buy-and-Hold Return
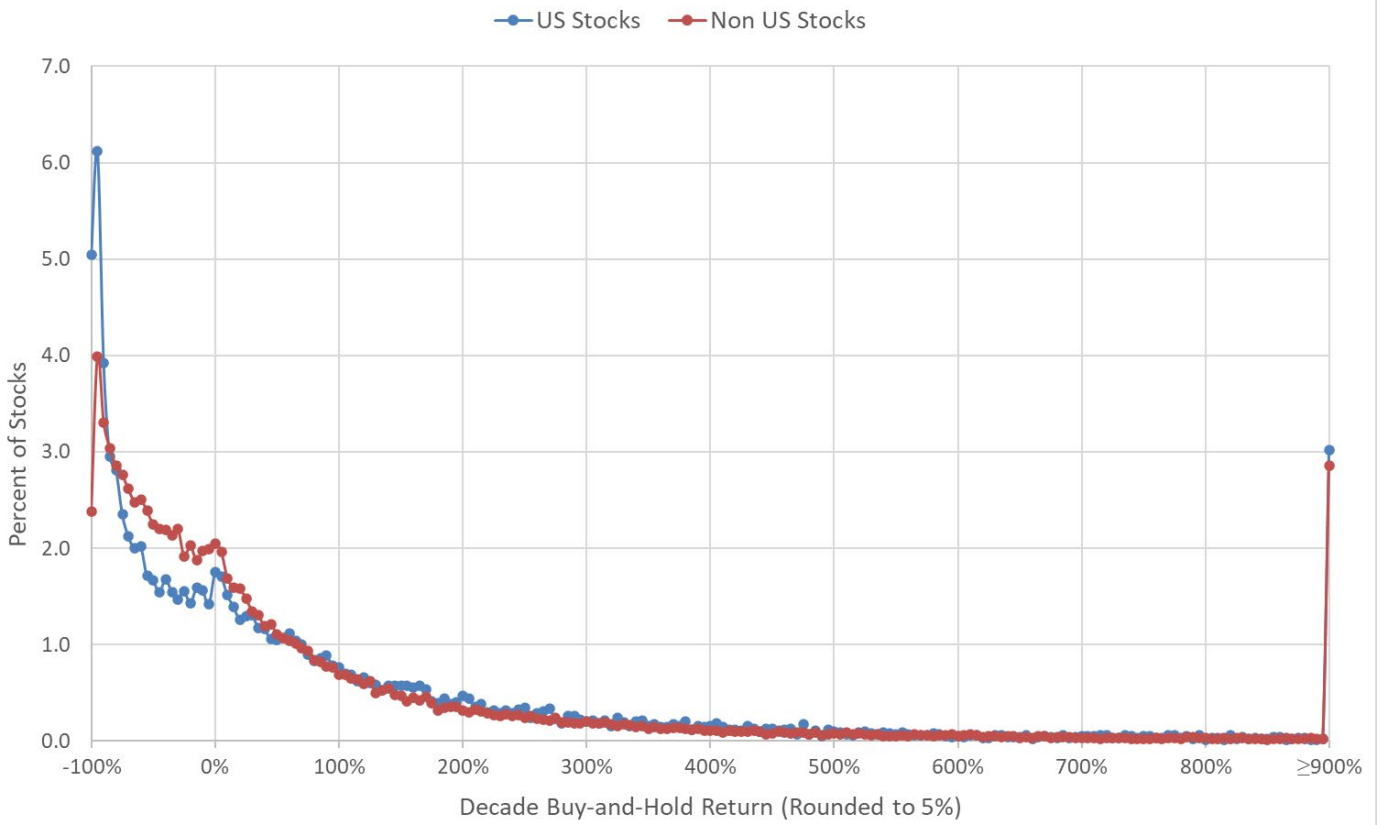
Figure 4: Percent of Stocks with Indicated Full Sample Period Buy-and-Hold Return

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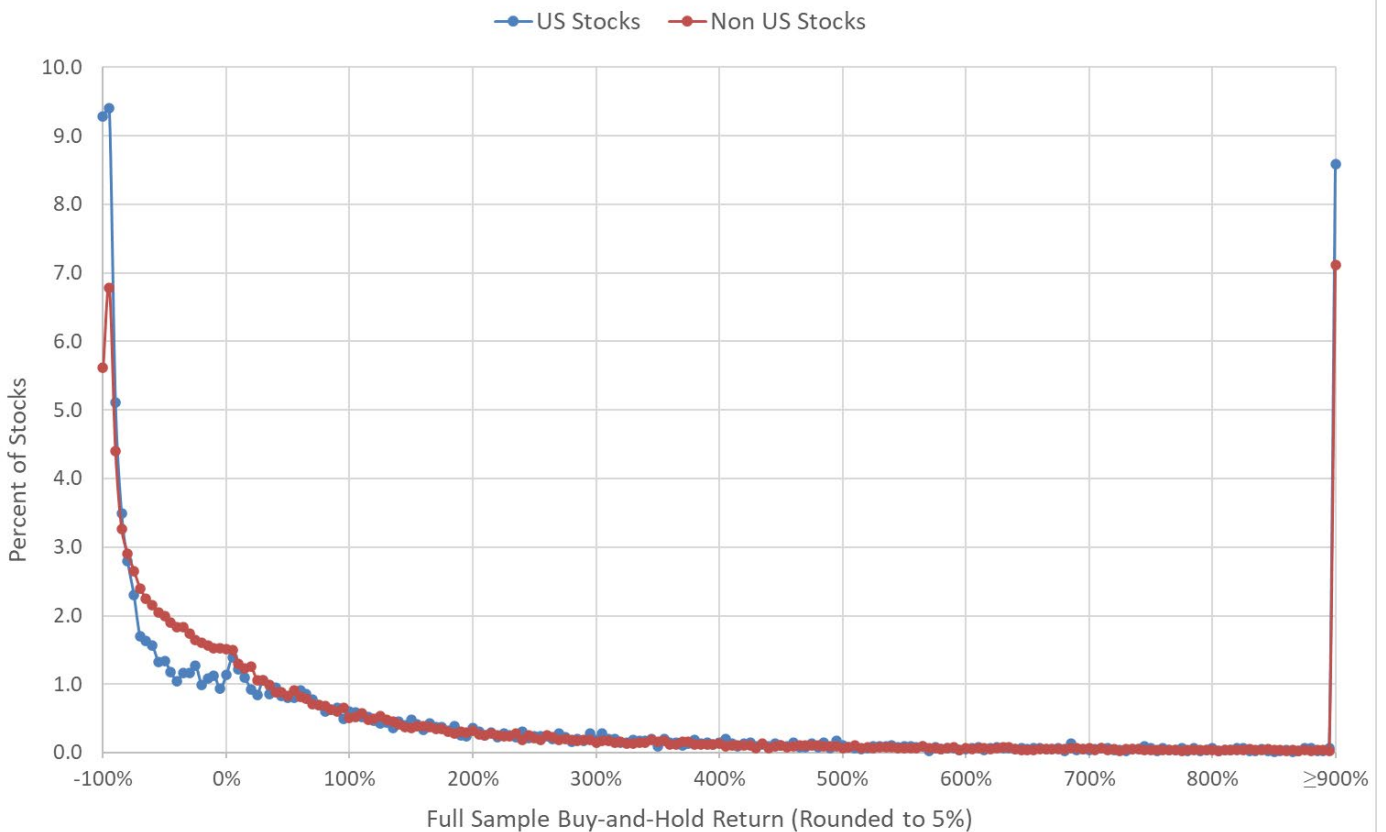
Figure 5: Cumulative Percentage of Global Dollar Wealth Creation, All Sample Firms
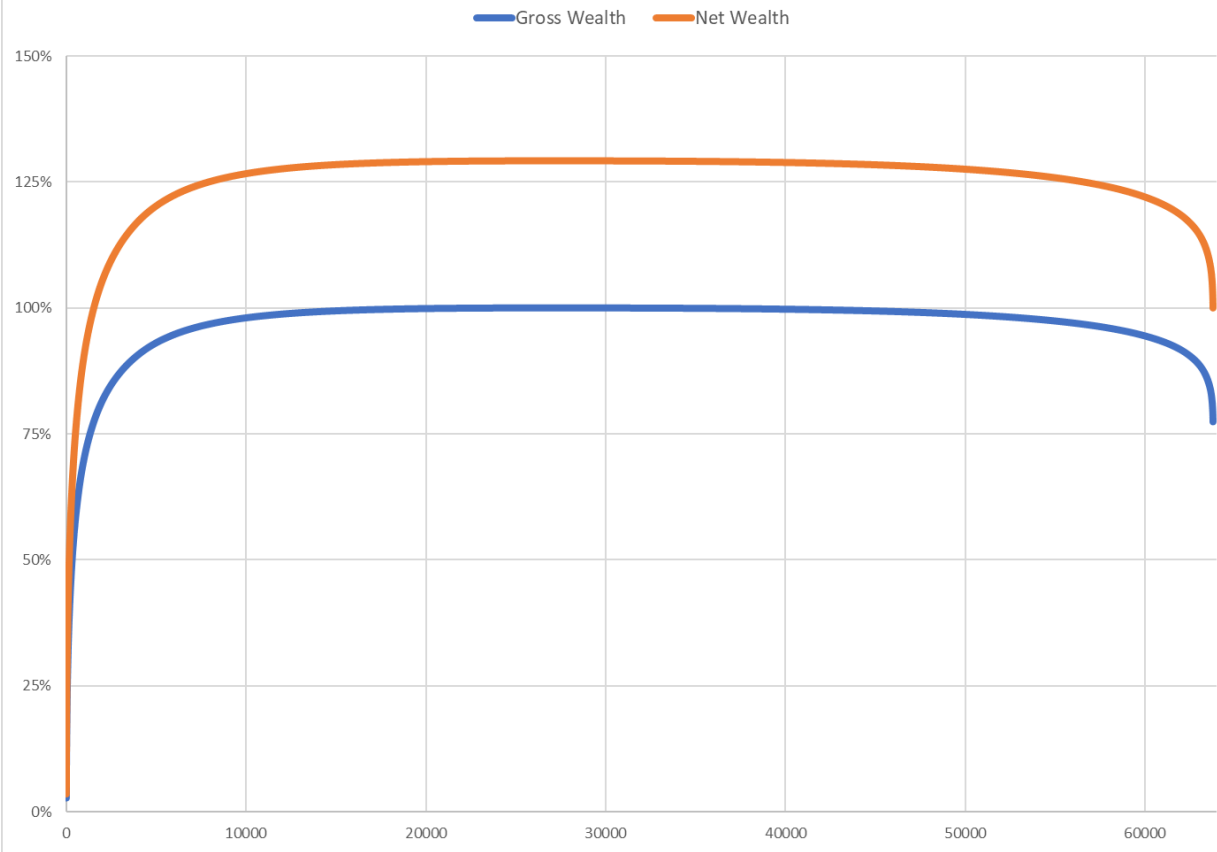
Figure 6: Cumulative Percentage of Global Dollar Wealth Creation, Top 1600 Firms

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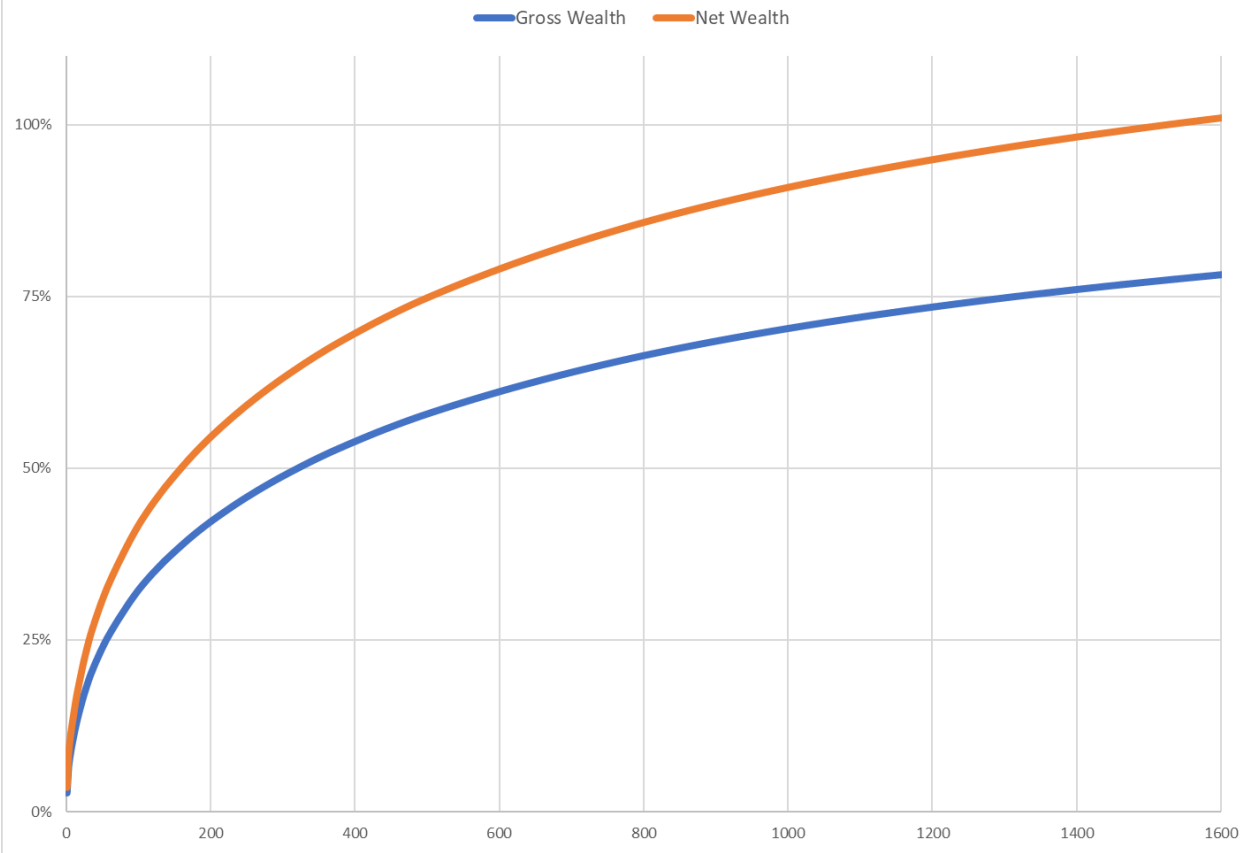
Table 1: Summary Statistics by Market

This table reports summary statistics by market, including the number of stocks included in the sample, the beginning month and the ending month of the sample in each market, GDP per capita in US dollars in 2020, the average GDP growth rate, GDP creation in US dollars during the sample period in each market, the total market capitalization in billion US dollars at the end of December 2020, the average market capitalization in US dollars at the end of December 2020, and the average market cap to GDP over the sample period. There are 42 markets included in the sample. Source of GDP: International Monetary Fund World (IMF) World Economic Outlook Database April 2021.

Market	Number of Stocks	First Month	Last Month	GDP per Capita (US$, 2020)	Avg. GDP Growth Rate (%)	GDP Creation ($U.S. billions)	Total Market Cap ($U.S. billions, 2020)	Avg. Market Cap ($U.S. billions)	Avg. Market Cap to GDP
United States	17,776	199001	202012	63,416	2.28	14,970	41,038	15,104	1.01
Canada	2,041	199001	202012	43,278	1.98	1,047	1,876	940	0.90
Austria	177	199001	202012	48,154	1.71	262	123	73	0.28
Belgium	298	199001	202012	44,529	1.59	313	386	215	0.69
Denmark	365	199001	202012	60,494	1.63	214	606	179	0.84
Finland	275	199001	202012	48,981	1.57	129	308	160	1.24
France	1,722	199001	202012	39,907	1.30	1,326	2,744	1,384	1.04
Germany	1,516	199001	202012	45,733	1.43	2,204	2,416	1,237	0.56
Greece	411	199001	202012	17,670	0.64	92	42	59	0.64
Ireland	86	199001	202012	83,850	5.55	371	155	63	0.17
Italy	725	199001	202012	31,288	0.44	716	663	501	0.70
Netherlands	332	199001	202012	52,248	1.93	588	1,036	489	0.83
Norway	578	199001	202012	67,176	2.19	242	269	141	0.58
Portugal	122	199001	202012	22,489	1.44	152	84	58	0.38
Spain	379	199001	202012	27,132	1.74	743	688	485	0.65
Sweden	1,056	199001	202012	51,796	1.98	278	1,013	381	1.37
Switzerland	408	199001	202012	86,849	1.58	481	1,824	791	1.64
United Kingdom	4,192	199001	202012	40,406	1.59	1,517	2,672	2,226	1.47
Australia	2,962	199001	202012	52,825	2.82	1,036	1,499	712	0.69
Hong Kong SAR	2,626	199001	202012	46,753	3.28	273	5,453	1,502	5.51
Israel	641	199411	202012	43,689	3.83	318	193	105	0.33
Japan	3,983	199001	202012	40,146	0.88	1,852	6,740	3,811	2.06
New Zealand	271	199001	202012	41,127	2.62	164	131	39	0.24
Singapore	1,043	199001	202012	58,902	5.49	301	406	280	0.93
South Korea	3,060	199001	202012	31,497	4.98	1,348	1,909	606	0.45
Taiwan	2,440	199001	202012	28,306	4.65	502	1,730	562	1.12
Argentina	118	199001	202012	8,555	2.34	230	49	44	0.19
Brazil	395	199308	202012	6,783	2.33	1,005	692	365	0.36
China	4,052	199101	202012	10,484	9.27	14,310	11,160	2,544	0.18
Colombia	66	199001	202012	5,336	3.17	215	90	65	0.30
India	3,967	199001	202012	1,965	6.08	2,382	2,517	755	0.32
Indonesia	782	199001	202012	3,922	4.94	921	425	151	0.16
Malaysia	1,364	199001	202012	10,270	5.41	291	418	246	0.85
Mexico	251	199001	202012	8,421	2.23	786	362	219	0.28
Nigeria	202	199311	202012	2,083	4.76	373	46	30	0.08
Poland	994	199306	202012	15,654	4.00	504	153	98	0.19
Russia	279	199508	202012	10,037	2.60	1,138	590	298	0.26
Saudi Arabia	201	200001	202012	20,178	3.13	512	2,607	439	0.86
South Africa	853	199001	202012	5,067	1.93	187	380	277	1.48
Thailand	923	199001	202012	7,190	4.11	413	486	186	0.45
Turkey	441	199002	202012	8,548	4.55	512	158	99	0.19
United Arab Emirates	126	200105	202012	31,982	3.40	251	242	140	0.56

Table 2: Summary Statistics by Exchange

This table reports the summary statistics by exchange from 42 markets, including the number of stocks and the average percentage of dollar trading volume in each exchange to the total dollar trading volume in a market.

Market	Exchange	Number of Stocks	Average % of Trading Volume
United States	New York Stock Exchange	3,224	58.64%
United States	Amex	1,556	2.75%
United States	NASDAQ	12,996	38.61%
Homeless Firms (U.S. ADRs)	New York Stock Exchange	99	74.11%
Homeless Firms (U.S. ADRs)	Amex	6	0.02%
Homeless Firms (U.S. ADRs)	NASDAQ	134	25.57%
Canada	Toronto Stock Exchange	2,041	98.31%
Austria	Wiener Boerse AG	177	98.44%
Belgium	NYSE Euronext Brussels	298	99.76%
Denmark	OMX Nordic Exchange Copenhagen AS	365	100.00%
Finland	NASDAQ OMX Helsinki Ltd	275	100.00%
France	NYSE Euronext Paris	1,722	99.93%
Germany	Deutsche Boerse AG	929	11.85%
Germany	XETRA	587	87.08%
Greece	Athens Exchange SA Cash Market	411	100.00%
Ireland	Irish Stock Exchange All Market	86	100.00%
Italy	Borsa Italiana Electronic Share Market	725	100.00%
Netherlands	NYSE Euronext Amsterdam	332	100.00%
Norway	Oslo Bors ASA	578	100.00%
Portugal	NYSE Euronext Lisbon	122	100.00%
Spain	Bolsa De Madrid	379	99.98%
Sweden	NASDAQ OMX Nordic	1,056	99.69%
Switzerland	Swiss Exchange	408	99.97%
United Kingdom	London Stock Exchange	4,192	97.47%
Australia	ASX All Markets	2,962	100.00%
Hong Kong SAR	Hong Kong Exchanges and Clearing Ltd	2,626	93.98%
Israel	Tel Aviv Stock Exchange	641	99.87%
Japan	Tokyo Stock Exchange	3,983	98.11%
New Zealand	New Zealand Exchange Ltd	271	99.35%
Singapore	Singapore Exchange	1,043	100.00%
South Korea	Korea Exchange KOSDAQ	1,666	20.09%
South Korea	Korea Exchange Stock Market	1,394	79.91%
Taiwan	Taipei Exchange	1,345	16.39%
Taiwan	Taiwan Stock Exchange	1,095	82.94%
Argentina	Bolsa De Comercio De Buenos Aires	118	100.00%
Brazil	BM and F Bovespa SA Bolsa De Valores Mercadorias E Futuros	395	100.00%
China	Shanghai Stock Exchange	1,719	53.83%
China	Shenzhen Stock Exchange	2,333	38.36%
Colombia	Bolsa De Valores De Colombia	66	100.00%
India	BSE Ltd	2,205	11.47%
India	National Stock Exchange of India	1,762	88.53%
Indonesia	Indonesia Stock Exchange	782	100.00%
Malaysia	Bursa Malaysia	1,364	100.00%
Mexico	Bolsa Mexicana De Valores Mexican Stock Exchange	251	100.00%
Nigeria	Nigerian Stock Exchange	202	100.00%
Poland	Warsaw Stock Exchange	994	100.00%
Russia	MICEX Stock Exchange	279	91.61%
Saudi Arabia	Saudi Stock Exchange	201	100.00%
South Africa	Johannesburg Stock Exchange	853	100.00%
Thailand	Stock Exchange of Thailand	923	99.99%
Turkey	Istanbul Stock Exchange	441	100.00%
United Arab Emirates	Abu Dhabi Securities Exchange	70	37.42%
United Arab Emirates	Dubai Financial Market	56	59.72%

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Table 3: Buy-and-Hold Returns, with Dividends Reinvested in Stock

This table reports the cross-sectional mean, median, standard deviation, standardized skewness, of buy-and-hold returns, as well as the percentage of stock outcomes greater than zero, the U.S. Treasury bill rate, and the corresponding value-weighted market return. The sample period is from January 1990 to December 2020 and includes 43 markets (including homeless U.S. ADRs) and 64,738 stocks. Panel E (Panel F)reports outcomes where the value-weighted market return is greater than (less than) the U.S. Treasury bill return during the period the stocks were included in the database.

Panel A: Monthly Horizon

Sample	N	Mean	Median	SD	Skewness	% > 0	% > T-bill	% > VW Market
Global	8,370,770	0.0105	0.0000	0.179	8.714	49.4%	48.7%	45.9%
Global (Excl. US)	6,372,336	0.0101	-0.0010	0.172	8.992	49.3%	48.5%	45.3%
By Development								
Developed	6,431,891	0.0102	0.0000	0.179	8.490	49.6%	48.8%	46.2%
Developed (Excl. US)	4,433,457	0.0094	-0.0008	0.168	8.729	49.5%	48.6%	45.5%
Emerging	1,938,879	0.0116	-0.0017	0.180	9.440	48.9%	48.2%	45.0%
By Region								
North America	2,265,906	0.0123	0.0000	0.202	9.497	49.7%	49.2%	47.5%
Europe	1,585,358	0.0076	0.0005	0.158	6.521	50.3%	49.2%	46.2%
Asia Pacific	2,580,627	0.0099	-0.0018	0.169	7.559	49.0%	48.2%	44.9%

Panel B: Annual Horizon

Sample	N	Mean	Median	SD	Skewness	% > 0	% > T-bill	% > VW Market
Global	749,430	0.1477	0.0174	0.898	18.541	51.9%	50.0%	43.2%
Global (Excl. US)	569,840	0.1451	0.0107	0.877	17.072	51.2%	49.4%	42.3%
By Development								
Developed	575,818	0.1402	0.0244	0.889	19.922	52.8%	50.6%	44.0%
Developed (Excl. US)	396,228	0.1332	0.0181	0.853	18.475	52.1%	50.0%	42.9%
Emerging	173,612	0.1724	-0.0087	0.927	14.480	49.1%	47.9%	40.8%
By Region								
North America	203,463	0.1647	0.0415	1.007	21.766	54.2%	51.9%	46.4%
Europe	145,016	0.1123	0.0291	0.738	16.399	53.5%	51.0%	44.5%
Asia Pacific	227,339	0.1361	0.0084	0.864	17.596	51.0%	49.1%	41.4%

Panel C: Decade Horizon

Sample	N	Mean	Median	SD	Skewness	% > 0	% > T-bill	% > VW Market
Global	110,964	1.1667	0.0147	8.443	68.270	50.6%	46.5%	35.4%
Global (Excl. US)	81,479	1.1114	-0.0014	6.976	66.959	49.9%	45.8%	33.5%
By Development								
Developed	86,559	1.1571	0.0377	8.933	71.964	51.4%	47.1%	36.7%
Developed (Excl. US)	57,074	1.0732	0.0230	7.205	81.217	50.9%	46.6%	34.8%
Emerging	24,405	1.2008	-0.0572	6.409	18.482	47.6%	44.1%	30.7%
By Region								
North America	33,277	1.3568	0.0796	11.077	59.987	52.7%	48.5%	40.7%
Europe	22,325	0.9432	0.0338	3.999	14.840	51.5%	46.5%	36.1%
Asia Pacific	30,957	1.0968	0.0003	8.924	77.496	50.0%	46.1%	32.9%

Sample	N	Mean	Median	SD	Skewness	% > 0	% > T-bill	% > VW Market
Global	64,738	3.6683	-0.0678	36.763	51.169	48.2%	43.2%	29.3%
Global (Excl. US)	46,723	3.2211	-0.0763	34.225	62.739	47.7%	42.6%	26.6%
By Development								
Developed	49,724	3.7766	-0.0439	38.555	50.458	48.9%	43.6%	31.0%
Developed (Excl. US)	31,709	3.1791	-0.0494	36.024	65.253	48.7%	43.0%	28.0%
Emerging	15,014	3.3098	-0.1209	30.073	50.904	45.8%	41.6%	23.5%
By Region								
North America	20,056	4.8059	-0.0208	40.808	34.603	49.5%	44.9%	36.6%
Europe	12,642	2.9703	-0.0311	17.381	21.587	49.2%	43.5%	30.7%
Asia Pacific	17,026	3.1629	-0.0707	46.404	55.945	48.0%	42.2%	24.7%
By Market								
Developed								
United States	17,776	4.8797	-0.0215	42.906	33.499	49.5%	44.8%	36.6%
Homeless (US ADRs)	239	1.0109	-0.3854	5.753	7.368	35.6%	35.1%	24.7%
Canada	2,041	4.6072	0.0643	18.046	10.200	51.2%	47.1%	38.1%
Austria	177	1.7747	0.0410	5.025	4.358	51.4%	42.4%	26.0%
Belgium	298	3.5552	0.5663	9.928	5.669	62.4%	56.0%	43.3%
Denmark	365	5.0296	0.2786	20.140	8.111	57.0%	51.0%	37.3%
Finland	275	5.7199	1.1649	16.066	7.968	70.2%	65.8%	52.4%
France	1,722	2.7274	0.1248	12.447	14.144	53.7%	47.7%	32.9%
Germany	1,516	3.0184	-0.3192	29.400	23.309	42.9%	38.2%	25.5%
Greece	411	0.4072	-0.7002	2.977	4.271	30.7%	25.5%	16.8%
Ireland	86	10.5514	-0.0583	58.727	8.221	48.8%	44.2%	34.9%
Italy	725	0.9444	-0.1975	5.315	10.312	41.2%	32.4%	21.7%
Netherlands	332	3.9776	0.4087	14.784	11.117	63.9%	54.2%	39.2%
Norway	578	2.4515	0.0419	12.715	10.941	51.9%	46.2%	33.4%
Portugal	122	0.9818	0.0243	3.542	4.849	51.6%	42.6%	29.5%
Spain	379	3.0977	0.1143	13.498	9.751	55.7%	49.1%	35.1%
Sweden	1,056	5.3019	0.2989	21.368	7.890	56.5%	53.5%	42.0%
Switzerland	408	7.5638	0.9715	23.253	8.323	72.5%	67.6%	45.8%
United Kingdom	4,192	2.1517	-0.2743	12.948	15.554	43.4%	37.8%	26.2%
Australia	2,962	6.0432	-0.4321	96.983	29.318	39.1%	36.1%	27.0%
Hong Kong SAR	2,626	3.7262	-0.2747	53.150	39.371	40.4%	37.2%	21.1%
Israel	641	3.5208	0.5943	8.761	4.272	62.4%	60.1%	47.6%
Japan	3,983	1.8411	0.0202	10.297	21.756	50.6%	38.0%	17.7%
New Zealand	271	7.2575	0.3967	28.984	6.518	62.0%	56.1%	42.4%
Singapore	1,043	1.8815	-0.1508	8.629	16.498	45.9%	41.0%	24.6%
South Korea	3,060	2.0558	-0.0675	9.546	11.690	48.0%	44.2%	24.1%
Taiwan	2,440	2.6050	0.3059	11.044	14.732	58.2%	53.6%	30.5%
Emerging								
Argentina	118	5.0315	-0.0955	24.669	8.617	47.5%	39.0%	26.3%
Brazil	395	3.7745	0.0380	12.191	5.389	51.4%	49.1%	34.7%
China	4,052	2.1288	0.1879	11.372	21.613	58.1%	52.2%	23.9%
Colombia	66	9.6914	1.2206	25.723	4.594	65.2%	65.2%	51.5%
India	3,967	5.0099	-0.3358	47.858	40.666	38.4%	36.3%	24.2%
Indonesia	782	2.9943	-0.3877	18.274	9.213	34.9%	31.3%	18.7%
Malaysia	1,364	2.8065	-0.2358	22.815	22.627	44.5%	37.2%	18.3%
Mexico	251	3.5772	0.2293	10.698	5.708	55.4%	49.8%	33.5%
Nigeria	202	1.2250	-0.7057	10.888	9.875	26.2%	25.2%	17.3%
Poland	994	0.8510	-0.4127	5.183	8.501	35.6%	33.5%	19.0%
Russia	279	1.6770	-0.3163	16.192	14.705	37.3%	35.5%	20.8%
Saudi Arabia	201	2.0018	0.4798	4.106	2.569	63.2%	60.2%	30.3%
South Africa	853	4.4781	-0.3342	52.423	19.878	36.6%	31.4%	24.2%
Thailand	923	3.7199	-0.1103	14.603	8.041	47.1%	42.8%	23.7%
Turkey	441	4.6507	0.0325	15.120	5.498	51.2%	46.0%	30.6%
UAE	126	1.0594	-0.0837	3.622	3.217	46.0%	43.7%	18.3%

Table 4: Simulation Outcomes, Assuming Lognormal Monthly Returns

This table outcomes regarding simulated compound returns, when simulated stocks are assigned to 10 industries that correspond SIC codes and industry definitions provided by Kenneth French. The simulated log return for stock j in each month depends on the simulated market and industry return according to, $r_j = a_I + b_{I,M}r_{Mkt} + b_{I,Ind}r_{I,Ind} + \epsilon_I$, where r_j is the log return for the stock j, r_{Mkt} is the log market return, and , $r_{I,Ind}$ is the log return for the industry I. We select parameter estimates to match the average observed mean log return, as well as the average correlation and return variance by industry. The number of monthly observations for each stock is a random draw from the distribution of the actual number of sample observations by industry. Each simulated log return is restated as the equivalent simple return, $r_j = \log(1 + R_j)$, and the simple returns are then compounded across months for each stock. The figures in the Table below are mean outcomes across 1,000 repetitions of the simulation.

Horizon	Mean	Median	SD	Skewness	% > 0	% > T-bill	% > VW Market
			Global				
Monthly	0.0105	-0.0025	0.165	0.514	49.4%	48.8%	47.7%
Annual	0.1259	-0.0261	0.669	2.221	47.9%	46.1%	42.4%
Decade	1.4906	-0.1225	11.810	58.974	44.8%	40.4%	31.8%
Lifetime	6.8492	-0.1759	251.345	120.540	43.3%	38.0%	27.8%
			Global (Excl. US)				
Monthly	0.0100	-0.0022	0.159	0.484	49.4%	48.9%	48.0%
Annual	0.1191	-0.0225	0.635	2.027	48.1%	46.3%	43.5%
Decade	1.3897	-0.1080	9.390	42.843	45.2%	40.6%	34.0%
Lifetime	5.7967	-0.1528	151.815	97.990	43.8%	38.0%	30.1%
			United States				
Monthly	0.0122	-0.0038	0.185	0.606	49.1%	48.6%	47.0%
Annual	0.1460	-0.0385	0.780	2.917	47.2%	45.5%	40.2%
Decade	1.6750	-0.1616	19.309	56.375	43.3%	39.7%	28.6%
Lifetime	10.4875	-0.2259	518.476	76.811	41.8%	37.4%	24.9%

Table 5: Bootstrap Simulations

This table reports the results of bootstrap simulations to assess the long-term performance of global individual stocks and portfolios following Bessembinder (2018). For each month from January 1990 to December 2020, 1, 5, 25, 50, and 100 stocks are randomly selected from each sub-sample (global, non-U.S., and U.S. stocks), and value-weighted portfolio returns for the selected stocks are calculated. These returns are computed over 5-, 10-, and 31-year horizons, and the procedure is repeated 1,000 times. Each of these returns is compared to three benchmarks, zero, the U.S. Treasury bill rate, and the corresponding value-weighted market return, over the same horizon. The numbers refer to the mean across the 1,000 outcomes.

	5-Year Horizon			10-Year Horizon			31-Year Horizon		
	Global	Global (Excl. US)	United States	Global	Global (Excl. US)	United States	Global	Global (Excl. US)	United States
Single-stock positions									
% > 0	45.6%	46.2%	43.0%	42.0%	43.6%	36.9%	37.2%	36.8%	30.0%
% > T-bill	41.8%	42.3%	39.3%	36.9%	38.4%	32.3%	28.4%	26.8%	21.1%
% > VW Market	33.5%	35.8%	28.1%	27.7%	30.6%	21.5%	15.2%	17.3%	7.8%
5-stock portfolios, value-weighted									
% > 0	62.7%	60.2%	68.0%	66.2%	65.4%	69.3%	76.1%	73.0%	88.0%
% > T-bill	56.1%	53.4%	61.9%	56.5%	55.3%	60.5%	59.5%	53.3%	73.8%
% > VW Market	41.3%	43.3%	39.1%	38.0%	40.8%	35.8%	27.1%	30.5%	23.4%
25-stock portfolios, value-weighted									
% > 0	76.3%	70.8%	81.1%	85.1%	80.7%	87.5%	97.5%	94.2%	99.7%
% > T-bill	67.7%	60.8%	74.7%	73.2%	67.2%	78.2%	86.9%	75.9%	98.1%
% > VW Market	45.8%	47.0%	45.3%	45.3%	46.3%	44.8%	36.7%	40.1%	36.4%
50-stock portfolios, value-weighted									
% > 0	80.0%	75.4%	83.7%	89.6%	86.0%	91.4%	99.3%	97.6%	100.0%
% > T-bill	71.4%	64.0%	77.3%	77.6%	72.0%	82.7%	93.9%	83.2%	99.7%
% > VW Market	46.6%	48.2%	47.8%	46.5%	48.9%	47.9%	40.7%	43.6%	42.9%
100-stock portfolios, value-weighted									
% > 0	83.5%	78.3%	84.4%	93.4%	90.2%	92.8%	100.0%	99.7%	100.0%
% > T-bill	74.9%	66.1%	77.6%	82.2%	75.2%	84.7%	97.6%	89.0%	99.9%
% > VW Market	47.6%	49.2%	47.6%	48.8%	49.6%	47.1%	42.4%	45.4%	39.6%

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Table 6: Full Sample Wealth Creation, Top 50 Global Firms

This table shows the wealth creation for the fifty global firms that created the most wealth during our sample period from January 1990 to December 2020. It also shows the market from which the firm comes, the wealth creation in million USD, accumulated percentage of global gross wealth creation, accumulated percentage of global net wealth creation, the annualized dollar-weighted return, and the beginning and ending months that the firm appears in the sample.

Firm Name	Market	PERMCO/GVKEY*	Wealth Created ($Millions)	Accumulated % of Global Gross Wealth Creation	Accumulated % of Global Net Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
APPLE INC	United States	7	2,674,231	2.74%	3.53%	23.51%	199002	202012
MICROSOFT CORP	United States	8048	1,910,158	4.69%	6.06%	19.16%	199002	202012
AMAZON COM INC	United States	15473	1,569,085	6.30%	8.13%	31.09%	199706	202012
ALPHABET INC	United States	45483	979,133	7.30%	9.43%	19.34%	200409	202012
TENCENT HOLDINGS LTD	Hong Kong SAR	270615*	691,671	8.00%	10.34%	48.11%	200407	202012
TESLA INC	United States	53453	639,266	8.66%	11.19%	65.44%	201007	202012
WALMART INC	United States	21880	568,713	9.24%	11.94%	13.51%	199002	202012
FACEBOOK INC	United States	54084	553,675	9.81%	12.67%	30.39%	201206	202012
SAMSUNG ELECTRONICS CO LTD	South Korea	104604*	540,605	10.36%	13.38%	20.17%	199002	202012
JOHNSON & JOHNSON	United States	21018	535,317	10.91%	14.09%	13.86%	199002	202012
TAIWAN SEMICONDUCTOR MFG CO	Taiwan	201395*	525,515	11.44%	14.79%	18.30%	199502	202012
BERKSHIRE HATHAWAY INC DEL	United States	540	504,079	11.96%	15.45%	11.68%	199002	202012
NESTLE SA/AG	Switzerland	016603*	478,110	12.45%	16.08%	13.21%	199002	202012
PROCTER & GAMBLE CO	United States	21446	451,109	12.91%	16.68%	13.05%	199002	202012
EXXON MOBIL CORP	United States	20678	437,083	13.36%	17.26%	10.65%	199002	202012
JPMORGAN CHASE & CO	United States	20436	414,080	13.78%	17.81%	9.76%	199002	202012
HOME DEPOT INC	United States	5085	399,790	14.19%	18.33%	16.55%	199002	202012
KWEICHOW MOUTAI CO LTD	China	251321*	395,870	14.60%	18.86%	38.98%	200205	202012
VISA INC	United States	52983	384,977	14.99%	19.37%	23.77%	200804	202012
ROCHE HOLDING AG	Switzerland	025648*	377,253	15.38%	19.86%	14.09%	199002	202012
MASTERCARD INC	United States	50700	374,932	15.76%	20.36%	32.98%	200606	202012
ALIBABA GROUP HLDG	Hong Kong SAR	020530*	374,085	16.14%	20.85%	17.17%	201410	202012
UNITEDHEALTH GROUP INC	United States	7267	370,220	16.52%	21.34%	21.23%	199002	202012
ALTRIA GROUP INC	United States	21398	364,636	16.89%	21.83%	17.03%	199002	202012
INTEL CORP	United States	2367	340,219	17.24%	22.28%	15.95%	199002	202012
COCA COLA CO	United States	20468	329,515	17.58%	22.71%	12.93%	199002	202012
LVMH MOET HENNESSY LOUIS V	France	014447*	327,264	17.91%	23.14%	12.36%	199002	202012
ORACLE CORP	United States	8045	318,543	18.24%	23.56%	19.50%	199002	202012
DISNEY WALT CO	United States	20587	311,559	18.56%	23.98%	10.56%	199002	202012

NVIDIA CORP	United States	16382	309,415	18.87%	24.39%	27.51%	199902	202012
NOVARTIS AG	Switzerland	101310*	308,868	19.19%	24.79%	10.16%	199002	202012
MERCK & CO INC NEW	United States	21188	294,504	19.49%	25.18%	11.80%	199002	202012
ABBOTT LABORATORIES	United States	20017	278,012	19.78%	25.55%	14.42%	199002	202012
PEPSICO INC	United States	21384	274,708	20.06%	25.91%	12.68%	199002	202012
INTERNATIONAL BUSINESS MACHS COR	United States	20990	251,798	20.32%	26.25%	9.72%	199002	202012
GENERAL ELECTRIC CO	United States	20792	249,413	20.57%	26.58%	9.90%	199002	202012
TOYOTA MOTOR CORP	Japan	019661*	248,904	20.82%	26.90%	7.37%	199002	202012
CHEVRON CORP NEW	United States	20440	246,044	21.08%	27.23%	10.37%	199002	202012
L'OREAL SA	France	100581*	245,549	21.33%	27.55%	15.43%	199002	202012
COMCAST CORP NEW	United States	43613	243,004	21.58%	27.88%	11.81%	200212	202012
MCDONALDS CORP	United States	21177	242,631	21.82%	28.20%	13.00%	199002	202012
ADOBE INC	United States	8476	240,417	22.07%	28.51%	19.52%	199002	202012
NETFLIX INC	United States	43145	232,391	22.31%	28.82%	38.71%	200206	202012
SAUDI ARABIAN OIL CO	Saudi Arabia	334426*	231,228	22.54%	29.13%	12.91%	202001	202012
CISCO SYSTEMS INC	United States	10486	229,556	22.78%	29.43%	9.37%	199003	202012
PAYPAL HOLDINGS INC	United States	55341	227,990	23.01%	29.73%	39.18%	201508	202012
PFIZER INC	United States	21394	219,723	23.24%	30.02%	6.50%	199002	202012
CHINA CONSTR BANK CORP	China & Hong Kong SAR	274364*	216,922	23.46%	30.31%	11.63%	200512	202012
INDUSTRIAL & COMM BANKCHINA	China & Hong Kong SAR	279378*	213,988	23.68%	30.59%	7.87%	200612	202012
ASML HOLDING NV	Netherlands	061214*	209,298	23.89%	30.87%	22.13%	199504	202012

Table 7: Full Sample Wealth Reduction, Bottom 20 Global Firms

This table shows the wealth reduction for the twenty global firms with the most negative wealth creation outcomes during our sample period from January 1990 to December 2020. It also shows the market from which the firm comes, the wealth creation in million USD, percentage of global gross wealth reduction, accumulated percentage of global gross wealth reduction, the annualized dollar-weighted return, and the beginning and ending months that the firm appears in the sample.

Firm Name	Market	PERMCO/GVKEY*	Wealth Created ($Millions)	% of Global Gross Wealth Destruction	Accumulated % of Global Gross Wealth Destruction	Annualized Dollar Weighted Return	First Month	Last Month
PETROCHINA CO LTD	China & Hong Kong SAR	133870*	-552,527	2.50%	2.50%	-11.23%	200006	202012
INDUSTRIAL BANK OF JAPAN LTD	Japan	015685*	-177,456	0.80%	3.30%	-13.36%	199002	200009
SUMITOMO MITSUI FINANCIAL GR	Japan	010137*	-156,954	0.71%	4.02%	-3.09%	199002	202012
NIPPON TELEGRAPH & TELEPHONE	Japan	007908*	-144,330	0.65%	4.67%	0.67%	199002	202012
BANK TOKYO-MITSUBISHI	Japan	015627*	-128,566	0.58%	5.25%	-8.91%	199002	200103
CHINA SHENHUA ENERGY CO LTD	China & Hong Kong SAR	273153*	-115,090	0.52%	5.77%	-6.64%	200608	202012
FUJI BANK LTD	Japan	015556*	-112,527	0.51%	6.28%	-8.55%	199002	200009
DAI-ICHI KANGYO BANK LTD	Japan	015550*	-101,150	0.46%	6.74%	-8.04%	199002	200009
TOKYO ELECTRIC POWER CO HOLD	Japan	100688*	-97,850	0.44%	7.18%	-7.35%	199002	202012
SAKURA BANK LTD	Japan	015624*	-97,377	0.44%	7.62%	-9.63%	199002	200103
SANWA BANK LTD	Japan	006775*	-97,096	0.44%	8.06%	-9.86%	199002	200103
WORLDCOM INC GA NEW	United States	61	-94,472	0.43%	8.49%	-50.47%	199002	200205
VIAVI SOLUTIONS INC	United States	12583	-84,482	0.38%	8.87%	-13.15%	199312	202012
LUCENT TECHNOLOGIES INC	United States	31614	-84,196	0.38%	9.25%	-19.45%	199605	200611
UNICREDIT SPA	Italy	015549*	-80,173	0.36%	9.62%	-11.37%	199002	202012
NATWEST GROUP PLC	United Kingdom	015634*	-77,522	0.35%	9.97%	-10.08%	199002	202012
NOMURA HOLDINGS INC	Japan	015613*	-75,762	0.34%	10.31%	-2.45%	199002	202012
MITSUBISHI UFJ FINANCIAL GRP	Japan	252940*	-65,993	0.30%	10.61%	-2.37%	200105	202012
MIZUHO FINANCIAL GROUP INC	Japan	248136*	-65,445	0.30%	10.91%	-3.80%	200011	202012
WACHOVIA CORP 2ND NEW	United States	1869	-65,404	0.30%	11.20%	-25.39%	199002	200812

Table 8: Concentration of Gross and Net Wealth Creation

This table reports the number of firms, percentage of gross wealth creation (summed across firms with positive wealth creation) and net wealth creation (summed across all firms) accounted for by the best-performing 0.25%, 0.5%, 1.0%, and 5.0% of firms in each sub-sample during our sample period from January 1990 to December 2020.

Sample	Total Firms			Top 0.25% of Firms			Top 0.5% of Firms			Top 1% of Firms			Top 5% of Firms		
	# Firms	Gross Wealth ($Bil.)	Net Wealth ($Bil.)	# Firms	% of Gross Wealth	% of Net Wealth	# Firms	% of Gross Wealth	% of Net Wealth	# Firms	% of Gross Wealth	% of Net Wealth	# Firms	% of Gross Wealth	% of Net Wealth
Global	63,785	97,750	75,661	160	38.81%	50.14%	319	49.91%	64.48%	638	62.26%	80.44%	3,190	88.00%	113.69%
Global (Excl. US)	46,221	47,193	30,733	116	33.32%	51.17%	232	45.34%	69.62%	463	58.68%	90.10%	2,312	86.36%	132.62%
By Development															
Developed	49,044	84,931	67,290	123	39.30%	49.61%	246	50.43%	63.66%	491	62.71%	79.16%	2,453	88.52%	111.73%
Developed (Excl. US)	31,480	34,374	22,362	79	34.03%	52.31%	158	46.20%	71.01%	315	59.82%	91.95%	1,574	87.35%	134.27%
Emerging	14,860	12,863	8,371	38	29.60%	45.49%	75	41.25%	63.39%	149	53.82%	82.71%	743	83.14%	127.77%
By Region															
North America	19,568	52,948	46,874	49	38.84%	43.87%	98	50.07%	56.56%	196	62.06%	70.11%	979	87.74%	99.11%
Europe	12,479	17,838	14,457	32	28.67%	35.37%	63	40.44%	49.90%	125	54.14%	66.80%	624	84.80%	104.63%
Asian Pacific	17,002	14,144	5,958	43	40.81%	96.88%	86	52.69%	125.07%	171	65.05%	154.41%	851	89.12%	211.56%
By Market															
Developed															
United States	17,330	50,096	44,558	44	39.36%	44.25%	87	50.55%	56.84%	174	62.43%	70.19%	867	87.87%	98.79%
Homeless (US ADRs)	239	461	370	1	24.53%	30.58%	2	36.98%	46.10%	3	48.43%	60.36%	12	81.56%	101.67%
Canada	2,001	2,392	1,946	6	29.16%	35.83%	11	40.17%	49.37%	21	53.13%	65.29%	101	83.04%	102.05%
Austria	177	97	38	1	15.29%	39.08%	1	15.29%	39.08%	2	30.47%	77.86%	9	66.94%	171.07%
Belgium	297	423	346	1	28.54%	34.91%	2	35.75%	43.72%	3	40.03%	48.96%	15	69.61%	85.13%
Denmark	346	692	660	1	26.48%	27.76%	2	36.73%	38.51%	4	49.54%	51.94%	18	82.72%	86.72%
Finland	249	413	376	1	12.87%	14.12%	2	23.99%	26.33%	3	34.22%	37.56%	13	74.00%	81.24%
France	1,721	2,942	2,481	5	33.20%	39.38%	9	47.35%	56.16%	18	63.34%	75.12%	87	88.34%	104.78%
Germany	1,492	2,426	1,924	4	21.07%	26.57%	8	34.10%	43.00%	15	49.21%	62.05%	75	84.72%	106.81%
Greece	411	60	-53	2	41.86%	NA	3	46.40%	NA	5	54.31%	NA	21	80.46%	NA
Ireland	85	135	101	1	24.08%	32.11%	1	24.08%	32.11%	1	24.08%	32.11%	5	84.45%	112.65%
Italy	725	800	349	2	23.48%	53.75%	4	33.61%	76.96%	8	48.32%	110.63%	37	81.43%	186.43%
Netherlands	329	1,143	1,035	1	18.31%	20.22%	2	31.10%	34.36%	4	43.80%	48.38%	17	85.28%	94.21%
Norway	564	364	275	2	28.38%	37.49%	3	39.38%	52.02%	6	51.61%	68.16%	29	78.14%	103.22%
Portugal	122	82	30	1	25.21%	67.93%	1	25.21%	67.93%	2	43.47%	117.11%	7	76.89%	207.14%
Spain	376	839	649	1	13.31%	17.22%	2	24.63%	31.86%	4	41.76%	54.00%	19	77.37%	100.06%
Sweden	993	1,228	1,176	3	18.39%	19.21%	5	26.64%	27.83%	10	40.17%	41.96%	50	77.68%	81.14%
Switzerland	405	2,235	2,158	2	38.27%	39.63%	3	52.08%	53.94%	5	57.41%	59.45%	21	79.67%	82.51%
United Kingdom	4,188	3,958	2,911	11	30.51%	41.48%	21	42.94%	58.39%	42	56.68%	77.07%	210	85.77%	116.62%
Australia	2,962	1,831	1,594	8	41.55%	47.72%	15	52.71%	60.55%	30	63.48%	72.92%	149	89.75%	103.09%
Hong Kong SAR	2,609	4,610	4,026	7	39.43%	45.15%	14	50.31%	57.61%	27	61.51%	70.43%	131	89.83%	102.85%

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Israel	636	201	175	2	14.67%	16.85%	4	24.26%	27.86%	7	34.00%	39.05%	32	61.90%	71.10%
Japan	3,983	3,828	-2,219	10	28.71%	NA	20	43.50%	NA	40	58.99%	NA	200	88.21%	NA
New Zealand	271	152	138	1	12.06%	13.28%	2	21.65%	23.84%	3	29.94%	32.97%	14	66.08%	72.76%
Singapore	1,042	469	350	3	27.34%	36.62%	6	43.58%	58.36%	11	55.83%	74.77%	53	85.45%	114.43%
South Korea	3,060	1,616	1,149	8	52.41%	73.70%	16	62.15%	87.39%	31	71.68%	100.80%	153	89.08%	125.27%
Taiwan	2,439	1,436	745	7	50.68%	97.76%	13	57.83%	111.55%	25	66.37%	128.03%	122	86.24%	166.36%
Emerging															
Argentina	114	52	22	1	40.08%	96.02%	1	40.08%	96.02%	2	58.96%	141.27%	6	82.95%	198.75%
Brazil	390	600	424	1	15.23%	21.55%	2	22.40%	31.69%	4	32.29%	45.67%	20	69.34%	98.07%
China	3,962	6,214	3,822	10	23.44%	38.12%	20	33.44%	54.37%	40	46.79%	76.07%	199	74.78%	121.58%
Colombia	66	107	99	1	22.46%	24.20%	1	22.46%	24.20%	1	22.46%	24.20%	4	46.10%	49.68%
India	3,967	2,102	1,630	10	38.26%	49.34%	20	52.08%	67.16%	40	65.46%	84.43%	199	92.08%	118.75%
Indonesia	781	354	213	2	30.37%	50.57%	4	43.72%	72.81%	8	61.51%	102.43%	40	88.80%	147.88%
Malaysia	1,364	383	188	4	20.70%	42.23%	7	29.08%	59.34%	14	44.03%	89.83%	69	81.47%	166.22%
Mexico	205	445	340	1	14.29%	18.67%	2	25.79%	33.71%	3	36.41%	47.59%	11	72.03%	94.15%
Nigeria	202	23	-24	1	17.95%	NA	2	35.72%	NA	3	51.02%	NA	11	92.03%	NA
Poland	994	142	72	3	35.01%	69.00%	5	44.58%	87.87%	10	61.86%	121.93%	50	89.44%	176.28%
Russia	276	462	263	1	19.60%	34.50%	2	37.13%	65.36%	3	46.11%	81.16%	14	87.53%	154.08%
Saudi Arabia	201	691	614	1	33.44%	37.68%	2	53.08%	59.80%	3	61.22%	68.97%	11	79.81%	89.91%
South Africa	852	513	259	3	31.99%	63.34%	5	39.54%	78.28%	9	51.12%	101.22%	43	88.24%	174.71%
Thailand	923	445	279	3	26.03%	41.57%	5	35.23%	56.27%	10	50.50%	80.65%	47	83.90%	133.99%
Turkey	437	148	92	2	14.68%	23.65%	3	21.28%	34.29%	5	32.99%	53.15%	22	74.79%	120.49%
UAE	126	181	79	1	32.13%	74.12%	1	32.13%	74.12%	2	45.92%	105.93%	7	80.01%	184.57%

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Table 9: Market-Level Cross-Sectional Analysis

This table reports on cross-sectional regressions of the determinants of (i) the proportion of stocks in each market whose buy-and-hold returns greater than the matched U.S. Treasury bill rates (Panel A) and (ii) the percentage of total gross wealth created in each market by the 0.5% best-performing firms (Panel B) for 42 markets. The original dependent variable (Y) is logistic transformed to $\ln(Y/(1-Y))$. Standard deviation, Skewness, and Mean are the time-series averages of the cross-sectional standard deviation, skewness, and mean of monthly stock return by market. Number of stocks is the time-series average of the number of stocks for each market. Real GDP growth % is the real GDP growth rate (in %) during the sample period for each market. GDP per capita ($ U.S.) is the 2020 GDP per capita in U.S. dollars. Individualism is the Hofstede (2001) individualism index for the markets with the index value and zero for markets with missing value. I_{Missing Individualism} equals one for markets with missing value of Individualism and zero otherwise. Risk taking is the Global Preference Survey (GPS) risk taking preference index from Falk, Becker, Dohmen, Enke, Huffman, and Sunde (2018) for markets with the index value and zero for markets with missing value. I_{Missing Risk taking} equals one for markets with the missing value of Risk taking and zero otherwise. I_{Developed} equals one if a market belongs to IMF developed markets and zero otherwise. The t–statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Panel A					Panel B				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Buy-and-Hold Returns > T-bill (%)					Gross Wealth Creation by the Top 0.5% (%)				
Standard Deviation	-4.727**	-5.538***			-6.522***	5.504*	5.928**			7.858**
	(-2.28)	(-3.95)			(-3.73)	(1.87)	(2.07)			(2.19)
Skewness	-0.614**	-0.773***			-0.743***	-0.096	-0.013			-0.390
	(-2.56)	(-4.74)			(-3.31)	(-0.28)	(-0.04)			(-0.85)
Mean		58.112***			56.336***		-30.374*			-32.695*
		(6.92)			(6.31)		(-1.77)			(-1.78)
Real GDP Growth %			0.024		0.044			0.048		-0.019
			(0.58)		(1.54)			(0.93)		(-0.33)
GDP Per Capita ($US)			0.010**		0.007			0.005		0.006
			(2.17)		(1.51)			(0.84)		(0.70)
Individualism				-0.077	-0.324				-0.471	-1.207*
				(-0.19)	(-1.12)				(-1.03)	(-2.04)
Risk Taking				0.127	0.182				0.498	0.339
				(0.40)	(1.08)				(1.35)	(0.98)
I_{Missing Individualism}				-0.068	-0.474**				-0.113	-0.092
				(-0.18)	(-2.05)				(-0.26)	(-0.19)
I_{Missing RiskTaking}				0.034	-0.068				-0.058	0.027
				(0.18)	(-0.65)				(-0.27)	(0.13)
I_{Developed}				0.192	0.004				0.276	0.158
				(0.99)	(0.03)				(1.23)	(0.54)
Number of Stocks					0.012					0.058*
					(0.79)					(1.94)
Constant	1.212***	1.067***	-0.527**	-0.291	1.087***	-1.349***	-1.273***	-0.836***	-0.485**	-0.860
	(3.90)	(5.07)	(-2.38)	(-1.49)	(3.28)	(-3.07)	(-2.96)	(-3.05)	(-2.14)	(-1.27)
Adj. R²	0.34	0.70	0.07	-0.09	0.72	0.05	0.10	-0.02	-0.05	0.16
N	42	42	42	42	42	42	42	42	42	42

Internet Data Appendix for
Long-term shareholder returns: Evidence from 64,000 global stocks

Appendix A: Sources, Sample election, and Filters

In this appendix, we describe our data sources, sample selection, as well as the error filters and corrections that we rely on. While many authors study returns to equity portfolios or aggregate market outcomes, we wish to study a broad cross-section of individual stocks. Data errors, resulting from either the inclusion of an incorrect observation or the filtering of a correct observation, are potentially more damaging in our study of the distribution of compound returns to individual stocks as compared, for example, to a study of mean returns to value-weighted stock portfolios. Prior studies typically exclude or winsorize unusually large returns. While we also exclude data for certain stocks and time periods where it is probable that large errors are prevalent, in other cases we alter the raw data (e.g., shifting a decimal) on occasions where it seems likely that errors can be corrected or mitigated. While our algorithms are undoubtedly imperfect, the goal is to mitigate potentially influential data errors, while retaining as much data as possible, including outlier observations that do not represent errors.

Our focus is on outcomes to investors in publicly traded stocks. We therefore exclude preferred stocks and real estate investment trusts. Also, to avoid double counting of investment results, we exclude mutual funds, hedge funds, and exchange-traded funds. Further, for stocks traded on multiple exchanges we avoid double counting by focusing only on outcomes in a single "home" market.

1.   Data sources and return definitions

For U.S. firms, data is retrieved from the CRSP monthly stock files. For Canadian firms, data is obtained from Compustat/North America. For all other markets, we retrieve data from Compustat/Global. We include common stocks listed on the major stock exchange(s) in each market. Local currency outcomes are converted into U.S. dollars using end-of-month exchange rates from Compustat/Global and

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Compustat/North America. We obtain the 30-day U.S. Treasury bill data from Professor Ken French's data library.

We rely on several Compustat data libraries, including the Security Daily library (secd) and the Security Monthly library (secm) for Canadian stocks and ADRs, and for other markets the Security Daily library (gsecd). We also obtain data from the Compustat - Fundamentals Quarterly library (fundq). The CRSP/Compustat Merged (CCM) library is used to link CRSP stocks to Compustat companies and securities. We rely also on reference data, including Country/Market (r_country), Exchange Trading Codes (r_ex_codes), and Global Industry Codes (r_giccd). We obtain *security* descriptor data from the Data Group (security), including the Unique Issue ID (IID), Security Description (DSCI), Stock Exchange (EXCHG), Stock Exchange Country/Market Code (EXCNTRY), and Issue Type (TPCI). We obtain *company* descriptor data from the Data Group (company), including Global Company Key (GVKEY), Primary Issue Tag - Rest of World (PRIROW), Primary Issue Tag - Canada (PRICAN), Primary Issue Tag - United States of America (PRIUSA), Business Description (BUSDESC), Company Name (CONM), Company Legal Name (CONML), ISO Country/Market Code - Headquarters (LOC), GICS Groups (GGROUP), GICS Industries (GIND), and GICS Sub-Industries (GSUBIND).

For U.S. stocks, CRSP reports monthly rates of return and end-of-month share prices measured in U.S. dollars. For international stocks, returns must be computed from daily data series included in the Compustat databases. We rely on the following Compustat variables:

- PRCCD -- Price - Close - Daily
- CSHOC -- Shares Outstanding
- AJEXDI -- Adjustment Factor (Issue)-Cumulative by Ex-Date
- TRFD -- Daily Total Return Factor
- CURCDD -- ISO Currency Code - Daily
- QUNIT -- Price Quotation Unit
- ADRRC -- ADR Ratio - Daily

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We compute the time t share price in U.S. dollars as $PRCFX(t) = PRCCD(t)/FX(t)/QUNIT(t)$, where $FX(t)$ is the currency exchange rate per U.S. dollar provided by Compustat from the Data Group (exrt_mth). Market capitalization in U.S. dollars at time t is $SZ(t) = PRCFX(t) \times CSHOC(t)$. (For ADR stocks, CSHOC is modified as CSHOC/ADRRC, to obtain total shares outstanding.) We extract monthly data from the daily data by focusing on the latest date with a non-zero daily closing price. To retain a stock/month in the sample, we require at least five daily observations with positive closing prices. The month t return in dollars, inclusive of dividends is computed as $RET(t) = [PRCFX(t)/AJEXDI(t) \times TRFD(t)]/[PRCFX(tlag)/AJEXDI(tlag) \times TRFD(tlag)] - 1$. Typically, $tlag$ refers to month t-1, but in some cases where data is missing the return is computed over a longer horizon.

2.   Markets included in the study

We obtain data for stocks in the forty largest markets based on average GDP during the 1990-2020 period as reported by the International Monetary Fund (IMF). We exclude Iran because stock return data is available for only ten years, and replace it with Portugal (the 41st largest economy). In addition, we include Singapore and New Zealand because of their status as prominent developed economies. We also include those stocks that are traded as American Deposit Receipts (ADRs), but do not have during the period of ADR trading publicly listed primary common stock data in Compustat. Including these "homeless ADRs" as a distinct "market", our final sample includes stocks for forty-three markets.

We assign each market as a developed or an emerging market based on IMF classifications. The 27 developed markets include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Israel, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, the U.K., the U.S., and homeless ADRs. The 16 emerging markets included in the study are Argentina, Brazil, China, Columbia, India, Indonesia, Malaysia, Mexico, Nigeria, Poland, Russia, Saudi Arabia, South Africa, Thailand, Turkey, and the United Arab Emirates. We further group the developed markets into three regions: North America (Canada, the

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U.S., and homeless ADRs), Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the U.K.), and Asia Pacific (Australia, Hong Kong, Israel, Japan, New Zealand, Singapore, South Korea, and Taiwan). The remaining markets are not grouped into a region because theirs are typically smaller markets, scattered across Latin America, Asia, and the Middle East.

3. Selecting common stocks

We identify U.S. common stocks based on the CRSP sharecode variable, SHRCD = 10, 11, and 12. The identification of common stocks outside the U.S. is more complicated. We initially select securities with Compustat Issue Type TPCI = '0' as well as ADR stocks with TPCI = 'F'. We exclude securities that contain the "%" symbol in the DSCI field (as they are likely preferred stocks with a fixed dividend). We also exclude stocks where the EXCHG field contains "Broker", "Fund Manager", "Fund Managers", "OTC", "OTC Bulletin Board", "Other-OTC", "Subsidiary/Private", "Unlisted Evaluated Equity", "Unlisted Securities Market", "Non-traded Company or Security", or "Stock Connect".

4. Main stock exchange filters

Although a market may have multiple stock exchanges, some can be very small. We exclude minor exchanges based on dollar trading volume. Since volume data can contain errors, the assessment of the exchanges to be excluded relies on some filters. We first compute dollar trading volume on a stock/month basis as $DVOL = CSHTR \times PRCFX$, where $CSHTR$ is share trading volume and $PRCFX$ is the stock price per share in U.S. dollars. We truncate share turnover ($CSHTR/shares\ outstanding$) at 100, and for each market, winsorize monthly dollar trading volume at the top one percent. We exclude from our study stocks listed on exchanges that account for less than two percent of total dollar trading volume among exchanges in that market, as well as stocks listed on exchanges that never have more than

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thirty listed stocks.[26] Having implemented these filters, our sample contains 70,971 stocks and 9,234,704 stock-month observations for the January 1990 to December 2020 period.

5.   Screening investment funds and trusts

Visual examination reveals that the set of non-U.S. securities with Issue Type TPCI = '0' contains a substantial number of investment funds and trusts, including mutual funds, hedge funds, and exchange-traded funds. To avoid double counting and to focus on returns and wealth creation from publicly traded common stocks, we seek to exclude these securities. We do so as follows: [27]

a. First, we identify securities that are likely to be Real Estate Investment Trusts, based on GSUBIND = 40401010 or GIND = 404020.

b. Second, we identify securities that are likely to be funds or trusts, based on their company name variables. In particular, we focus on securities for which CONM or CONML contains "_fund", "_trust", "venture_capital_trust", "_vct", or "_reit".

c. Third, we consider the information provided by the business description variable BUSDESC. To avoid false positives in the following step, we remove the whole words that represent company name (i.e., CONM or CONML) as well as the following words and phrases (when they occur) from the BUSDESC variable: '_fund_advisor', '_fund_manage', '_fund_benchmark', '_fund_raising', '_fund_administration', '_fund_transfer, '_fund_service', '_fund_product', '_fund_sponsor', '_fund_plan_sponsor', '_fund_corp', '_fund_company', '_fund_group', '_trust_advisor', '_trust_bank', '_trust_manager', '_trust_sponsor', or '_reit_manager'. We then identify securities that may be funds or trusts based on BUSDESC, if any of the following are true:

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[26] The latter condition removes only one exchange, the Nasdaq Dubai. We were informed by a Compustat representative than one data provider in 2018 misclassified several JASDAQ-listed stocks as listed under Tokyo Stock Exchange (TSE). These firms are now correctly identified as Jasdaq stocks (and excluded from the study by the minimum two percent volume data filter).

[27] Here, we use the underline character (_) to indicate a blank space.

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(i)   BUSDESC contains any word patterns in the sequences of {str1,str2,str3} or

{str1,str2,str4,str3}, where str1 = {'_is_a_', '_was_a_', '_as_a_', '_is_an_', '_was_an_',

'_as_an_'}, str2 = {'_fund_', '_fund', '_etf', '_reit', 'property_trust', 'investment_trust',

'venture_capital_trust', '_vct'}, str3 = {'.'} and str4 = {'firm', 'company', 'companies',

'_by_', '_for_', '_of_', '_to_', '_through_'}.

(ii)   BUSDESC contains {'_fund_invests', '_fund,_invests', '_fund_engages', '_fund,_engages',

'_fund_operates', '_fund,_operates'} or {'_trust_invests', '_trust,_invests',

'_trust_engages', '_trust,_engages', '_trust_operates', '_trust,_operates'}.

(iii)   BUSDESC contains {'_reit', '_an_investment_trust', or '_real_estate_investment_trust'} in

the beginning 100 characters and there is none of {'_by_', '_for_', '_of_', '_to_'

,'_through_'} prior to the indicated string found.

Having completed steps (a) to (c) above, we exclude those securities that are identified as

potential mutual funds or trusts, except for those that can be identified as banks (an example being

Northern Trust Corporation). We identify securities as banks, and do not exclude them, if they meet

condition (b) and the industry code GGROUP equals 4010, if the company name fields CONM or

CONML contains 'bank' at the beginning or end, or if the company name fields contain

"trust_&_banking" or "securities_co".

6.   Decimal errors

Visual examination indicates that data errors for non-U.S. stocks are not infrequent, especially for

emerging markets and for smaller capitalization issues. One form of data error is an erroneous shift of the

decimal, either to the left or to the right, for one or more periods. We seek to repair temporary decimal

shift errors in six key variables that are used to compute market capitalization and returns for non-U.S.

stocks. These are PRC, the stock price per share; $AJEX$, a cumulative adjustment factor; TRF, a total

return factor; $CSHO$, common shares outstanding; $QUNIT$ the price quotation unit; and, for ADRs,

$ADRRC$, the ADR-to-regular stock ratio.

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Let X be a variable of interest and define $RatX(t; s_1; s_2)$ as the ratio of $X(t + s_1)/X(t + s_2)$, where t identifies the current month.

a. Repairing a decimal error that pertains to only a single date (immediate reversal). An example would be the sequence of stock prices 8.56, 69.50, and 7.32 in t = -1, 0, and +1. The natural repair would be to use 6.95 = 69.50/10 to replace 69.50 at t =0. More broadly, we proceed as follows. If $RatX(t; 0; -1) > 5 \times 10^{N-1}$ and $RatX(t; 0; 1) > 5 \times 10^{N-1}$, we replace $X(t)$ by $Xa(t) = X(t)/10^N$, where N is the maximal positive integer such that $5 \times 10^{N-1} < min\{RatX(t; 0; -1), RatX(t; 0; 1)\}$. In other words, $X(t)$ is scaled by 10 if both $RatX(t; 0; -1)$ and $RatX(t; 0; 1)$ are in the interval [5,50) and scaled by 100 in the interval [50,500), etc. Analogously, if $RatX(t; 0; -1) < 1/(5 \times 10^{N-1})$ and $RatX(t; 0; 1) < 1/(5 \times 10^{N-1})$, we replace $X(t)$ by $Xa(t) = X(t) \times 10^N$, where N is the maximal positive integer such that $1/(5 \times 10^{N-1}) > max\{RatX(t; 0; -1), RatX(t; 0; 1)\}$. That is, $X(t)$ is multiplied by 10 if both $RatX(t; 0; -1)$ and $RatX(t; 0; 1)$ are in the interval [1/50,1/5) and multiplied by 100 in the interval [1/500,1/50) and so on so forth.

b. Repairing decimal errors that persist up to three periods. An example is the Brazilian stock MMX MINERACAO E METALICOS SA, with CSHO (shares outstanding) values of 305.12 from August 2009 to January 2010, 35.242 from February 2010 to April 2010, and 472.973 from May 2010 to December 2010. In this case, we would like to replace the value 35.242 with 352.42 during the three periods that it occurs. Formally, we search for $nlag$ from 1 to 3 and $nfwd$ from 1 to 3. If $RatX(t; 0; -nlag) > 5 \times 10^{N-1}$ and $RatX(t; 0; nfwd) > 5 \times 10^{N-1}$ together with the conditions that $RatX(t; -n1; -nlag) > 5 \times 10^{N-1}$, $RatX(t; n2; nfwd) > 5 \times 10^{N-1}$, and $|RatX(t; 0; n2) - 1| < 30\%$ for all $n1 = 1, ..., nlag$-1 and for all $n2 = 1, ..., nfwd$-1, we then replace $X(t)$ by $Xa(t) = X(t)/10^N$, where N is the maximal positive integer such that $5 \times 10^{N-1} < min\{RatX(t; 0; -nlag), RatX(t; 0; nfwd)\}$. On the other hand, if $RatX(t, 0, -nlag) < 1/(5 \times 10^{N-1})$ and $RatX(t, 0, nfwd) < 1/(5 \times 10^{N-1})$ together with the

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conditions that $RatX(t; \text{-}n1; \text{-}nlag) < 1/(5 \times 10^{N-1})$, $RatX(t; n2; nfwd) < 1/(5 \times 10^{N-1})$,

and $|RatX(t; 0; n2) - 1| < 30\%$ for all $n1$ and all $n2$ defined above, we then replace $X(t) = X(t) \times 10^N$, where N is the maximal positive integer such that $1/(5 \times 10^{N-1}) > max\{RatX(t; 0; \text{-}nlag), RatX(t; 0; nfwd)\}$.

c. We first apply the 3-period correction procedure to {'TRF', 'QUNIT', 'ADRRC'} independently. For share price and shares outstanding we apply the 3-period decimal error correction procedure to the adjusted share price (ex-dividend) $adjPRC = PRCFX/AJEX$ and the adjusted shares outstanding $adjCSHO = CSHOC \times AJEX$.

7. Merging Compustat North America data for common stock selection

The variable CSHOC (shares outstanding at the security level) is not available prior to April 1998 in the Compustat North America data, which we rely on for Canadian stocks and ADRs. As a consequence, we must rely for the pre-1998 period on data regarding shares outstanding at the firm level. We proceed as follows:

a. For Canadian stocks and U.S. ADR stocks in Compustat North America, we use data from Compustat secd data library if available and otherwise use the data from the Compustat secm data library. If secd data is available for less than five daily observations, we drop the month.

b. If CSHOC is missing, we delete observations prior to April 1998 if aggregate stock-level $CSHOC$ summed over stock issues has an unexplained jump (up or down) of 10% or more at the first available fiscal quarter end. Otherwise, we use the proportional firm-level shares outstanding provided by Compustat - Fundamentals Quarterly library (fundq) to replace $CSHOC$. For ADR stocks, we drop observations if ADRRC is missing.

c. We select unique stock issues using GVKEY, IID (unique issue ID), and DSCI. For companies with stock listed in both Canada and the US, we focus on the stock with the longest period of listing. If DSCI for the primary issue contains the keyword of "CL" or "SER" (e.g., CL A),

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which indicates multiple share classes, we continue to search for other IIDs (e.g., CL B, CL C, etc.) with the same GVKEY. Specifically, for each company j, we select the fiscal quarter end $DATADATE(j, q)$ such that its stock-level shares outstanding $CSHOC(js, qm)$ are available for the first time at $qm = DATADATE(j, q)$, where $js = j1, j2, ..., jN$ for N different unique share classes. If $|sum(CSHOC(js, qm))/CSHOQ(j, q) - 1| < 10\%$, we then fill the missing value for $CSHOC(js, m)$ in month m with $w(js) \times CSHOQ(j, q^*) \times AJEX(js, q^*)/AJEX(js, m)$, where the weight $w(js) = CSHOC(js, qm)/sum\{CSHOC(js, qm); js = j1, j2, ..., jN\}$ and q^* is the quarter that exceeds month m but no more than one year.

8. Filters based on trading volume, share price, market capitalization, and initial errors

Our repair of decimal errors described in Section 6 does not address all types of errors that are observable in the data. Visual examination indicates that the remaining errors tend to be most frequent in low trading volume, low share price, and low market capitalization stocks, and also in the earliest months that a stock is contained in the data. We further filter securities according to the following sequence.

a. *Trading volume filter*: We compute the average number of daily observations with positive trading volume for each stock and month. We then eliminate from the study the two percent of stocks with the lowest average. This filter reduces the sample to 70,455 stocks and 9,222,231 stock-month observations.

b. *AJEX and QUNIT filtering*: We drop stocks where the adjustment factor $AJEX$ ever takes the value of zero. We also drop stocks with changes in $QUNIT$ (the price quotation unit) in the absence of a change in the currency code CURCD, and where the contemporaneous change in $adjPRCFX$ (the adjusted share price in U.S. dollars) is higher than 50% or below -50%. This filter reduces the sample to 70,432 stocks and 9,219,725 stock-month observations.

c. *Low share price and low market capitalization filtering*: We delete the remaining history for any stock if its market capitalization drops below $US 1 million or its share price drops below $US 0.01. Exceptions are Brazil, Indonesia, Nigeria, and Turkey where we retain stocks unless their

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share price drops below $US 0.001, since many actives stocks on those markets have very low share prices. All observations are deleted for stocks where the initial observation indicates a share price below $US 0.01/$US 0.001 or market capitalization below $US 1 million. After this filter, the sample contains 69,057 stocks and 8,565,924 stock-month observations.

d. *Filtering data gaps and measurement of returns*: In those cases where the data contain gaps of more than 11 months, we drop the first month after the data resumes.[28] In cases where there is a gap of eleven or fewer months we measure the return by $RET(t) = adjPRCFX(t)/adjPRCFX(tlag) \times TRF(t)/TRF(tlag) - 1$, where TRF is the Compustat adjustment factor for cash equivalent distributions. If TRF is missing, it is filled with the value within the past one year if available, or the value within the future one year if available. If no TRF observation is available with one year, the return is set to be missing. With these filters, the sample is reduced to 68,391 stocks and 8,492,939 stock-month observations.

e. *Adjusted shares outstanding filtering*: We observe some large changes in the number of adjusted (for stock splits) shares outstanding, in the absence of commensurate changes in market capitalization. With the exception of stocks listed in China, where reverse mergers are common (see Lee, Qu, and Shen, 2017; Liu, Stambaugh, and Yuan, 2019), we deem monthly changes in adjusted shares outstanding by a factor of more than 5x to be indicative of likely data errors. Letting $adjCSHO$ denote adjusted shares outstanding and SZ denote market capitalization, we proceed as follows:

(1) Define an observation as a jump if

- $adjCSHO(t)/adjCSHO(tlag) \geq 5$ and $SZ(t)/SZ(tlag) \geq 2.5$ (for China: $adjCSHO(t)/adjCSHO(tlag) \geq 50$ and $SZ(t)/SZ(tlag) \geq 25$) or

- $adjCSHO(t)/adjCSHO(tlag) \leq 0.2$ and $SZ(t)/SZ(tlag) \leq 0.4$.

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[28] When we compare each stock's accumulated returns to benchmarks defined by the Treasury bill rates or value-weighted market returns we omit the same months from the benchmark returns.

(2) If any jump appears during the lesser of the first 24 months of data for the firm or during the first 20% of the observation for that firm, we delete all observations up to and including the jump.

(3) For observations not deleted by criterion (2) above, we proceed as follows.

- For paired jumps (i.e., for jumps that are reversed by an offsetting jump), we adjust $adjCSHO$ inside the interval smoothly. Specifically, we use the smaller value between two ends, $min\{adjCSHO(t\text{-}1), adjCSHO(s)\}$, to replace the values of $adjCSHO$ inside the interval $[t,s\text{-}1]$.

- For unpaired jumps (where there is no reversal), we adjust $adjCSHO$ to be smaller for observations before or after the jumps. For up-jumps, $adjCSHO$ starting at t until the end of sample is multiplied by $adjCSHO(t\text{-}1)/adjCSHO(t)$. For down-jumps, $adjCSHO$ since the beginning and ending at t is multiplied by $adjCSHO(t)/adjCSHO(t\text{-}1)$.

We then recompute the market capitalization SZ based on the updated $adjCSHO$ data. After these corrections, the sample continues to consist of 68,391 stocks, but is reduced to 8,490,221 stock month observations.

f. *Filtering market capitalization*: We identify cases where the market capitalization variable (SZ) jumps in a manner not supported by reported returns or changes in shares outstanding. We proceed as follows:

(1) Define an observation as a jump if

- $SZ(t)/SZ(tlag) - 1 > 9$ and $RET < 2$ or

- $SZ(t)/SZ(tlag) - 1 < -0.9$ and $RET > -0.5$.

(2) If any jump appears during the lesser of the first 24 months of data for the firm or during the first 20% of the observation for that firm, we delete all observations up to and including the jump.

(3) For observations not deleted by the above criterion, we adjust the size variable. In the case of paired jumps (where the change is reversed), we define SZ within the interval smoothly. Specifically, we use the smaller value between two ends, $\min\{SZ(t\text{-}1) \times (1 + RETX(t)), SZ(s)/(1 + RETX(s))\}$, to replace the values of SZ within the interval $[t,s\text{-}1]$. In the case of unpaired jumps $[t,s]$ (when the change is not reversed), we adjust SZ downward before or after the jumps. For up-jumps, SZ starting at t until the end is multiplied by $SZ(t\text{-}1)/SZ(t) \times (1 + RETX(t))$. For down-jumps, SZ since beginning and ending at t is multiplied by $SZ(t)/SZ(t\text{-}1)/(1 + RETX(t))$.

After implementing these filters, the sample continues to contain 68,391 stocks, while the number of stock-month observations is reduced to 8,490,163.

g. *Filtering returns*: We correct large returns that are not accompanied by commensurate changes in market capitalization. In particular, we delete observations where (i) $RET > 0.8$ and $SZ(t)/SZ(tlag) - 1 < 0.5$ or (ii) $RET < -0.8$ and $SZ(t)/SZ(tlag) - 1 > -0.5$. After this filter, the sample continues to contain 68,391 stocks, but stock-month observations are reduced to 8,489,776.

h. *Filtering initial share price and market cap*: We observe a number of erroneous share price ($adjPRCFX$) and market capitalization observations that were not captured by earlier filters, particularly in the first few observations after a stock enters the database. We delete observations that are among the first three for the stock if (i) $adjPRCFX(t)/adjPRCFX(tlag) > 10$ or $SZ(t)/SZ(tlag) > 10$ or (ii) $adjPRCFX(t)/adjPRCFX(tlag) < 1/10$ or $SZ(t)/SZ(tlag) < 1/10$. After implementing this filter the sample contains 68,390 stocks and 8,489,405 stock-month observations.

i. *Treatment of inactive returns, delisting returns, and short-lived stocks*: We observe a number of non-U.S. stocks indicated to be active by the security status (SECSTAT) variable, but for which return data is unavailable (as the identical price is reported in each month) for twelve or more

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months before the end of the sample. We view these stocks to be effectively delisted and delete

observations with identical share prices, and following Shumway (1997), we set the final return

on these stocks to -30%. For non-U.S. stocks that are indicated to have been delisted, and where

the delisting reason is bankruptcy (DLRSN = 02) or liquidation (DLRSN = 03), we also set the

final return to -30%. For U.S. stocks we incorporate CRSP delisting returns, and also follow

Shumway (1997). In particular, if the delisting return is available, the return is adjusted as $(1 +$

$return) \times (1 + delisted\ return) - 1$. If the delisting return is missing and the delisting code is

500, 520, 551-573, 580, 574, or 584, we set the return to -30%. Finally, we delete stocks with

less than six monthly observations in total. After these filters, the sample contains 68,392 stocks

and 8,489,561stock-month observations.

9. Primary issues and multiple share class selection:

Some sample firms issue multiple classes of common stock, and some stocks are traded in more

than one market. When studying overall outcomes to a firm's shareholders it is natural to focus on results

that are aggregated across share classes. Also, to avoid double counting, we assign each firm to just one

market. We proceed as follows.

We identify 18,236 CRSP stocks and 47,696 Compustat stocks. We are able to link 17,866 of the

CRSP stocks to the Compustat GVKEY variable. Of these, 774 CRSP stocks were also identified as non-

U.S. Compustat stocks. Examples include UNILEVER NV, ROYAL BANK CANADA MONTREAL,

MEDTRONIC PLC, and AON PLC. Among these issues, (as well as issues listed in multiple non-U.S.

markets), we retain in the study only the issue with the longest listing period. If there are two primary

issues with the same listing period, we retain the stock in the headquarter market (LOC). Among the 772

CRSP firms also present in the non-U.S. Compustat data, we ultimately assign 320 as U.S. firms and 452

as non-U.S. firms. We retain homeless ADR stocks in the sample only if the database contains no other

stock with the same GVKEY during the listing time of the ADR stock. Those ADRs with a minimum of

six monthly return observations that also appear on a non-U.S. market are assigned to the non-U.S.

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markets for purposes of tabulating shareholder wealth creation by market. Prominent examples are ALIBABA GROUP HLDG, NETEASE INC, and JD.COM INC, which listed in Hong Kong in November 2019 and June 2020, respectively, after previously trading as ADRs. We also count the performance for ADR stocks after the voluntarily delisting of their common stocks and assign them to their home markets.

To identify multiple securities issued by the same U.S. (CRSP) firm, we focus on stocks with differing PERMNO but common PERMCO. For non-U.S. stocks we retain the primary issue with IID (unique issue ID) = PRICAN in Canada or IID = PRIROW in the rest of the world, and we identify multiple classes of stock from the same issuer based on the keywords of "CL" or "SER" contained in the Security Description (DSCI).

In a few cases a company's primary issue may not be in the form of common stock (examples include Volkswagen's "preference shares" and Roche's "bearer shares"), even though the primary issues retain the key economic characteristics of common stock. Therefore, for (only) those companies whose primary issues are not common stocks, we retain in the sample *special* stocks (TPCI = "Q'), and *preferred* stocks (TPCI = '1').

In addition, we note that the sample contains seven dual-listed companies, where economically identical stocks trade with different company identifiers. We follow De Jong, Rosenthal, and Van Dijk (2009) and Bedi, Richards, and Tennant (2003) to manually combine these. The companies are:

a. UNILEVER NV & UNILEVER PLC; Netherlands & United Kingdom.

b. RIO TINTO GROUP (AUS) & RIO TINTO GROUP (GBR); Australia & United Kingdom.

c. BHP GROUP LTD & BILLITON PLC; Australia & United Kingdom.

d. RELX NV & RELX PLC; Netherlands & United Kingdom.

e. CARNIVAL CORP/PLC (GBR) & CARNIVAL CORP; United Kingdom & United States.

f. MONDI PLC/LTD (ZAF) & MONDI PLC/LTD (GBR); South Africa & United Kingdom.

g. INVESTEC LTD & INVESTEC PLC; South Africa & United Kingdom.

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After these adjustments, the final sample contains 63,785 firms, 64,738 stocks and 8,370,770 stock-month observations from January 1990 to December 2020. Among the 8.37 million stock-months in the final sample, 1.7% contain either a return or a market capitalization observation that has been modified by our algorithms as described here.

Appendix B: Description of the Log Normal Simulation

We describe the procedure to simulate log returns for stocks in our sample. For our simulation study, we incorporate a block diagonal covariance structure that accommodates observed average correlations of stocks within each of ten industries (based on stock SIC codes and industry definitions on Ken French's website) as well as the dependence of all stock returns on common market outcomes. The simulated log return for stock j in each month depends on the simulated market and industry return according to, $r_j = a_I + b_{I,M}r_{Mkt} + b_{I,Ind}r_{I,Ind} + \epsilon_I$, where r_j is the log return for the stock j, r_{Mkt} is the log market return, and , $r_{I,Ind}$ is the log return for the industry I.

We select parameter estimates to match the average observed mean log return, as well as the average correlation and return variance by industry. The factor model implies that the covariance between two stocks, $Mlcov$, is characterized by the factor loadings, $b = [b_{I,M}, b_{I,Ind}]'$, and the factor covariance, $\Sigma_f = \mathbb{V}ar([r_{Mkt}, r_{I,Ind}])$, in a quadratic form, $Mlcov = b\Sigma_f b'$. We use a multiplicative coefficient χ to adjust the factor loadings to obtain the adjusted model covariance, $adjMlcov = Mlcov * \chi^2$, and we then match the average correlation ($Acorr$) and average variance ($Avar$) in each industry using the condition:

$$Acorr = \frac{adjMlcov}{adjMlcov + \sigma_{\epsilon,I}^2}, \text{and}$$

$$Avar = adjMlcov + \sigma_{\epsilon,I}^2,$$

where $\sigma_{\epsilon,I}^2$ is the idiosyncratic variance. We therefore set the idiosyncratic variance as $\sigma_{\epsilon,I}^2 = Avar * (1 - Acorr)$ and multiply the factor loadings b by $\chi = \sqrt{Acorr * Avar / Mlcov}$. Using the adjusted

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parameters, we then re-calculate the intercept parameter a_I to match the average log stock returns in the

industry. We use the adjusted parameters to generate multivariate normal random samples. To

accommodate this feature of the actual data in our simulation, we assign a lifetime to each simulated stock

as a random draw from the distribution of lifetimes for sample stocks in the same industry. Each

simulated log return is restated as the equivalent simple return, $r_j = \log(1 + R_j)$, and the simple returns

are then compounded across months for each stock. The entire simulation is repeated 1,000 times to

obtain a distribution of simulated compound returns at various horizons.

Internet Global Appendix for
Long-term shareholder returns: Evidence from 64,000 global stocks

Top Wealth Creating Firms by Market

Table A1: Wealth Creation by Market, Top 20 United States Firms

Firm Name	PERMCO	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
APPLE INC	7	2,674,231	2.74%	5.34%	23.51%	199002	202012
MICROSOFT CORP	8048	1,910,158	1.95%	3.81%	19.16%	199002	202012
AMAZON COM INC	15473	1,569,085	1.61%	3.13%	31.09%	199706	202012
ALPHABET INC	45483	979,133	1.00%	1.95%	19.34%	200409	202012
TESLA INC	53453	639,266	0.65%	1.28%	65.44%	201007	202012
WALMART INC	21880	568,713	0.58%	1.14%	13.51%	199002	202012
FACEBOOK INC	54084	553,675	0.57%	1.11%	30.39%	201206	202012
JOHNSON & JOHNSON	21018	535,317	0.55%	1.07%	13.86%	199002	202012
BERKSHIRE HATHAWAY INC DEL	540	504,079	0.52%	1.01%	11.68%	199002	202012
PROCTER & GAMBLE CO	21446	451,109	0.46%	0.90%	13.05%	199002	202012
EXXON MOBIL CORP	20678	437,083	0.45%	0.87%	10.65%	199002	202012
JPMORGAN CHASE & CO	20436	414,080	0.42%	0.83%	9.76%	199002	202012
HOME DEPOT INC	5085	399,790	0.41%	0.80%	16.55%	199002	202012
VISA INC	52983	384,977	0.39%	0.77%	23.77%	200804	202012
MASTERCARD INC	50700	374,932	0.38%	0.75%	32.98%	200606	202012
UNITEDHEALTH GROUP INC	7267	370,220	0.38%	0.74%	21.23%	199002	202012
ALTRIA GROUP INC	21398	364,636	0.37%	0.73%	17.03%	199002	202012
INTEL CORP	2367	340,219	0.35%	0.68%	15.95%	199002	202012
COCA COLA CO	20468	329,515	0.34%	0.66%	12.93%	199002	202012
ORACLE CORP	8045	318,543	0.33%	0.64%	19.50%	199002	202012

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Table A2: Wealth Creation by Market, Top 20 Homeless Firms (US ADRs)

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
PINDUODUO INC -ADR	033861	113,161	0.12%	24.53%	167.43%	201809	202012
SEA LTD - ADR	032546	57,410	0.06%	12.45%	148.24%	201711	202012
BAIDU INC	164532	52,788	0.05%	11.44%	21.79%	200509	202012
NIO INC -ADR	034067	42,791	0.04%	9.28%	162.03%	201810	202012
TAL EDUCATION GROUP	185733	22,598	0.02%	4.90%	45.84%	201011	202012
BILIBILI INC	033186	18,695	0.02%	4.05%	122.13%	201805	202012
VIPSHOP HOLDINGS LTD	170761	16,305	0.02%	3.54%	79.38%	201204	202012
BIONTECH SE	035653	14,689	0.02%	3.18%	275.06%	201911	202012
JAMES HARDIE INDUSTRIES PLC	100477	13,789	0.01%	2.99%	15.43%	200202	202012
SUZANO SA	200512	8,671	0.01%	1.88%	14.77%	200202	202012
AUTOHOME INC	019295	7,653	0.01%	1.66%	22.28%	201401	202012
SOC QUIMICA Y MINERA DE CHI	028883	7,637	0.01%	1.66%	25.87%	200202	202012
ASCENDIS PHARMA AS	022604	6,288	0.01%	1.36%	48.38%	201503	202012
GSX TECHEDU INC -ADR	035207	5,529	0.01%	1.20%	200.17%	201907	202012
TENCENT MUSIC ENNT GRP -ADR	034496	5,063	0.01%	1.10%	41.60%	201901	202012
KINGSOFT CLOUD HO -ADR	036395	4,963	0.01%	1.08%	276.11%	202006	202012
TRIP COM GROUP LTD	157413	4,462	0.00%	0.97%	6.24%	200405	202012
STELLANTIS NV	101276	4,316	0.00%	0.94%	2.59%	200502	202012
ONECONNECT FIN TECH -ADS	035858	3,519	0.00%	0.76%	92.88%	202001	202012
DAQO NEW ENERGY CORP	184155	3,242	0.00%	0.70%	22.12%	201011	202012

Table A3: Wealth Creation by Market, Top 20 Canada Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ROYAL BANK OF CANADA	015633	157,874	0.16%	6.60%	14.30%	199002	202012
TORONTO DOMINION BANK	015706	124,604	0.13%	5.21%	13.08%	199002	202012
SHOPIFY INC	023650	110,038	0.11%	4.60%	114.06%	201506	202012
BCE INC	002137	108,885	0.11%	4.55%	18.76%	199002	202012
CANADIAN NATIONAL RAILWAY CO	002696	105,177	0.11%	4.40%	23.49%	199512	202012
BANK OF NOVA SCOTIA	015582	90,786	0.09%	3.80%	15.60%	199002	202012
BANK OF MONTREAL	015580	67,758	0.07%	2.83%	14.73%	199002	202012
CANADIAN PACIFIC RAILWAY LTD	002698	54,151	0.06%	2.26%	10.08%	199002	202012
CANADIAN IMPERIAL BANK	015581	53,193	0.05%	2.22%	12.39%	199002	202012
THOMSON-REUTERS CORP	015704	51,766	0.05%	2.16%	8.94%	199002	202012
GREAT-WEST LIFECO INC	016431	36,631	0.04%	1.53%	15.46%	199002	202012
ENBRIDGE INC	006135	34,700	0.04%	1.45%	11.65%	199002	202012
SHELL CANADA LTD -CL A	009652	33,828	0.03%	1.41%	15.64%	199002	200704
CANADIAN NATURAL RESOURCES	015055	32,987	0.03%	1.38%	15.31%	199002	202012
TC ENERGY CORP	010671	32,881	0.03%	1.37%	8.67%	199002	202012
POWER FINANCIAL CORP	015607	32,173	0.03%	1.35%	14.80%	199002	202002
MAGNA INTERNATIONAL INC	006946	29,740	0.03%	1.24%	12.55%	199002	202012
CONSTELLATION SOFTWARE INC	174302	29,640	0.03%	1.24%	37.63%	200606	202012
ALIMENTATION COUCHE-TARD INC	064655	28,172	0.03%	1.18%	23.11%	199805	202012
NUTRIEN LTD	016582	27,926	0.03%	1.17%	16.24%	199002	202012

Table A4: Wealth Creation by Market, Top 20 Austria Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
OMV AG	102798	14,867	0.02%	15.29%	8.57%	199002	202012
VERBUND AG	102797	14,753	0.02%	15.17%	12.13%	199002	202012
VOESTALPINE AG	226156	7,610	0.01%	7.83%	11.21%	199511	202012
ANDRITZ AG	246759	6,273	0.01%	6.45%	24.97%	200108	202012
BOEHLER-UDDEHOLM	203429	4,856	0.00%	5.00%	17.43%	199510	200808
ERSTE GROUP BK AG	214659	4,418	0.00%	4.54%	3.57%	199801	202012
TELEKOM AUSTRIA AG	141239	4,378	0.00%	4.50%	6.79%	200012	202012
MAYR-MELNHOF KARTON AG	210823	4,331	0.00%	4.45%	9.51%	199407	202012
EVN-ENERGIE-VERSORG NIEDEROS	103133	3,596	0.00%	3.70%	7.40%	199007	202012
FLUGHAFEN WIEN AG	222139	2,875	0.00%	2.96%	7.68%	199302	202012
LENZING AG	101434	2,590	0.00%	2.66%	7.27%	199002	202012
OESTERREICH POST AG	277897	2,351	0.00%	2.42%	8.34%	200607	202012
OBERBANK AG	015730	2,189	0.00%	2.25%	6.81%	199002	202012
BUWOG AG	317487	2,122	0.00%	2.18%	18.32%	201406	201812
CA IMMOBILIEN ANLAGEN AG	030390	1,475	0.00%	1.52%	3.93%	199506	202012
BRAU-UNION AG	103070	1,433	0.00%	1.47%	13.98%	199112	200405
PALFINGER AG	230638	1,259	0.00%	1.29%	12.98%	199910	202012
CONSTANTIA PACKAGING AG	222148	1,098	0.00%	1.13%	14.71%	199506	201009
KTM AG	271495	1,046	0.00%	1.08%	12.82%	200501	201606
OESTERREICHISCHE BRAU-BETEIL	101485	1,041	0.00%	1.07%	12.13%	199002	200403

Table A5: Wealth Creation by Market, Top 20 Belgium Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ANHEUSER-BUSCH INBEV	241637	120,852	0.12%	28.54%	11.40%	200101	202012
KBC GROUP NV	015703	30,520	0.03%	7.21%	9.55%	199002	202012
UCB SA-NV	100751	18,124	0.02%	4.28%	10.18%	199002	202012
GROUPE BRUXELLES LAMBERT	021408	16,829	0.02%	3.97%	8.08%	199008	202012
SOLVAY SA	101394	13,791	0.01%	3.26%	8.57%	199002	202012
COLRUYT SA	101465	13,754	0.01%	3.25%	18.46%	199002	202012
SOFINA SA	024056	12,548	0.01%	2.96%	12.14%	199002	202012
ARGEN-X SE	318005	10,790	0.01%	2.55%	73.88%	201408	202012
ALMANIJ NV	023899	10,727	0.01%	2.53%	10.19%	199107	200502
DELHAIZE GROUP - ETS DLHZ FR	100781	9,138	0.01%	2.16%	7.46%	199002	201607
CIE NATL A PORTEFEUILLE	204024	8,278	0.01%	1.96%	13.26%	199008	201105
PROXIMUS SA	200384	8,274	0.01%	1.95%	6.84%	200404	202012
TELENET GROUP HOLDING N.V.	270034	7,212	0.01%	1.70%	17.19%	200511	202012
UMICORE SA	100773	7,055	0.01%	1.67%	5.42%	199003	202012
ELIA GROUP SA/NV	269744	6,826	0.01%	1.61%	12.53%	200507	202012
GENERALE DE BANQUE	015592	6,735	0.01%	1.59%	17.75%	199002	199812
PETROFINA	101289	5,721	0.01%	1.35%	8.38%	199002	200012
POWERFIN	100754	5,571	0.01%	1.32%	16.42%	199002	200202
WAREHOUSES DE PAUW SCA	242381	5,420	0.01%	1.28%	21.44%	200102	202012
ACKERMANS & VAN HAAREN NV/SA	200034	5,326	0.01%	1.26%	10.58%	199008	202012

Table A6: Wealth Creation by Market, Top 20 Denmark Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
NOVO NORDISK A/S	008020	183,179	0.19%	26.48%	20.42%	199002	202012
ORSTED A/S	232646	70,938	0.07%	10.25%	48.82%	201607	202012
VESTAS WIND SYSTEMS A/S	225094	45,182	0.05%	6.53%	18.68%	199812	202012
A.P. MOLLER - MAERSK A/S	103292	43,428	0.04%	6.28%	8.05%	199002	202012
DSV PANALPINA A/S	213029	34,422	0.04%	4.98%	24.64%	199701	202012
COLOPLAST A/S	101538	34,219	0.04%	4.95%	18.51%	199309	202012
GENMAB AS	245207	22,854	0.02%	3.30%	18.29%	200106	202012
DANSKE BANK AS	015552	18,875	0.02%	2.73%	8.50%	199002	202012
NOVOZYMES A/S	241336	15,906	0.02%	2.30%	17.49%	200012	202012
CARLSBERG A/S	101130	14,853	0.02%	2.15%	6.00%	199002	202012
TDC A/S	030112	14,462	0.01%	2.09%	9.47%	199406	201805
CHR.HANSEN HOLDINGS AS	294764	12,738	0.01%	1.84%	21.79%	201007	202012
GN STORE NORD A/S	101539	11,601	0.01%	1.68%	11.87%	199002	202012
DEMANT AS	204544	10,981	0.01%	1.59%	17.34%	199512	202012
TRYG AS	274282	10,875	0.01%	1.57%	15.53%	200511	202012
PANDORA AS	295526	9,643	0.01%	1.39%	11.57%	201011	202012
AMBU A/S	221020	9,075	0.01%	1.31%	22.28%	199409	202012
KOBENHAVNS LUFTHAVNE	221130	8,982	0.01%	1.30%	15.30%	199409	202012
D/S 1912 AB	103289	7,730	0.01%	1.12%	10.51%	199002	200306
ROCKWOOL INTERNATIONAL A/S	221499	7,036	0.01%	1.02%	9.75%	199702	202012

Table A7: Wealth Creation by Market, Top 20 Finland Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
NESTE OYJ	272746	53,128	0.05%	12.87%	17.63%	200505	202012
KONE OYJ	101023	45,921	0.05%	11.12%	18.96%	199002	202012
FORTUM OYJ	225597	42,261	0.04%	10.23%	20.94%	199902	202012
SAMPO PLC	015773	38,771	0.04%	9.39%	14.35%	199002	202012
NOKIA CORP	023671	31,969	0.03%	7.74%	9.42%	199108	202012
UPM-KYMMENE CORP	101718	23,672	0.02%	5.73%	10.71%	199606	202012
STORA ENSO OYJ	101020	15,992	0.02%	3.87%	9.00%	199607	202012
KESKO OYJ	101971	11,358	0.01%	2.75%	9.62%	199002	202012
NELES OYJ	102345	10,563	0.01%	2.56%	14.09%	199902	202012
WARTSILA OYJ ABP	101557	10,249	0.01%	2.48%	12.25%	199002	202012
ORION CORP	211453	8,345	0.01%	2.02%	10.34%	199512	202012
ELISA CORP	234087	6,830	0.01%	1.65%	5.73%	200002	202012
NOKIAN RENKAAT OYJ	211452	6,530	0.01%	1.58%	19.47%	199512	202012
POHJOLA BANK PLC	021447	5,403	0.01%	1.31%	19.65%	199309	201409
HUHTAMAKI OYJ	101714	5,203	0.01%	1.26%	7.97%	199002	202012
AMER SPORTS CORP	101737	4,702	0.00%	1.14%	8.70%	199002	201908
POHJOLA GROUP	015608	4,641	0.00%	1.12%	14.33%	199002	200606
FISKARS OY	101739	3,715	0.00%	0.90%	16.68%	199002	202012
NESTE OY	220527	3,680	0.00%	0.89%	43.11%	199601	199808
VALMET CORP	116961	3,445	0.00%	0.83%	22.92%	201402	202012

Table A8: Wealth Creation by Market, Top 20 France Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
LVMH MOET HENNESSY LOUIS V	014447	327,264	0.33%	11.12%	12.36%	199002	202012
L'OREAL SA	100581	245,549	0.25%	8.35%	15.43%	199002	202012
TOTAL SE	024625	161,933	0.17%	5.50%	9.31%	199002	202012
ELF AQUITAINE SA	019364	122,809	0.13%	4.17%	14.31%	199002	201004
SANOFI	101204	119,437	0.12%	4.06%	8.12%	199002	202012
HERMES INTERNATIONAL	203053	118,068	0.12%	4.01%	20.81%	199401	202012
CHRISTIAN DIOR SE	201260	115,757	0.12%	3.93%	15.27%	199202	202012
KERING	222379	102,100	0.10%	3.47%	14.52%	199002	202012
L'AIR LIQUIDE SA	101202	80,400	0.08%	2.73%	10.94%	199002	202012
AIRBUS SE	220833	72,290	0.07%	2.46%	8.72%	199907	202012
VINCI SA	102296	59,972	0.06%	2.04%	11.75%	199002	202012
SAFRAN SA	101305	56,908	0.06%	1.93%	14.75%	199002	202012
BNP PARIBAS	015532	52,551	0.05%	1.79%	6.15%	199311	202012
PERNOD RICARD SA	101396	49,981	0.05%	1.70%	11.10%	199002	202012
DASSAULT SYSTEMS SA	063169	48,892	0.05%	1.66%	14.08%	199608	202012
DANONE SA	017452	43,807	0.04%	1.49%	8.03%	199002	202012
AXA SA	063120	43,207	0.04%	1.47%	5.36%	199002	202012
AVENTIS SA	013467	42,665	0.04%	1.45%	11.58%	199303	200509
ESSILORLUXOTTICA	101248	39,016	0.04%	1.33%	12.88%	199002	202012
SARTORIUS STEDIM BIOTECH SA	211509	32,330	0.03%	1.10%	26.85%	199512	202012

Table A9: Wealth Creation by Market, Top 20 Germany Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
SAP SE	103487	159,068	0.16%	6.56%	12.83%	199002	202012
SIEMENS AG	019349	142,837	0.15%	5.89%	8.12%	199002	202012
BASF SE	017436	119,013	0.12%	4.91%	12.23%	199002	202012
VODAFONE AG	100181	90,170	0.09%	3.72%	20.60%	199002	200208
VOLKSWAGEN AG	100737	86,618	0.09%	3.57%	8.03%	199002	202012
AUDI AG	101120	84,781	0.09%	3.50%	18.49%	199306	202011
ADIDAS AG	221244	73,667	0.08%	3.04%	15.11%	199512	202012
ALLIANZ SE	015724	70,991	0.07%	2.93%	5.05%	199002	202012
BAYER MOTOREN WERKE AG	100022	69,923	0.07%	2.88%	11.05%	199002	202012
DEUTSCHE POST AG	241456	54,000	0.06%	2.23%	8.39%	200012	202012
BAYER AG	100080	53,739	0.05%	2.22%	7.80%	199002	202012
MUNICH RE CO	015677	50,770	0.05%	2.09%	7.11%	199002	202012
E.ON SE	100590	47,691	0.05%	1.97%	8.11%	199002	202012
HENKEL AG & CO KGAA	101942	45,374	0.05%	1.87%	9.81%	199002	202012
HOECHST AG	100049	44,994	0.05%	1.85%	13.12%	199002	200507
DEUTSCHE BOERSE AG	243774	38,854	0.04%	1.60%	17.33%	200103	202012
LINDE AG	100037	34,398	0.04%	1.42%	8.30%	199002	201904
ELECTRABEL SA/NV	100977	32,452	0.03%	1.34%	16.14%	199911	200707
SARTORIUS AG	208821	31,349	0.03%	1.29%	25.92%	199301	202012
DAIMLER AG	017828	30,733	0.03%	1.27%	3.78%	199002	202012

Table A10: Wealth Creation by Market, Top 20 Greece Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
COSMOTE MOBILE TELECOMMNICTN	140717	13,417	0.01%	22.26%	29.83%	200011	200803
OPAP SA	245672	11,821	0.01%	19.61%	32.53%	200106	202012
JUMBO SA	243198	2,735	0.00%	4.54%	18.46%	200103	202012
MOTOR OIL CORINTH REFINERIES	250580	2,596	0.00%	4.31%	14.36%	200204	202012
ERGOBANK S/A	202058	2,174	0.00%	3.61%	18.10%	199002	200009
TITAN CEMENT COMPANY SA	336884	1,814	0.00%	3.01%	8.36%	199002	201908
OTE - HELLENIC TELECOM ORG	106815	1,378	0.00%	2.29%	3.01%	199605	202012
PUBLIC POWER CORP SA	249638	1,265	0.00%	2.10%	4.10%	200201	202012
GERMANOS SA	239598	1,249	0.00%	2.07%	15.52%	200010	200703
MYTILINEOS SA	216609	1,173	0.00%	1.95%	6.17%	199804	202012
KARELIA TOBACCO CO INC SA	241494	1,158	0.00%	1.92%	15.13%	200012	202012
BANK OF GREECE	200569	1,050	0.00%	1.74%	15.34%	199002	202012
IONIAN BANK OF GREECE SA	203374	944	0.00%	1.57%	17.07%	199002	200004
NEOCHIMIKI IND AND COMMERCIA	257040	829	0.00%	1.37%	41.15%	200308	200809
HELLENIC PETROLEUM SA	112296	804	0.00%	1.33%	3.28%	199808	202012
XIOSBANK SA	213779	765	0.00%	1.27%	93.68%	199712	200006
METKA INDUSTRIAL CONSTRUCT	210537	718	0.00%	1.19%	12.81%	199412	201706
ALUMINIUM OF GREECE SA	200146	716	0.00%	1.19%	9.95%	199002	200709
GREGORY SARANTIS SA	203540	698	0.00%	1.16%	9.09%	199510	202012
FOLLI FOLLIE SA	223389	623	0.00%	1.03%	13.27%	199811	201012

Table A11: Wealth Creation by Market, Top 20 Ireland Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
CRH PLC	015444	32,542	0.03%	24.08%	10.69%	199002	202012
RYANAIR HOLDINGS PLC	064835	26,852	0.03%	19.87%	16.27%	199707	202012
KERRY GROUP PLC	100801	24,785	0.03%	18.34%	13.56%	199508	202012
FLUTTER ENTERTAINMENT PLC	243174	17,170	0.02%	12.70%	25.37%	200103	202012
KINGSPAN GROUP PLC	102574	12,802	0.01%	9.47%	25.33%	199309	202012
SMURFIT KAPPA GROUP PLC	283184	6,380	0.01%	4.72%	6.36%	200704	202012
GLANBIA PLC	102596	3,068	0.00%	2.27%	7.45%	199309	202012
EIRCOM GROUP PLC	270195	1,438	0.00%	1.06%	31.99%	200404	200608
ICON PLC	110620	1,198	0.00%	0.89%	16.87%	200101	201301
FBD HOLDINGS	021409	1,069	0.00%	0.79%	19.43%	199107	202012
DRAGON OIL PLC	201676	1,030	0.00%	0.76%	11.39%	199003	201508
JURYS DOYLE HOTEL GROUP PLC	101380	954	0.00%	0.71%	15.37%	199804	200512
GREEN PROPERTY PLC	016316	656	0.00%	0.49%	16.29%	199002	200208
ABBEY PLC	100119	649	0.00%	0.48%	11.68%	199003	202012
FIRST ACTIVE PLC	232019	646	0.00%	0.48%	14.77%	199902	200312
FYFFES PLC	100602	556	0.00%	0.41%	5.43%	199002	201702
CPL RESOURCES PLC	231821	458	0.00%	0.34%	29.47%	200206	202012
UNIPHAR GROUP PLC	332963	432	0.00%	0.32%	77.46%	201908	202012
HEITON GROUP PLC	101387	425	0.00%	0.31%	19.77%	199804	200501
SOUTH WHARF PLC	101366	369	0.00%	0.27%	92.78%	200203	200701

Table A12: Wealth Creation by Market, Top 20 Italy Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ENI SPA	061616	108,355	0.11%	13.55%	12.09%	199601	202012
ENEL SPA	201794	79,358	0.08%	9.93%	6.47%	199912	202012
TELECOM ITALIA SPA- OLD	019540	44,233	0.05%	5.53%	16.57%	199004	200307
TIM-TELECOM ITALIA MOBILE	214259	36,814	0.04%	4.60%	16.02%	199508	200506
TELECOM ITALIA SPA-OLD	101090	34,156	0.03%	4.27%	30.07%	199002	199707
SNAM SPA	249457	30,016	0.03%	3.75%	16.12%	200201	202012
ATLANTIA SPA	102743	29,388	0.03%	3.68%	21.62%	199011	202012
LUXOTTICA GROUP SPA	020196	24,053	0.02%	3.01%	10.15%	200102	201902
SAN PAOLO-IMI SPA	024589	18,379	0.02%	2.30%	8.76%	199205	200612
TERNA SPA	270451	18,137	0.02%	2.27%	14.84%	200408	202012
EXOR SPA	016331	16,161	0.02%	2.02%	19.66%	200904	202012
RAS HOLDINGS SPA	015786	14,162	0.01%	1.77%	10.14%	199002	200610
TENARIS SA	151933	14,158	0.01%	1.77%	18.39%	200302	202012
DAVIDE CAMPARI-MILANO N.V.	246939	13,046	0.01%	1.63%	17.44%	200109	202012
RECORDATI SPA	102429	12,796	0.01%	1.60%	15.99%	199008	202012
DIASORIN SPA	285500	11,182	0.01%	1.40%	22.90%	200709	202012
MONCLER SPA	316895	9,927	0.01%	1.24%	16.42%	201401	202012
CAPITALIA SPA	025885	9,920	0.01%	1.24%	7.48%	199111	200709
FIAT CHRYSLER AUTOMOBILES NV	015172	9,401	0.01%	1.18%	3.70%	199002	202012
AMPLIFON SPA	246778	8,836	0.01%	1.11%	17.73%	200108	202012

Table A13: Wealth Creation by Market, Top 20 Netherlands Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ASML HOLDING NV	061214	209,298	0.21%	18.31%	22.13%	199504	202012
ROYAL DUTCH PETROLEUM NV	009267	146,250	0.15%	12.79%	12.94%	199002	200509
ABN-AMRO HOLDINGS NV	015504	76,690	0.08%	6.71%	17.13%	199002	200811
HEINEKEN NV	104833	68,488	0.07%	5.99%	14.00%	199002	202012
KONINKLIJKE PHILIPS NV	008546	66,710	0.07%	5.83%	10.61%	199002	202012
PROSUS NV	333645	52,913	0.05%	4.63%	34.78%	201910	202012
ADYEN N.V	327401	51,999	0.05%	4.55%	77.60%	201807	202012
ROYAL DUTCH SHELL PLC	012384	47,022	0.05%	4.11%	3.01%	200508	202012
ING GROEP NV	015617	43,169	0.04%	3.78%	8.48%	199104	202012
KONINKLIJKE DSM NV	102454	36,711	0.04%	3.21%	13.31%	199002	202012
AKZO NOBEL NV	015334	32,722	0.03%	2.86%	9.93%	199002	202012
KONINKLIJKE KPN NV	061440	30,139	0.03%	2.64%	10.95%	199407	202012
RELX NV & RELX PLC	100075	28,806	0.03%	2.52%	11.30%	199002	201809
HEINEKEN HOLDING NV	206493	28,023	0.03%	2.45%	12.04%	199306	202012
WOLTERS KLUWER NV	101361	26,112	0.03%	2.28%	11.01%	199002	202012
KONINKLIJKE AHOLD DELHAIZE	023667	17,858	0.02%	1.56%	4.78%	199002	202012
NUMICO (KONINKLIJKE) NV	100775	12,116	0.01%	1.06%	17.01%	199002	200712
RANDSTAD NV	104761	12,060	0.01%	1.05%	11.04%	199102	202012
NN GROUP N.V.	260840	8,311	0.01%	0.73%	11.88%	201408	202012
VOPAK (KONINKLIJKE) NV	100783	7,110	0.01%	0.62%	9.59%	199002	202012

Table A14: Wealth Creation by Market, Top 20 Norway Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
EQUINOR ASA	220546	54,388	0.06%	14.96%	8.05%	200107	202012
NORSK HYDRO ASA	012383	48,801	0.05%	13.42%	13.51%	199002	202012
TELENOR ASA	221612	39,985	0.04%	11.00%	13.94%	200101	202012
ORKLA ASA	100913	17,311	0.02%	4.76%	13.89%	199002	202012
YARA INTERNATIONAL ASA	264351	15,467	0.02%	4.25%	18.92%	200404	202012
GJENSIDIGE FORSIKRING BA	296091	11,666	0.01%	3.21%	17.84%	201101	202012
SCHIBSTED ASA	208224	8,488	0.01%	2.33%	12.14%	199311	202012
TOMRA SYSTEMS A/S	102252	7,277	0.01%	2.00%	14.68%	199002	202012
SALMAR ASA	284523	7,221	0.01%	1.99%	22.08%	200706	202012
FRONTLINE LTD-OLD	029290	6,827	0.01%	1.88%	36.21%	199802	201511
AKER ASA	270904	5,750	0.01%	1.58%	19.11%	200410	202012
SCATEC ASA	318456	4,925	0.01%	1.35%	59.64%	201411	202012
LEROY SEAFOOD GROUP ASA	252666	4,404	0.00%	1.21%	19.60%	200207	202012
AKASTOR ASA	270267	4,256	0.00%	1.17%	23.08%	200407	202012
KAHOOT! AS	327346	4,256	0.00%	1.17%	279.18%	201806	202012
TANDBERG AS	203881	3,933	0.00%	1.08%	39.31%	199011	201004
ADEVINTA ASA	331821	3,868	0.00%	1.06%	35.74%	201905	202012
KONGSBERG GRUPPEN ASA	211787	3,802	0.00%	1.05%	14.48%	199601	202012
SUBSEA 7 INC	254138	3,675	0.00%	1.01%	35.44%	200211	201101
P/F BAKKAFROST HOLDING	294271	3,539	0.00%	0.97%	28.44%	201005	202012

Table A15: Wealth Creation by Market, Top 20 Portugal Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
EDP-ENERGIAS DE PORTUGAL SA	064910	20,643	0.02%	25.21%	6.46%	199707	202012
EDP RENOVAVEIS SA	288970	14,946	0.02%	18.26%	8.54%	200809	202012
JERONIMO MARTINS SGPS SA	221102	11,456	0.01%	13.99%	10.27%	199409	202012
PHAROL SGPS SA	031882	4,249	0.00%	5.19%	5.99%	199507	202012
THE NAVIGATOR COMPANY SA	065439	4,175	0.00%	5.10%	10.50%	199602	202012
GALP ENERGIA SGPS SA	279448	4,110	0.00%	5.02%	4.28%	200611	202012
BANCO TOTTA & ACORES SA	200539	3,369	0.00%	4.12%	13.52%	199002	200409
MUNDIAL CONFIANCA SA	221225	2,504	0.00%	3.06%	38.93%	199409	200010
SONAE SGPS SA	208164	2,081	0.00%	2.54%	6.06%	199002	202012
SEMAPA-SOC DE INVEST GESTAO	211952	1,939	0.00%	2.37%	13.41%	199602	202012
BANCO PINTO & SOTTO MAIOR SA	211946	1,920	0.00%	2.35%	22.40%	199602	200011
ALTRI SGPS SA	271928	1,785	0.00%	2.18%	26.51%	200504	202012
CORTICEIRA AMORIM SGPS SA	222135	1,500	0.00%	1.83%	6.55%	199002	202012
BRISA-AUTO-ESTRADAS PORTUGAL	214839	824	0.00%	1.01%	5.08%	199801	201304
BANCO BPI SA	200671	692	0.00%	0.85%	3.87%	199002	201812
VODAFONE TELECEL COM PESSOAI	108468	516	0.00%	0.63%	7.69%	199701	200305
GESCARTAO SGPS SA	257971	488	0.00%	0.60%	46.43%	200309	200704
MOTA-ENGIL SGPS SA	106276	428	0.00%	0.52%	6.42%	199611	202012
INPARSA INDS E PARTICIPACOES	213493	378	0.00%	0.46%	36.01%	199704	199909
UNICER-UNIAO CERVEJARIA SA	209296	375	0.00%	0.46%	11.27%	199004	200005

Table A16: Wealth Creation by Market, Top 20 Spain Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
IND DE DISENO TEXTIL SA	245663	111,763	0.11%	13.31%	15.90%	200106	202012
IBERDROLA SA	100957	95,012	0.10%	11.32%	11.91%	199002	202012
ENDESA SA	015321	81,872	0.08%	9.75%	14.74%	199002	202012
TELEFONICA SA	013683	61,900	0.06%	7.37%	9.40%	199002	202012
NATURGY ENERGY GROUP SA	220586	31,540	0.03%	3.76%	11.90%	199002	202012
AMADEUS IT GROUP SA	294508	29,114	0.03%	3.47%	18.76%	201006	202012
ABERTIS INFRAESTRUCTURAS SA	102629	28,056	0.03%	3.34%	13.46%	199002	201807
TELEFONICA MOVILES SA	141243	26,179	0.03%	3.12%	10.65%	200012	200607
ALTADIS SA	101209	21,302	0.02%	2.54%	18.08%	199002	200802
REPSOL SA	015319	20,410	0.02%	2.43%	6.55%	199002	202012
FERROVIAL SA	271217	19,833	0.02%	2.36%	11.64%	200412	202012
SIEMENS GAMESA RENB ENRG SA	241161	17,333	0.02%	2.06%	12.09%	200012	202012
ACTIVIDADES CONSTR Y SERVICI	222186	17,047	0.02%	2.03%	12.77%	199101	202012
RED ELECTRICA CORP SA	234117	16,133	0.02%	1.92%	17.95%	199908	202012
CELLNEX TELECOM SA	319659	15,787	0.02%	1.88%	30.95%	201506	202012
UNION FENOSA SA	101330	15,108	0.02%	1.80%	17.99%	199002	200908
AENA SME S A	319219	14,685	0.02%	1.75%	14.62%	201503	202012
BBVA	015181	13,302	0.01%	1.58%	3.93%	199002	202012
CEPSA-CIA ESPANOLA DE PETROL	100954	13,144	0.01%	1.57%	13.42%	199002	201108
GRIFOLS SA	277812	12,501	0.01%	1.49%	18.85%	200606	202012

Table A17: Wealth Creation by Market, Top 20 Sweden Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ATLAS COPCO AB	017420	91,015	0.09%	7.41%	17.26%	199002	202012
VOLVO AB	011217	71,853	0.07%	5.85%	14.22%	199002	202012
INVESTOR AB	015699	63,032	0.06%	5.13%	13.90%	199209	202012
HENNES & MAURITZ AB	102276	56,419	0.06%	4.59%	25.94%	199003	202012
NORDEA BANK ABP	214881	44,864	0.05%	3.65%	9.25%	199801	202012
SANDVIK AB	019591	34,799	0.04%	2.83%	12.08%	199208	202012
SCA-SVENSKA CELLULOSA AB	012368	34,596	0.04%	2.82%	10.60%	199002	202012
SVENSKA HANDELSBANKEN	015654	34,094	0.03%	2.78%	11.89%	199002	202012
TELEFONAKTIEBOLAGET LM ERICS	004439	32,280	0.03%	2.63%	6.53%	199002	202012
HEXAGON AB	103065	30,417	0.03%	2.48%	21.61%	199410	202012
SCANIA AB	062557	28,225	0.03%	2.30%	13.18%	199605	201405
SKANDINAVISKA ENSKILDA BANK	015671	26,880	0.03%	2.19%	8.85%	199002	202012
SWEDBANK AB	024578	26,364	0.03%	2.15%	13.76%	199507	202012
ASSA ABLOY AB	223492	26,098	0.03%	2.12%	13.36%	199501	202012
SWEDISH MATCH AB	100956	19,881	0.02%	1.62%	16.89%	199606	202012
EVOLUTION GAMING GROUP AB	319432	17,582	0.02%	1.43%	94.88%	201504	202012
INVESTMENTS AB KINNEVIK	228316	16,080	0.02%	1.31%	14.05%	199907	202012
ELECTROLUX AB	014620	16,062	0.02%	1.31%	10.40%	199002	202012
LATOUR INVESTMENT AB	016299	15,784	0.02%	1.29%	31.53%	199201	202012
INDUSTRIVARDEN AB	103036	15,571	0.02%	1.27%	11.41%	199002	202012

Table A18: Wealth Creation by Market, Top 20 Switzerland Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
NESTLE SA/AG	016603	478,110	0.49%	21.39%	13.21%	199002	202012
ROCHE HOLDING AG	025648	377,253	0.39%	16.88%	14.09%	199002	202012
NOVARTIS AG	101310	308,868	0.32%	13.82%	10.16%	199002	202012
CIE FINANCIERE RICHEMONT AG	102902	64,609	0.07%	2.89%	13.87%	199002	202012
SYNGENTA AG	241216	54,458	0.06%	2.44%	18.66%	200012	201801
ABB LTD	210418	46,022	0.05%	2.06%	5.95%	199002	202012
LONZA GROUP AG	231397	41,625	0.04%	1.86%	14.13%	199912	202012
GIVAUDAN SA	237419	40,123	0.04%	1.79%	16.30%	200007	202012
SIKA AG	101350	38,119	0.04%	1.71%	17.82%	199002	202012
ACTELION LTD	239717	33,101	0.03%	1.48%	20.22%	200005	201710
PARTNERS GROUP AG	275863	32,894	0.03%	1.47%	25.46%	200605	202012
SWISS RE LTD	063546	31,476	0.03%	1.41%	13.54%	201106	202012
CIBA-GEIGY AG	100834	30,921	0.03%	1.38%	21.82%	199002	199612
SGS SA	101340	29,043	0.03%	1.30%	15.46%	199002	202012
ZURICH VERSICH (ZURICH GRP)	015674	28,014	0.03%	1.25%	23.70%	199002	199903
EMS-CHEMIE HOLDING AG	102283	27,617	0.03%	1.24%	17.20%	199002	202012
GEBERIT AG	228918	27,425	0.03%	1.23%	20.06%	199908	202012
SCHWEIZERISCHER BANKVEREIN	015788	26,812	0.03%	1.20%	26.33%	199002	199806
SWISSCOM AG	114927	24,098	0.02%	1.08%	5.78%	199811	202012
SCHINDLER HOLDING AG	101343	21,207	0.02%	0.95%	15.32%	199002	202012

Table A19: Wealth Creation by Market, Top 20 United Kingdom Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ASTRAZENECA PLC	028272	160,731	0.16%	4.06%	10.86%	199307	202012
BRITISH AMER TOBACCO PLC	001932	143,601	0.15%	3.63%	13.47%	199002	202012
RIO TINTO GROUP & RIO TINTO LTD	019565	135,313	0.14%	3.42%	12.13%	199002	202012
DIAGEO PLC	018636	117,006	0.12%	2.96%	9.86%	199002	202012
HSBC HLDGS PLC	015509	112,936	0.12%	2.85%	7.53%	199002	202012
BP PLC	002410	104,449	0.11%	2.64%	6.28%	199002	202012
GLAXOSMITHKLINE PLC	005180	98,403	0.10%	2.49%	5.97%	199002	202012
SHELL TRANSPORT AND TRADING	009655	96,700	0.10%	2.44%	12.59%	199002	200507
SABMILLER PLC	100472	90,675	0.09%	2.29%	14.68%	199904	201609
RECKITT BENCKISER GROUP PLC	221858	77,180	0.08%	1.95%	12.26%	199002	202012
BG GROUP PLC	014087	70,626	0.07%	1.78%	11.74%	199002	201602
SMITHKLINE BEECHAM (UK) PLC	014261	69,456	0.07%	1.75%	22.32%	199002	200012
PRUDENTIAL PLC	015782	62,981	0.06%	1.59%	10.27%	199002	202012
ORANGE PLC	062489	59,650	0.06%	1.51%	88.12%	199605	200002
ANGLO AMERICAN PLC	015508	59,613	0.06%	1.51%	11.04%	199204	202012
NATIONAL GRID	211819	58,098	0.06%	1.47%	11.80%	199601	202012
LONDON STOCK EXCH GROUP PLC	246706	39,318	0.04%	0.99%	17.44%	200108	202012
NATL WESTMINSTER BANK	013294	38,070	0.04%	0.96%	17.55%	199002	200004
IMPERIAL BRANDS PLC	212773	37,308	0.04%	0.94%	14.05%	199611	202012
RELX NV & RELX PLC	100338	33,969	0.03%	0.86%	9.41%	199002	202012

Table A20: Wealth Creation by Market, Top 20 Australia Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
BHP GROUP LTD & BILLITON PLC	013312	156,459	0.16%	8.55%	11.87%	199002	202012
COMMONWEALTH BANK AUSTRALIA	024512	152,304	0.16%	8.32%	15.98%	199111	202012
CSL LTD	223003	106,259	0.11%	5.80%	26.15%	199409	202012
NATIONAL AUSTRALIA BK	014802	78,324	0.08%	4.28%	13.47%	199002	202012
WESTPAC BANKING	015362	77,931	0.08%	4.26%	11.69%	199002	202012
ANZ-AUSTRALIA & NEW ZEALD BK	015889	71,824	0.07%	3.92%	11.42%	199002	202012
FORTESCUE METAL GROUP	212427	61,178	0.06%	3.34%	32.46%	199607	202012
WESFARMERS LTD	101601	56,408	0.06%	3.08%	14.47%	199002	202012
WOOLWORTHS GROUP LTD	100894	49,423	0.05%	2.70%	15.70%	199308	202012
MACQUARIE GROUP LTD	212856	41,009	0.04%	2.24%	16.36%	199611	202012
WESTFIELD CORP	015932	29,550	0.03%	1.61%	13.34%	199002	201805
AFTERPAY LTD	321601	22,369	0.02%	1.22%	183.20%	201708	202012
WOODSIDE PETROLEUM LTD	100712	22,294	0.02%	1.22%	11.82%	199002	202012
TRANSURBAN GROUP	212650	20,626	0.02%	1.13%	12.55%	199609	202012
GOODMAN GROUP	271810	19,161	0.02%	1.05%	10.05%	200503	202012
AMCOR PLC	100243	18,429	0.02%	1.01%	10.20%	199002	202012
SYDNEY AIRPORT	252268	15,744	0.02%	0.86%	23.11%	200211	202012
ARISTOCRAT LEISURE LTD	212628	15,427	0.02%	0.84%	20.71%	199609	202012
REA GROUP LTD	248015	15,123	0.02%	0.83%	44.75%	200110	202012
COLES GROUP LTD - OLD	014977	15,003	0.02%	0.82%	12.19%	199002	200711

Table A21: Wealth Creation by Market, Top 20 Hong Kong Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
TENCENT HOLDINGS LTD	270615	691,671	0.71%	15.00%	48.11%	200407	202012
ALIBABA GROUP HLDG	020530	374,085	0.38%	8.11%	17.17%	201410	202012
CHINA CONSTR BANK CORP	274364	217,870	0.22%	4.73%	12.64%	200512	202012
MEITUAN	328083	169,793	0.17%	3.68%	94.04%	201810	202012
CHINA MOBILE LTD	065662	156,086	0.16%	3.39%	8.45%	199711	202012
AIA GROUP LTD	295735	122,277	0.13%	2.65%	16.87%	201012	202012
JD.COM INC	019744	85,870	0.09%	1.86%	22.98%	201406	202012
PING AN INSURANCE GROUP	160709	85,838	0.09%	1.86%	19.66%	200407	202012
HUTCHISON WHAMPOA LTD	101784	83,106	0.09%	1.80%	16.03%	199002	201505
CNOOC LTD	142540	73,646	0.08%	1.60%	18.20%	200104	202012
HONG KONG EXCH & CLEARING	240637	73,634	0.08%	1.60%	23.78%	200011	202012
HANG SENG BANK LTD	015498	70,517	0.07%	1.53%	23.20%	199002	202012
NETEASE INC	137435	65,669	0.07%	1.42%	46.06%	200202	202012
SUN HUNG KAI PROPERTIES LTD	019421	49,314	0.05%	1.07%	12.56%	199002	202012
XIAOMI CORPORATION	327599	49,073	0.05%	1.06%	32.78%	201808	202012
WUXI BIOLOGICS (CAYMAN) INC	324727	46,826	0.05%	1.02%	96.92%	201707	202012
INDUSTRIAL & COMM BANKCHINA	279378	46,726	0.05%	1.01%	7.20%	200612	202012
BOC HONG KONG HOLDINGS LTD	031648	44,490	0.05%	0.97%	12.87%	200208	202012
SANDS CHINA LTD	293425	42,254	0.04%	0.92%	20.95%	201001	202012
ANTA SPORTS PRODUCTS	285365	41,760	0.04%	0.91%	24.66%	200708	202012

Table A22: Wealth Creation by Market, Top 20 Israel Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
NICE LTD	061902	15,448	0.02%	7.67%	15.13%	199605	202012
ICL GROUP LTD	220211	14,094	0.01%	7.00%	18.21%	199605	202012
BANK HAPOALIM B M	030579	10,331	0.01%	5.13%	11.74%	199503	202012
BANK LEUMI LE-ISRAEL BM	002018	8,976	0.01%	4.46%	9.59%	199602	202012
BEZEQ ISRAEL TELECOMMUNICATN	222070	7,988	0.01%	3.97%	12.15%	199502	202012
FRUTAROM INDUSTRIES	258676	6,032	0.01%	3.00%	26.05%	200311	201810
AZRIELI GROUP LTD	294788	5,598	0.01%	2.78%	12.09%	201007	202012
MIZRAHI TEFAHOT BANK LTD	222765	5,562	0.01%	2.76%	15.32%	199811	202012
STRAUSS GROUP LTD	023290	2,870	0.00%	1.43%	10.45%	199812	202012
ISRAEL DISCOUNT BANK LTD	006203	2,568	0.00%	1.28%	6.01%	199605	202012
DELEK ENERGI SYSTEM LTD	243107	2,539	0.00%	1.26%	16.15%	200103	201810
OSEM INVESTMENT LTD	204450	2,536	0.00%	1.26%	11.55%	199509	201604
MELISRON LTD	244591	2,489	0.00%	1.24%	23.83%	200105	202012
DELEK AUTOMOTIVE SYSTEMS LTD	224603	2,410	0.00%	1.20%	35.32%	199812	202012
SHIKUN & BINUI LTD	241490	2,403	0.00%	1.19%	11.63%	199807	202012
SHUFERSAL LTD	204459	2,314	0.00%	1.15%	12.54%	199502	202012
THE ISRAEL CORP LTD	220217	2,286	0.00%	1.14%	9.00%	199503	202012
ALONY HETZ	224578	2,249	0.00%	1.12%	17.48%	199812	202012
FIRST INTERNATL BANK ISRAEL	204417	2,214	0.00%	1.10%	8.92%	199502	202012
SHAPIR ENGINEERING AND INDUS	318820	2,210	0.00%	1.10%	33.80%	201501	202012

Table A23: Wealth Creation by Market, Top 20 Japan Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
TOYOTA MOTOR CORP	019661	248,904	0.25%	6.50%	7.37%	199002	202012
SOFTBANK GROUP CORP	204222	160,559	0.16%	4.19%	13.77%	199502	202012
KEYENCE CORP	103228	132,342	0.14%	3.46%	14.70%	199002	202012
FAST RETAILING CO LTD	212948	98,042	0.10%	2.56%	25.24%	199701	202012
NTT DOCOMO INC	223911	94,193	0.10%	2.46%	5.27%	199811	202012
CHUGAI PHARMACEUTICAL CO LTD	100441	83,054	0.08%	2.17%	11.01%	199002	202012
NINTENDO CO LTD	102450	77,111	0.08%	2.01%	7.96%	199002	202012
NIDEC CORP	221821	72,905	0.07%	1.90%	16.84%	199409	202012
SHIN-ETSU CHEMICAL CO LTD	100697	69,441	0.07%	1.81%	9.81%	199002	202012
M3 INC	270939	62,446	0.06%	1.63%	36.01%	200410	202012
KDDI CORP	201584	61,191	0.06%	1.60%	6.55%	199311	202012
SONY GROUP CORPORATION	009818	60,112	0.06%	1.57%	4.90%	199002	202012
DAIKIN INDUSTRIES LTD	101138	59,619	0.06%	1.56%	10.26%	199002	202012
MURATA MANUFACTURING CO LTD	100226	59,354	0.06%	1.55%	10.48%	199002	202012
TOKYO ELECTRON LTD	100658	57,794	0.06%	1.51%	10.04%	199002	202012
HOYA CORP	100433	55,785	0.06%	1.46%	12.23%	199002	202012
DAIICHI SANKYO COMPANY LTD	100336	54,932	0.06%	1.43%	7.59%	199002	202012
HONDA MOTOR CO LTD	005691	54,107	0.06%	1.41%	7.45%	199002	202012
RECRUIT HOLDINGS CO LTD	318510	52,656	0.05%	1.38%	25.25%	201411	202012
ORIENTAL LAND CO LTD	213193	50,772	0.05%	1.33%	9.82%	199701	202012

Table A24: Wealth Creation by Market, Top 20 New Zealand Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
SPARK NEW ZEALAND LTD	104831	18,310	0.02%	12.06%	19.42%	199108	202012
FISHER & PAYKEL HEALTHCARE	101256	14,572	0.01%	9.60%	16.54%	199002	202012
MERIDIAN ENERGY LTD	270045	12,593	0.01%	8.29%	33.79%	201312	202012
AUCKLAND INTL AIRPORT LTD	222761	9,213	0.01%	6.07%	24.64%	199811	202012
A2 MILK COMPANY LTD (THE)	275289	6,063	0.01%	3.99%	48.70%	200607	202012
RYMAN HEALTHCARE LTD	245274	5,979	0.01%	3.94%	28.85%	200106	202012
CONTACT ENERGY LTD	227916	5,811	0.01%	3.83%	12.23%	199906	202012
MAINFREIGHT LTD	212481	5,399	0.01%	3.55%	23.26%	199608	202012
MERCURY NZ LTD	270043	5,367	0.01%	3.53%	19.07%	201306	202012
PORT OF TAURANGA LTD	105118	4,660	0.00%	3.07%	22.59%	199208	202012
INFRATIL LTD	209828	4,019	0.00%	2.65%	17.72%	199510	202012
FLETCHER BUILDING LTD	062403	2,995	0.00%	1.97%	7.62%	199605	202012
EBOS GROUP LTD	201739	2,904	0.00%	1.91%	20.69%	200105	202012
VECTOR LTD	268629	2,469	0.00%	1.63%	7.05%	200509	202012
SKYCITY ENTERTAINMENT GROUP	212167	2,297	0.00%	1.51%	12.04%	199603	202012
CHORUS LTD	308388	1,922	0.00%	1.27%	14.22%	201112	202012
GENESIS ENERGY LTD	269532	1,922	0.00%	1.27%	15.28%	201405	202012
SUMMERSET GROUP HLDGS LTD	306300	1,838	0.00%	1.21%	27.94%	201112	202012
AIR NEW ZEALAND LTD	102234	1,766	0.00%	1.16%	5.89%	199002	202012
TILT RENEWABLES LTD	322685	1,491	0.00%	0.98%	43.77%	201612	202012

Table A25: Wealth Creation by Market, Top 20 Singapore Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
DBS GROUP HOLDINGS LTD	015743	49,141	0.05%	10.47%	8.90%	199002	202012
JARDINE MATHESON HLDGS LTD	100424	41,700	0.04%	8.88%	10.53%	199502	202012
UNITED OVERSEAS BANK LTD	015679	37,488	0.04%	7.99%	12.12%	199002	202012
OVERSEA CHINESE BANKING	015753	33,360	0.03%	7.11%	9.43%	199002	202012
JARDINE STRATEGIC HLDGS LTD	016334	28,790	0.03%	6.13%	11.95%	199408	202012
THAI BEVERAGE PCL	277881	14,045	0.01%	2.99%	13.30%	200607	202012
HONGKONG LAND HOLDINGS LTD	210576	12,968	0.01%	2.76%	8.59%	199106	202012
SINGAPORE TECHNOLOGIES ENGR	214882	12,026	0.01%	2.56%	12.06%	199802	202012
ASIA PACIFIC BREWERIES LTD	100126	11,521	0.01%	2.45%	14.35%	199002	201301
SINGAPORE EXCHANGE LTD	241904	10,522	0.01%	2.24%	22.20%	200101	202012
KEPPEL CORPORATION LTD	100076	10,480	0.01%	2.23%	8.15%	199002	202012
GREAT EASTERN HOLDINGS LTD	015565	9,584	0.01%	2.04%	13.22%	199002	202012
SINGAPORE AIRLINES LTD	100713	8,950	0.01%	1.91%	6.76%	199002	202012
FRASER & NEAVE LTD	100340	8,747	0.01%	1.86%	10.40%	199002	202012
JARDINE CYCLE & CARRIAGE LTD	100296	8,540	0.01%	1.82%	12.74%	199002	202012
CAPITALAND LTD	241537	8,319	0.01%	1.77%	6.69%	200012	202012
SINGAPORE PRESS HOLDINGS LTD	100025	6,512	0.01%	1.39%	12.22%	199002	202012
VENTURE CORP LTD	209401	5,160	0.01%	1.10%	15.93%	199206	202012
UOL GROUP LTD	019799	4,872	0.00%	1.04%	9.12%	199002	202012
GLOBAL LOGISTIC PROPERTIES	295620	4,835	0.00%	1.03%	6.48%	201011	201801

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Table A26: Wealth Creation by Market, Top 20 South Korea Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
SAMSUNG ELECTRONICS CO LTD	104604	540,605	0.55%	33.45%	20.17%	199002	202012
SK HYNIX INC	204049	59,275	0.06%	3.67%	8.68%	199707	202012
LG CHEMICAL LTD	245036	54,300	0.06%	3.36%	25.08%	200106	202012
NAVER CORP	255244	45,884	0.05%	2.84%	31.23%	200304	202012
SAMSUNG BIOLOGICS CO LTD	322757	40,148	0.04%	2.48%	52.87%	201612	202012
HYUNDAI MOTOR CO LTD	104607	39,898	0.04%	2.47%	10.58%	199002	202012
POSCO	104598	33,440	0.03%	2.07%	14.66%	199208	202012
SAMSUNG SDI CO LTD	104582	33,376	0.03%	2.07%	11.95%	199002	202012
SK TELECOM CO LTD	203480	25,292	0.03%	1.57%	11.72%	199204	202012
HYUNDAI MOBIS	203215	24,025	0.02%	1.49%	14.80%	199204	202012
LG HOUSEHOLD & HEALTHCARE	245697	23,572	0.02%	1.46%	25.11%	200106	202012
KAKAO CORP	137802	20,666	0.02%	1.28%	17.74%	200012	202012
NCSOFT CORP	243260	18,513	0.02%	1.15%	21.31%	200103	202012
CELLTRION HEALTHCA	325060	16,510	0.02%	1.02%	50.40%	201709	202012
KT&G CORP	234376	14,941	0.02%	0.92%	11.55%	200003	202012
LG CORP	104608	13,866	0.01%	0.86%	8.15%	199002	202012
KEPCO-KOREA ELEC POWER CORP	030874	13,755	0.01%	0.85%	5.90%	199208	202012
LG ELECTRONICS INC	251303	13,478	0.01%	0.83%	7.40%	200205	202012
S-OIL CORP	223142	12,328	0.01%	0.76%	13.32%	199411	202012
SHINHAN FINANCIAL GROUP LTD	025714	11,881	0.01%	0.74%	7.43%	200102	202012

Table A27: Wealth Creation by Market, Top 20 Taiwan Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
TAIWAN SEMICONDUCTOR MFG CO	201395	525,515	0.54%	36.59%	18.30%	199502	202012
HON HAI PRECISION IND CO LTD	203177	53,243	0.05%	3.71%	16.02%	199312	202012
MEDIA TEK INC	247202	39,615	0.04%	2.76%	15.90%	200109	202012
FORMOSA PETROCHEMI	259598	37,296	0.04%	2.60%	12.07%	200402	202012
DELTA ELECTRONICS INC	210201	26,417	0.03%	1.84%	13.98%	199002	202012
CHUNGHWA TELECOM LTD	241159	23,612	0.02%	1.64%	5.32%	200012	202012
FORMOSA PLASTICS CORP	202271	22,154	0.02%	1.54%	6.77%	199002	202012
NAN YA PLASTICS CORP	204012	21,246	0.02%	1.48%	6.78%	199002	202012
FORMOSA CHEMICAL & FIBER	202268	20,493	0.02%	1.43%	7.21%	199002	202012
LARGAN PRECISION CO LTD	251937	16,637	0.02%	1.16%	22.85%	200207	202012
FUBON FINANCIAL HOLDING CO	249738	15,982	0.02%	1.11%	8.35%	200102	202012
TAIWAN MOBILE CO LTD	240656	14,305	0.01%	1.00%	8.85%	200011	202012
HOTAI MOTOR CO	205713	14,032	0.01%	0.98%	16.74%	199708	202012
ASE TECHNOLOGY HLDNG CO	213412	13,619	0.01%	0.95%	13.65%	199212	202012
UNI-PRESIDENT ENTERPRISE CO	208572	13,148	0.01%	0.92%	7.43%	199002	202012
CTBC FINANCIAL HOLDING CO LT	201238	11,108	0.01%	0.77%	6.97%	199312	202012
PRESIDENT CHAIN STORE CORP	231256	10,777	0.01%	0.75%	10.13%	199709	202012
GLOBALWAFERS CO LTD	318603	10,307	0.01%	0.72%	49.33%	201412	202012
MEGA FINANCIAL HOLDING CO	213202	10,192	0.01%	0.71%	5.48%	199702	202012
FAR EASTONE TELECOMMUNICTN	252295	9,836	0.01%	0.68%	13.26%	200208	202012

Table A28: Wealth Creation by Market, Top 20 Argentina Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
BODEGAS ESMERALDA	289406	20,675	0.02%	40.08%	14.45%	200906	202012
YACIMIENTOS PETE FISCALES SA	028520	9,742	0.01%	18.88%	8.19%	199308	202012
PETROBRAS ARGENTINA SA	220474	6,869	0.01%	13.32%	24.47%	199002	201805
SIDERCA SAIC	208059	2,428	0.00%	4.71%	18.54%	199002	200303
TERNIUM ARGENTINA SA	221633	1,680	0.00%	3.26%	4.68%	199710	202012
ALUAR ALUMINIO ARGENTINA	200144	1,400	0.00%	2.71%	7.58%	200206	202012
ASTRA CIA ARGENTINA PETROLEO	200301	1,013	0.00%	1.96%	23.00%	199002	200105
GRUPO FINANCIERO VALORES SOC	291533	859	0.00%	1.67%	464.81%	201506	202012
BANCO MACRO SA - OLD	212969	706	0.00%	1.37%	42.66%	199701	200312
ESTABLECIMENTO MODELO TERRAB	210211	589	0.00%	1.14%	103.54%	199002	199411
BANCO GALICIA BUENOS AIRES	028409	516	0.00%	1.00%	4.56%	199002	201408
BGH SA	212939	478	0.00%	0.93%	7.88%	199710	200007
RENAULT ARGENTINA SA	201296	454	0.00%	0.88%	19.34%	199002	200512
BANCO PATAGONIA SA	279125	454	0.00%	0.88%	4.89%	200709	202012
TELEFONICA DE ARGENTINA SA	029178	443	0.00%	0.86%	5.27%	199002	200912
MOLINOS RIO PLATA	205247	380	0.00%	0.74%	8.03%	199002	202012
CONSULTATIO SA	294437	307	0.00%	0.60%	8.06%	201005	202012
RIGOLLEAU	207107	279	0.00%	0.54%	17.18%	199002	202012
LEDESMA SDAD ANONIMA AGRICOL	203579	275	0.00%	0.53%	8.59%	199002	202012
PETROLERA PAMPA SA	317065	239	0.00%	0.46%	48.91%	201402	201808

Table A29: Wealth Creation by Market, Top 20 Brazil Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
VALE SA	209382	91,419	0.09%	15.23%	18.61%	199309	202012
ITAU UNIBANCO HLDG SA	030580	43,018	0.04%	7.17%	17.46%	199309	202012
BRADESCO BANCO	030452	31,225	0.03%	5.20%	13.27%	199309	202012
WEG SA	207375	28,101	0.03%	4.68%	17.38%	200704	202012
MAGAZINE LUIZA SA	297353	27,620	0.03%	4.60%	33.02%	201106	202012
PETROLEO BRASILEIRO SA- PETR	222111	23,917	0.02%	3.99%	8.06%	199309	202012
COMPANHIA SIDERURGICA NACION	208057	21,231	0.02%	3.54%	17.20%	199402	202012
SOUZA CRUZ SA	208201	18,550	0.02%	3.09%	15.22%	199309	201511
ARCELOR BRASIL SA	200690	18,195	0.02%	3.03%	31.93%	199401	200706
AMBEV SA	201140	15,167	0.02%	2.53%	4.95%	199309	202012
PARMALAT BRASIL IND ALIMENTO	213304	13,712	0.01%	2.29%	1089.97%	200908	201002
ITAUSA - INVESTIMENTOS ITAU	203401	13,681	0.01%	2.28%	17.20%	199309	202012
BANCO BTG PACTUAL SA	312148	11,791	0.01%	1.97%	85.14%	201808	202012
UNIBANCO UNIAO DE BANCO	061134	11,060	0.01%	1.84%	18.59%	199611	200903
LOCALIZA RENT A CAR SA	267371	9,877	0.01%	1.65%	29.22%	200506	202012
CPFL ENERGIA SA	269005	9,856	0.01%	1.64%	21.23%	200411	202012
CCR SA	255993	8,661	0.01%	1.44%	42.47%	200305	202012
RAIA DROGASIL SA	271838	6,768	0.01%	1.13%	18.12%	200706	202012
B3 S.A.-BRASIL BOLSA BALCAO	287454	6,345	0.01%	1.06%	2.68%	200801	202012
ELETROBRAS-CENTR ELETR BRAS	201792	5,898	0.01%	0.98%	5.14%	199309	202012

Table A30: Wealth Creation by Market, Top 20 China Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
KWEICHOW MOUTAI CO LTD	251321	395,870	0.40%	6.37%	38.98%	200205	202012
YIBIN WULIANGYE CO LTD	243683	174,443	0.18%	2.81%	21.48%	199806	202012
INDUSTRIAL & COMM BANKCHINA	279378	167,262	0.17%	2.69%	8.09%	200612	202012
CHINA MERCHANTS BANK CO LTD	254023	142,087	0.15%	2.29%	18.67%	200205	202012
PING AN INSURANCE GROUP	160709	119,237	0.12%	1.92%	12.91%	200704	202012
CONTEMPORARY AMPER	327415	96,058	0.10%	1.55%	90.84%	201807	202012
MIDEA GROUP CO LTD	316100	94,912	0.10%	1.53%	36.91%	201310	202012
FOSHAN HAITIAN FLAVOURING	317136	91,887	0.09%	1.48%	44.43%	201403	202012
JIANGSU HENGRUI MEDICINE CO	271085	89,795	0.09%	1.45%	30.30%	200011	202012
AGRICULTURAL BANK OF CHINA	269783	85,204	0.09%	1.37%	6.51%	201008	202012
CHINA TOURISM GRP DUTY FREE	292784	82,344	0.08%	1.33%	39.33%	200911	202012
HANGZHOU HIK-VISION DIGITAL	294594	66,361	0.07%	1.07%	28.42%	201009	202012
GREE ELEC APPLLIANCES INC	259980	64,087	0.07%	1.03%	26.90%	200102	202012
CHINA PETROLEUM & CHEM CORP	140756	63,406	0.06%	1.02%	7.45%	200109	202012
SHENZHEN MINDRAY B	328966	61,491	0.06%	0.99%	102.71%	201811	202012
BANK OF CHINA LTD	267461	61,409	0.06%	0.99%	5.53%	200608	202012
CHINA YANGTZE POWER CO	259541	59,403	0.06%	0.96%	14.36%	200312	202012
LUXSHARE PRECISION INDUSTRY	295326	57,440	0.06%	0.92%	47.55%	201010	202012
INDUSTRIAL BANK CO LTD	282483	52,950	0.05%	0.85%	11.10%	200703	202012
LUZHOU LAOJIAO CO LTD	243767	52,098	0.05%	0.84%	25.26%	200103	202012

Table A31: Wealth Creation by Market, Top 20 Colombia Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ECOPETROL SA	287882	23,972	0.02%	22.46%	6.60%	200802	202012
BANCO DE BOGOTA	217719	8,630	0.01%	8.09%	17.89%	199003	202012
INTERCONEXION ELECTRICA SA	249448	8,416	0.01%	7.88%	17.45%	200201	202012
BAVARIA SA	200623	8,190	0.01%	7.67%	36.19%	199006	200710
BANCOLOMBIA SA	061067	7,497	0.01%	7.02%	15.53%	199006	202012
GRUPO AVAL ACCIONES VALORES	241388	7,144	0.01%	6.69%	18.46%	200205	202012
PROMIGAS SA ESP	205898	4,861	0.00%	4.55%	15.05%	199710	202012
CEMENTOS ARGOS SA	201101	4,296	0.00%	4.03%	10.92%	199303	202012
GRUPO ENERGIA BOGOTA SA ESP	286567	3,769	0.00%	3.53%	5.99%	201004	202012
CORP FIN COLUMBIANA SA	105163	3,315	0.00%	3.11%	20.69%	200410	202012
GRUPO DE INVERSIONES SURAMER	203756	2,939	0.00%	2.75%	7.87%	199307	202012
GRUPO NUTRESA SA	216320	2,936	0.00%	2.75%	9.50%	199804	202012
GRUPO ARGOS SA	201095	2,247	0.00%	2.11%	6.47%	199302	202012
ISAGEN S.A. E.S.P.	287564	1,951	0.00%	1.83%	6.45%	200801	201703
BANCO DE OCCIDENTE	205914	1,889	0.00%	1.77%	9.32%	199710	202012
BBVA COLUMBIA SA	200664	1,611	0.00%	1.51%	5.99%	199204	202012
CEMENTOS DEL VALLE	237817	1,565	0.00%	1.47%	79.92%	200201	200512
CELSIA SA ESP	248838	1,292	0.00%	1.21%	19.73%	200111	202012
EMPRESA DE ENERGIA PACIFICO	294553	1,180	0.00%	1.11%	7.19%	201006	202012
BANCO SANTANDER COLOMBIA SA	210595	1,022	0.00%	0.96%	10.30%	199405	201203

Table A32: Wealth Creation by Market, Top 20 India Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
RELIANCE INDUSTRIES LTD	207074	162,978	0.17%	7.75%	14.08%	199002	202012
TATA CONSULTANCY SVCS LTD	270885	156,428	0.16%	7.44%	20.16%	200409	202012
HDFC BANK LTD	144535	95,754	0.10%	4.56%	21.52%	199511	202012
INFOSYS LTD	211009	85,606	0.09%	4.07%	31.42%	199307	202012
HINDUSTAN UNILEVER LTD	203076	75,922	0.08%	3.61%	15.29%	199002	202012
HOUSING DEV FINANCE CORP LTD	223055	57,224	0.06%	2.72%	20.65%	199102	202012
KOTAK MAHINDRA BANK LTD	223062	45,928	0.05%	2.19%	18.36%	199410	202012
ITC LTD	203402	43,266	0.04%	2.06%	19.66%	199002	202012
ICICI BANK LTD	223148	40,692	0.04%	1.94%	11.42%	199404	202012
BAJAJ FINANCE LTD	284229	40,277	0.04%	1.92%	39.33%	200705	202012
ASIAN PAINTS LTD	200283	37,222	0.04%	1.77%	20.51%	199002	202012
WIPRO LTD	204867	37,152	0.04%	1.77%	22.30%	199103	202012
MARUTI SUZUKI INDIA LTD	201805	31,730	0.03%	1.51%	21.97%	200308	202012
HCL TECHNOLOGIES LTD	235820	31,270	0.03%	1.49%	10.39%	200005	202012
BHARTI AIRTEL LTD	251118	30,210	0.03%	1.44%	17.49%	200205	202012
OIL & NATURAL GAS CORP LTD	208175	28,769	0.03%	1.37%	9.29%	199511	202012
NESTLE INDIA LTD	204060	25,584	0.03%	1.22%	16.09%	199002	202012
LARSEN & TOUBRO LTD	203560	23,334	0.02%	1.11%	10.33%	199002	202012
STATE BANK OF INDIA	203666	22,997	0.02%	1.09%	11.13%	199102	202012
HINDUSTAN ZINC LTD	206319	22,194	0.02%	1.06%	18.21%	199501	202012

Table A33: Wealth Creation by Market, Top 20 Indonesia Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
BANK CENTRAL ASIA TBK (PT)	242865	64,466	0.07%	18.20%	36.50%	200102	202012
PT BANK RAKYAT INDONESIA	157304	43,103	0.04%	12.17%	27.16%	200312	202012
BANK MANDIRI (PERSERO) TBK	257421	24,324	0.02%	6.87%	19.92%	200308	202012
ASTRA INTERNATIONAL TBK (PT)	222309	22,993	0.02%	6.49%	11.66%	199204	202012
TELEKOMUNIKASI INDONESIA	061548	22,948	0.02%	6.48%	6.83%	199512	202012
HANJAYA MANDALA SAMPOERNA	222066	22,139	0.02%	6.25%	18.69%	199009	202012
CHANDRA ASRI PETROCHEMICAL	030531	9,786	0.01%	2.76%	23.70%	200807	202012
CHAROEN POKPHAND INDONESIA	201163	8,131	0.01%	2.30%	15.26%	199105	202012
UNITED TRACTORS	209347	8,047	0.01%	2.27%	12.66%	199002	202012
ELANG MAHKOTA TECH TBK	293743	5,441	0.01%	1.54%	30.34%	201002	202012
KALBE FARMA	202830	5,409	0.01%	1.53%	11.27%	199111	202012
INDOFOOD CBP SUKSES MAKMUR	295540	5,217	0.01%	1.47%	10.00%	201011	202012
PT SEMEN INDONESIA (PERSERO)	208304	5,049	0.01%	1.43%	7.70%	199109	202012
PERUSAHAAN GAS NEGARA TBK	260321	4,736	0.00%	1.34%	17.70%	200403	202012
MAYORA INDAH (PT)	205061	4,563	0.00%	1.29%	27.15%	199206	202012
BANK MEGA TBK (PT)	246144	3,973	0.00%	1.12%	26.17%	200107	202012
PT BUKIT ASAM TBK	256137	3,872	0.00%	1.09%	30.02%	200403	202012
UNILEVER INDONESIA	209301	3,829	0.00%	1.08%	13.67%	199002	202012
SINAR MAS MULTHIARTHA TBK PT	245936	3,761	0.00%	1.06%	7.92%	199510	202012
SARANA MENARA NUSANTARA	294123	3,517	0.00%	0.99%	28.80%	201004	202012

Table A34: Wealth Creation by Market, Top 20 Malaysia Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
MALAYAN BANKING BHD	015688	26,851	0.03%	7.00%	10.58%	199002	202012
PUBLIC BANK BHD	015632	26,368	0.03%	6.88%	14.82%	199002	202012
DIGI.COM BHD	232085	13,764	0.01%	3.59%	18.99%	199912	202012
TOP GLOVE CORP BHD	247714	12,344	0.01%	3.22%	37.59%	200110	202012
IOI CORP BHD	103912	11,313	0.01%	2.95%	14.19%	199106	202012
TELEKOM MALAYSIA BHD	104129	10,767	0.01%	2.81%	7.45%	199101	202012
NESTLE (MALAYSIA) BHD	103756	10,078	0.01%	2.63%	12.90%	199007	202012
HARTALEGA HOLDINGS BHD	289024	10,023	0.01%	2.61%	45.99%	200807	202012
MAXIS COMMUNICATIONS BHD	252198	9,165	0.01%	2.39%	29.96%	200208	200706
HONG LEONG BANK BHD	206381	8,054	0.01%	2.10%	7.79%	199508	202012
KUALA LUMPUR KEPONG BHD	018753	7,846	0.01%	2.05%	10.75%	199002	202012
PRESS METAL ALUMNIUM HLD BHD	208574	7,777	0.01%	2.03%	20.59%	199402	202012
CIMB GROUP HOLDINGS BERHAD	200932	7,228	0.01%	1.89%	6.98%	199208	202012
MISC BERHAD	102138	7,189	0.01%	1.88%	6.78%	199002	202012
PPB GROUP BHD	019246	7,063	0.01%	1.84%	9.42%	199002	202012
PETRONAS DAGANGAN	206374	7,009	0.01%	1.83%	11.26%	199508	202012
HAP SENG CONSOLIDATED BHD	101453	6,473	0.01%	1.69%	14.87%	199002	202012
BRITISH AMER TOB (MALAYSIA)	100945	6,286	0.01%	1.64%	16.57%	199002	202012
HONG LEONG FINANCIAL GP BHD	015921	5,815	0.01%	1.52%	11.73%	199002	202012
PLUS EXPRESSWAYS BHD	252354	5,110	0.01%	1.33%	12.17%	200208	201112

Table A35: Wealth Creation by Market, Top 20 Mexico Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
WAL MART DE MEXICO SA	105104	63,549	0.07%	14.29%	13.96%	199002	202012
TELMEX-TELEFONOS DE MEXICO	019625	51,168	0.05%	11.50%	17.07%	199007	201212
AMERICA MOVIL SA DE CV	142248	47,249	0.05%	10.62%	14.77%	200103	202012
GRUPO MEXICO SAB DE CV	220509	41,345	0.04%	9.29%	13.32%	199002	202012
AMERICA TELECOM SA DE CV	148549	30,999	0.03%	6.97%	67.89%	200206	200701
GRUPO CARSO SA DE CV	024650	18,870	0.02%	4.24%	10.95%	199207	202012
FOMENTO ECONOMICO MEXICANO	031205	16,093	0.02%	3.62%	9.36%	199106	202012
GRUPO ELEKTRA SA DE CV	061761	15,260	0.02%	3.43%	16.52%	199602	202012
GRUPO FINANCIERO BANORTE SA	211934	13,870	0.01%	3.12%	14.12%	199507	202012
KIMBERLY-CLARK DE MEXICO SA	210701	11,883	0.01%	2.67%	13.28%	199002	202012
INDUSTRIAS PENOLES SAB DE CV	105111	10,149	0.01%	2.28%	12.13%	199002	202012
BANCO SANTANDER MEXICO -ADR	243588	7,325	0.01%	1.65%	12.04%	200108	202012
GRUPO BIMBO S.A.B. DE C.V.	200752	6,321	0.01%	1.42%	5.66%	199403	202012
EL PUERTO DE LIVERPOOL SA	220496	5,819	0.01%	1.31%	8.67%	199002	202012
GRUPO FINANCIERO INBURSA SA	202553	5,768	0.01%	1.30%	5.93%	199406	202012
GRUPO MODELO S.A.B. DE C.V.	204483	5,692	0.01%	1.28%	9.04%	199502	201509
GRUPO AEROPORTUARIO DEL PACI	166385	5,563	0.01%	1.25%	13.62%	200604	202012
ALFA SAB DE CV	221497	5,388	0.01%	1.21%	8.58%	199106	202011
GRUPO AEROPORTUARIO SURESTE	140045	5,230	0.01%	1.18%	19.22%	200207	202012
ARCA CONTINENTAL SAB DE CV	250684	4,371	0.00%	0.98%	5.95%	200204	202012

Table A36: Wealth Creation by Market, Top 20 Nigeria Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
NESTLE NIGERIA PLC	204059	4,213	0.00%	17.95%	17.61%	199402	202012
GUARANTY TRUST BANK PLC	243344	4,170	0.00%	17.77%	19.72%	200103	202012
BUA CEMENT PLC	337231	3,591	0.00%	15.30%	137.74%	202003	202012
DANGOTE CEMENT PLC	295654	2,826	0.00%	12.04%	2.73%	201012	202012
MTN NIGERIA COMMUNICATIONS	332215	1,911	0.00%	8.14%	16.54%	201906	202012
NIGERIAN BREWERIES PLC	204096	1,608	0.00%	6.85%	8.14%	199404	202012
ZENITH BANK PLC	274186	1,355	0.00%	5.77%	4.09%	200511	202012
BENUE CEMENT CO PLC	200704	909	0.00%	3.87%	25.46%	199510	201010
11 PLC	205235	388	0.00%	1.65%	11.02%	199406	202012
NIGERIAN BOTTLING CO PLC	204095	378	0.00%	1.61%	6.90%	199402	201108
JULIUS BERGER NIGERIA PLC	202805	250	0.00%	1.06%	15.87%	199505	202012
7-UP BOTTLING CO	243316	205	0.00%	0.88%	21.13%	200103	202012
PRESCO PLC	275651	191	0.00%	0.82%	14.68%	200604	202012
ASHAKA CEMENT	200260	190	0.00%	0.81%	8.26%	199404	201706
OKOMU OIL PALM CO PLC	282694	184	0.00%	0.78%	8.84%	200703	202012
TOTAL NIGERIA PLC	245833	173	0.00%	0.74%	6.32%	200107	202012
FLOUR MILLS NIGERIA PLC	243336	99	0.00%	0.42%	4.90%	200103	202012
GLAXOSMITHKLINE CONSUM (NGA)	246176	93	0.00%	0.40%	15.38%	200009	202012
PZ CUSSONS NIGERIA	208695	92	0.00%	0.39%	0.46%	199402	202012
UNITED CAPITAL PLC	314655	90	0.00%	0.38%	24.02%	201302	202012

Table A37: Wealth Creation by Market, Top 20 Poland Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
UNICREDIT BANK AUSTRIA AG	257360	25,542	0.03%	18.02%	40.62%	200402	200803
KGHM POLSKA MIEDZ SA	205812	16,995	0.02%	11.99%	18.68%	199708	202012
CD PROJEKT SA	250358	7,074	0.01%	4.99%	32.86%	200203	202012
BANK BPH S.A.	206518	6,924	0.01%	4.89%	23.62%	199509	201609
DINO POLSKA SA	323984	6,641	0.01%	4.69%	75.31%	201705	202012
POLSKI KONCERN NAFTOWY ORLEN	232743	6,016	0.01%	4.25%	7.29%	200001	202012
ING BANK SLASKI SA	206516	5,096	0.01%	3.60%	9.95%	199509	202012
POWSZECHNY ZAKLAD UBEZPIEC	269546	4,730	0.00%	3.34%	5.95%	201006	202012
POWSZECHNA KASA OSZCZEDNOSCI	271187	4,390	0.00%	3.10%	4.23%	200412	202012
LPP SA	254244	4,260	0.00%	3.01%	26.43%	200212	202012
SANTANDER BANK POLSKA SA	247552	3,298	0.00%	2.33%	9.62%	200110	202012
SYNTHOS SA	271560	2,727	0.00%	1.92%	23.11%	200502	201802
BUDIMEX SA	206524	2,688	0.00%	1.90%	15.11%	199509	202012
BANK HANDLOWY W WARZAWIE SA	205687	2,497	0.00%	1.76%	8.09%	199708	202012
GRUPA ZYWIEC SA	209641	2,333	0.00%	1.65%	10.22%	199307	202012
GRUPA KETY SA	212133	1,633	0.00%	1.15%	12.51%	199603	202012
MBANK SA	200773	1,490	0.00%	1.05%	7.42%	199308	202012
MONDI SWIECIE SPOLKA AKCYJJN	208283	1,249	0.00%	0.88%	18.52%	199711	201205
ECHO INVESTMENT SA	213164	1,224	0.00%	0.86%	14.17%	199702	202012
AMREST HOLDINGS SE	272820	1,218	0.00%	0.86%	13.53%	200506	202012

Table A38: Wealth Creation by Market, Top 20 Russia Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
SBERBANK OF RUSSIA OJSC	221682	90,611	0.09%	19.60%	16.86%	199511	202012
MMC NORILSK NICKEL PSJC	248384	81,059	0.08%	17.53%	23.30%	200112	202012
NOVATEK JSC	273716	41,524	0.04%	8.98%	13.53%	201003	202012
OIL CO LUKOIL PJSC	206457	39,902	0.04%	8.63%	7.33%	201002	202012
GAZPROM NEFT PJSC	213127	31,967	0.03%	6.91%	19.84%	199910	202012
MOBILE TELESYSTEMS PJSC	137433	26,600	0.03%	5.75%	23.44%	200008	202012
TATNEFT PJSC	064181	24,431	0.02%	5.28%	20.60%	200201	202012
POLYUS PJSC	030725	24,360	0.02%	5.27%	10.02%	200606	202012
SEVERSTAL PJSC	206702	16,529	0.02%	3.57%	8.90%	200507	202012
ALROSA PJSC	268692	6,926	0.01%	1.50%	9.42%	201201	202012
WIMM BILL DANN FOODS	147202	6,577	0.01%	1.42%	25.19%	200203	201108
NOVOLIPETSK STEEL	206642	6,548	0.01%	1.42%	3.51%	201003	202012
COMSTAR UNITED TELE SYS	275350	3,871	0.00%	0.84%	5.00%	200606	201103
MAGNIT PJSC	277015	3,814	0.00%	0.82%	5.48%	201003	202012
ACRON PJSC	212059	3,713	0.00%	0.80%	16.31%	201003	202012
VSMPO-AVISMA CORP	259738	3,686	0.00%	0.80%	15.91%	201003	202012
PJSC PIK-SPECIALIZED HOME	177345	3,107	0.00%	0.67%	8.04%	201003	202012
BALTIKA BREWERY	212062	3,059	0.00%	0.66%	21.08%	201003	201209
MOSCOW CITY TELEPHONE NETWK	206463	2,953	0.00%	0.64%	19.93%	201003	202012
PHOSAGRO PJSC	298317	2,809	0.00%	0.61%	5.94%	201108	202012

Table A39: Wealth Creation by Market, Top 20 Saudi Arabia Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
SAUDI ARABIAN OIL CO	334426	231,228	0.24%	33.44%	12.91%	202001	202012
SAUDI BASIC INDUSTRIES CORP	248963	135,780	0.14%	19.64%	25.10%	200111	202012
AL RAJHI BANK	248858	56,311	0.06%	8.14%	14.05%	200111	202012
SAUDI TELECOM CO	259013	41,109	0.04%	5.95%	6.43%	200312	202012
RIYAD BANK	248868	17,271	0.02%	2.50%	10.78%	200111	202012
SAMBA FINANCIAL GROUP	248869	14,946	0.02%	2.16%	7.36%	200112	202012
SABIC AGRI-NUTRIENTS COMPANY	248962	14,370	0.01%	2.08%	17.90%	200111	202012
ALMARAI CO	274337	12,362	0.01%	1.79%	11.22%	200509	202012
BANQUE SAUDI FRANSI	249018	10,156	0.01%	1.47%	9.19%	200111	202012
YANBU NATIONAL PETROCHEMICAL	282679	9,222	0.01%	1.33%	10.84%	200702	202012
SAUDI BRITISH BANK	248870	9,078	0.01%	1.31%	9.42%	200111	202012
ARAB NATIONAL BANK	248860	8,652	0.01%	1.25%	10.13%	200111	202012
THE SAUDI NATIONAL BANK	268696	8,540	0.01%	1.24%	5.10%	201412	202012
JARIR MARKETING CO	275074	7,264	0.01%	1.05%	23.94%	200408	202012
SAVOLA GROUP	248878	6,785	0.01%	0.98%	15.77%	200111	202012
SAUDI ELECTRICITY CO	274222	6,600	0.01%	0.95%	2.91%	200502	202012
DR. SULAIMAN AL HABIB	337781	5,216	0.01%	0.75%	157.14%	202004	202012
ALAWWAL BANK	249023	5,047	0.01%	0.73%	9.55%	200111	201906
SAUDI ARABIAN MINING CO	289361	4,664	0.00%	0.67%	4.67%	200809	202012
ADVANCED PETROCHEMICAL CO	282410	4,615	0.00%	0.67%	20.36%	200702	202012

Table A40: Wealth Creation by Market, Top 20 South Africa Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
NASPERS LTD	206059	116,447	0.12%	22.68%	19.20%	199609	202012
FIRSTRAND LTD	200019	25,614	0.03%	4.99%	9.31%	199206	202012
STANDARD BANK GROUP LTD	015781	22,216	0.02%	4.33%	12.23%	199002	202012
ANGLO AMERICAN PLATINUM LTD	016610	20,118	0.02%	3.92%	7.19%	199002	202012
KUMBA IRON ORE LTD	281544	18,615	0.02%	3.63%	19.14%	200612	202012
MTN GROUP LTD	211655	17,625	0.02%	3.43%	11.74%	199512	202012
SASOL LTD	100465	17,067	0.02%	3.32%	10.34%	199002	202012
VODACOM GROUP LTD	292072	12,414	0.01%	2.42%	10.32%	200906	202012
SANLAM-STH AFR NAT LIFE ASSR	225136	12,394	0.01%	2.41%	12.37%	199901	202012
EXXARO RESOURCES LTD	146202	11,742	0.01%	2.29%	50.84%	200112	202012
REMGRO LTD	240519	11,701	0.01%	2.28%	19.77%	200011	202012
ABSA GROUP LTD	016305	11,383	0.01%	2.22%	9.79%	199002	202012
CAPITEC BANK HOLDINGS LTD	251924	11,105	0.01%	2.16%	38.46%	200207	202012
BIDVEST GROUP LTD	209955	10,325	0.01%	2.01%	11.25%	199403	202012
IMPALA PLATINUM HOLDINGS LTD	102039	9,675	0.01%	1.88%	8.17%	199002	202012
TELKOM SA SOC LTD	152649	8,861	0.01%	1.73%	36.42%	200304	202012
RMB HOLDINGS LTD	210803	8,449	0.01%	1.65%	13.19%	199409	202012
SIBANYE-STILLWATER LIMITED	017287	8,201	0.01%	1.60%	27.39%	201303	202012
SHOPRITE HLDGS LTD	211166	6,877	0.01%	1.34%	15.91%	199403	202012
FIRST NATL BANK OF S AFRICA	015695	6,406	0.01%	1.25%	25.83%	199002	199805

Table A41: Wealth Creation by Market, Top 20 Thailand Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
PTT PLC	249399	55,767	0.06%	12.52%	29.19%	200201	202012
AIRPORTS OF THAILAND PCL	260558	30,265	0.03%	6.80%	20.62%	200404	202012
ADVANCED INFO SERVICE PCL	104558	29,870	0.03%	6.71%	17.68%	199211	202012
DELTA ELECTRONICS (THAILAND)	210059	21,139	0.02%	4.75%	21.24%	199508	202012
CP ALL PCL	258648	19,849	0.02%	4.46%	27.35%	200311	202012
SIAM CEMENT PCL	104125	18,470	0.02%	4.15%	8.52%	199002	202012
PTT EXPLORATION & PRODUCTION	208623	15,660	0.02%	3.52%	12.91%	199307	202012
SIAM COMMERCIAL BANK	025608	11,742	0.01%	2.64%	11.87%	199002	202012
INTOUCH HOLDINGS PCL	104092	11,074	0.01%	2.49%	15.93%	199010	202012
BANGKOK DUSIT MEDICAL SVCS	200774	11,048	0.01%	2.48%	18.98%	199211	202012
KASIKORNBANK PCL	027833	10,395	0.01%	2.33%	10.33%	199002	202012
BANGKOK BANK PCL	025609	9,452	0.01%	2.12%	9.51%	199002	202012
CHAROEN POKPHAND FOODS PCL	103951	8,515	0.01%	1.91%	14.24%	199002	202012
GULF ENERGY DEVELO	326073	8,053	0.01%	1.81%	43.21%	201801	202012
CENTRAL PATTANA PCL	206379	7,323	0.01%	1.64%	13.37%	199508	202012
HOME PRODUCT CENTER PCL	250060	6,679	0.01%	1.50%	30.88%	200202	202012
SIAM MAKRO PCL	204588	6,292	0.01%	1.41%	9.53%	199503	202012
KRUNGTHAI CARD PCL	256003	5,300	0.01%	1.19%	29.32%	200305	202012
ENERGY ABSOLUTE PUBLIC CO	314861	5,282	0.01%	1.19%	28.90%	201303	202012
BIG C SUPERCENTER PCL	207185	4,944	0.01%	1.11%	13.82%	199208	201709

Table A42: Wealth Creation by Market, Top 20 Turkey Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
TUPRAS-TURKIYE PETROL RAFINE	211469	11,844	0.01%	8.00%	24.63%	199512	202012
AKBANK TURK AS	109299	9,888	0.01%	6.68%	25.81%	199312	202012
KENT GIDA	213041	9,781	0.01%	6.61%	19.32%	199701	202012
FORD OTOMOTIV SANAYI AS	220399	9,539	0.01%	6.44%	17.13%	199004	202012
EREGLI DEMIR VE CELIK FABRIK	202056	7,788	0.01%	5.26%	6.97%	199004	202012
BIM BIRLESIK MAGAZALAR	273498	6,684	0.01%	4.51%	22.49%	200508	202012
KOC HOLDING AS	203442	6,395	0.01%	4.32%	7.56%	199004	202012
ENKA INSAAT VE SANAYI AS	210725	6,065	0.01%	4.10%	13.91%	199004	202012
YAPI VE KREDI BANKASI AS	209571	4,912	0.01%	3.32%	20.26%	199004	200205
ASELSAN AS	200258	4,898	0.01%	3.31%	16.67%	199312	202012
TURKIYE IS BANKASI AS	203784	4,895	0.01%	3.31%	6.66%	199004	202012
T KALKINMA BANKASI	211466	3,970	0.00%	2.68%	6.47%	199512	202012
DENIZBANK A.S.	161937	3,780	0.00%	2.55%	5.26%	200411	202006
GUBRE FABRIKALARI	202678	3,563	0.00%	2.41%	13.28%	199004	202012
BSH PROFILO ELEKTRIKLI	208423	3,362	0.00%	2.27%	18.50%	199312	201402
MIGROS TICARET AS	205162	2,458	0.00%	1.66%	12.38%	199312	202012
ARCELIK AS	200218	2,318	0.00%	1.57%	6.54%	199003	202012
TURK TRAKTOR VE ZIRAAT	271455	2,102	0.00%	1.42%	30.20%	200501	202012
TURK HAVA YOLLARI AO	209265	1,939	0.00%	1.31%	8.18%	199312	202012
BORUSAN YATIRIM PAZARLAMA	241789	1,635	0.00%	1.10%	19.22%	200101	202012

Table A43: Wealth Creation by Market, Top 20 United Arab Emirates Firms

Firm Name	GVKEY	Wealth Created ($Millions)	% of Global Gross Wealth Creation	% of National Gross Wealth Creation	Annualized Dollar Weighted Return	First Month	Last Month
ETISALAT GROUP	274234	58,263	0.06%	32.13%	16.93%	200303	202012
FIRST ABU DHABI BANK P.J.S.C	282949	25,008	0.03%	13.79%	12.26%	200603	202012
INTERNATIONAL HOLDING CO	337385	19,324	0.02%	10.66%	623.73%	201909	202012
NATIONAL BANK OF ABU DHABI	251249	16,598	0.02%	9.15%	17.20%	200206	201703
ABU DHABI COMMERCIAL BANK	251138	10,507	0.01%	5.79%	11.96%	200205	202012
EMIRATES ISLAMIC BANK	283434	8,842	0.01%	4.88%	26.28%	200906	202012
EMAAR PROPERTIES PJSC	251248	6,545	0.01%	3.61%	7.57%	200205	202012
ABU DHABI ISLAMIC BANK	251139	5,025	0.01%	2.77%	13.33%	200106	202012
DUBAI ISLAMIC BANK PJSC	251246	4,995	0.01%	2.75%	6.08%	200205	202012
ABU DHABI NATIONAL OIL	326213	4,546	0.00%	2.51%	16.22%	201801	202012
EMIRATE INTEGRATED TELECOM	279381	3,096	0.00%	1.71%	3.74%	200606	202012
DUBAI INVESTMENTS	274891	2,460	0.00%	1.36%	16.48%	200106	202012
EMIRATES NBD PJSC	286983	2,164	0.00%	1.19%	1.47%	200711	202012
NATL BANK OF RAS AL KHAIMAH	284899	2,100	0.00%	1.16%	9.16%	200602	202012
EMIRATES BANK INTL LTD	251250	1,503	0.00%	0.83%	10.67%	200206	200709
NATIONAL BANK OF DUBAI	251247	1,398	0.00%	0.77%	9.55%	200206	200710
AIR ARABIA PJSC	285482	1,268	0.00%	0.70%	6.83%	200708	202012
NATIONAL BANK OF FUJAIRAH	284425	1,139	0.00%	0.63%	4.91%	200705	202012
WAHA CAPITAL PJSC	251233	875	0.00%	0.48%	13.21%	200106	202012
DAMAC PROPS DUBAI	319007	666	0.00%	0.37%	6.10%	201502	202012

Table A44: Concentration of Gross and Net Wealth Creation - Adjusting for Cross-holdings

This table reports the number of firms, percentage of gross wealth creation adjusted by cross holding (summed across firms with positive wealth creation) and net wealth creation adjusted by cross holding (summed across all firms) accounted for by the best-performing 0.25%, 0.5%, 1.0%, and 5.0% of firms in each sub-sample during our sample period from January 1990 to December 2020.

Sample	Total Firms			Top 0.25% of Firms			Top 0.5% of Firms			Top 1% of Firms			Top 5% of Firms		
	# Firms	Gross Wealth ($Bil.)	Net Wealth ($Bil.)	# Firms	% of Gross Wealth	% of Net Wealth	# Firms	% of Gross Wealth	% of Net Wealth	# Firms	% of Gross Wealth	% of Net Wealth	# Firms	% of Gross Wealth	% of Net Wealth
Global	63,785	93,493	72,438	160	39.24%	50.64%	319	50.39%	65.04%	638	62.60%	80.80%	3,190	88.12%	113.73%
Global (Excl. US)	46,221	43,871	28,322	116	33.59%	52.03%	232	45.72%	70.82%	463	58.91%	91.25%	2,312	86.33%	133.72%
By Development															
Developed	49,044	81,360	64,605	123	39.74%	50.05%	246	50.79%	63.97%	491	62.96%	79.29%	2,453	88.65%	111.64%
Developed (Excl. US)	31,480	31,738	20,490	79	34.07%	52.77%	158	46.39%	71.86%	315	59.81%	92.65%	1,574	87.32%	135.26%
Emerging	14,860	12,171	7,833	38	30.52%	47.42%	75	42.18%	65.55%	149	54.75%	85.08%	743	83.20%	129.29%
By Region															
North America	19,568	51,953	46,012	49	39.00%	44.04%	98	50.11%	56.57%	196	62.07%	70.08%	979	87.72%	99.04%
Europe	12,479	16,867	13,696	32	29.16%	35.91%	63	41.01%	50.51%	125	54.67%	67.32%	624	84.81%	104.44%
Asian Pacific	17,002	12,540	4,896	43	40.64%	104.08%	86	52.05%	133.30%	171	64.74%	165.81%	851	88.90%	227.69%
By Market															
Developed															
United States	17,330	49,171	43,751	44	39.51%	44.41%	87	50.54%	56.80%	174	62.38%	70.11%	867	87.83%	98.71%
Homeless (US ADRs)	239	452	364	1	24.68%	30.63%	2	37.12%	46.07%	3	48.69%	60.43%	12	81.59%	101.26%
Canada	2,001	2,331	1,897	6	29.79%	36.61%	11	41.04%	50.45%	21	54.26%	66.69%	101	83.34%	102.43%
Austria	177	91	35	1	16.24%	42.50%	1	16.24%	42.50%	2	31.82%	83.26%	9	68.38%	178.90%
Belgium	297	391	317	1	31.00%	38.19%	2	34.89%	42.98%	3	39.53%	48.69%	15	69.86%	86.06%
Denmark	346	681	649	1	26.85%	28.16%	2	37.26%	39.08%	4	50.27%	52.73%	18	83.80%	87.91%
Finland	249	403	370	1	13.13%	14.32%	2	24.46%	26.66%	3	34.94%	38.08%	13	74.03%	80.69%
France	1,721	2,661	2,207	5	32.79%	39.53%	9	48.45%	58.40%	18	65.09%	78.46%	87	88.29%	106.43%
Germany	1,492	2,235	1,821	4	22.81%	27.99%	8	34.08%	41.82%	15	50.07%	61.45%	75	85.00%	104.32%
Greece	411	49	-62	2	32.99%	-25.99%	3	38.22%	-30.12%	5	48.00%	-37.82%	21	77.50%	-61.06%
Ireland	85	134	100	1	24.33%	32.53%	1	24.33%	32.53%	1	24.33%	32.53%	5	84.76%	113.34%
Italy	725	778	359	2	24.14%	52.36%	4	35.43%	76.85%	8	50.65%	109.87%	37	82.14%	178.18%
Netherlands	329	1,084	990	1	18.46%	20.21%	2	31.95%	34.98%	4	45.38%	49.69%	17	85.37%	93.47%
Norway	564	350	263	2	29.79%	39.52%	3	41.19%	54.66%	6	53.60%	71.12%	29	78.51%	104.17%
Portugal	122	62	15	1	31.86%	131.65%	1	31.86%	131.65%	2	33.40%	138.01%	7	64.23%	265.36%
Spain	376	757	589	1	14.75%	18.95%	2	27.17%	34.90%	4	44.43%	57.08%	19	76.19%	97.89%
Sweden	993	1,121	1,070	3	17.56%	18.39%	5	26.79%	28.05%	10	40.37%	42.28%	50	77.27%	80.91%
Switzerland	405	2,194	2,121	2	38.07%	39.39%	3	52.13%	53.94%	5	57.55%	59.54%	21	79.86%	82.63%

United Kingdom	4,188	3,877	2,851	11	30.02%	40.83%	21	42.62%	57.96%	42	56.55%	76.91%	210	85.75%	116.61%
Australia	2,962	1,775	1,550	8	42.42%	48.58%	15	53.62%	61.40%	30	64.52%	73.88%	149	89.95%	103.00%
Hong Kong SAR	2,609	3,938	3,392	7	36.62%	42.52%	14	47.79%	55.49%	27	58.77%	68.23%	131	88.98%	103.31%
Israel	636	158	134	2	11.91%	14.04%	4	23.33%	27.49%	7	35.38%	41.70%	32	60.15%	70.89%
Japan	3,983	3,374	-2,298	10	28.86%	-42.37%	20	43.77%	-64.27%	40	59.51%	-87.39%	200	88.41%	-129.81%
New Zealand	271	147	134	1	11.95%	13.19%	2	21.76%	24.02%	3	30.30%	33.44%	14	67.28%	74.25%
Singapore	1,042	394	286	3	26.53%	36.56%	6	40.20%	55.41%	11	53.02%	73.08%	53	85.12%	117.31%
South Korea	3,060	1,469	1,077	8	53.35%	72.77%	16	62.71%	85.54%	31	72.08%	98.32%	153	88.97%	121.36%
Taiwan	2,439	1,283	621	7	50.19%	103.70%	13	57.70%	119.22%	25	65.97%	136.30%	122	85.84%	177.36%
Emerging															
Argentina	114	48	20	1	43.37%	102.19%	1	43.37%	102.19%	2	59.36%	139.84%	6	81.69%	192.48%
Brazil	390	570	400	1	15.64%	22.28%	2	22.97%	32.71%	4	33.38%	47.54%	20	70.40%	100.26%
China	3,962	6,027	3,681	10	23.51%	38.49%	20	33.70%	55.18%	40	46.94%	76.86%	199	74.88%	122.59%
Colombia	66	90	83	1	26.61%	29.04%	1	26.61%	29.04%	1	26.61%	29.04%	4	47.90%	52.28%
India	3,967	1,906	1,456	10	39.43%	51.61%	20	53.16%	69.59%	40	67.11%	87.85%	199	91.73%	120.08%
Indonesia	781	316	183	2	34.03%	58.76%	4	45.09%	77.87%	8	63.41%	109.50%	40	88.54%	152.90%
Malaysia	1,364	354	175	4	21.84%	44.12%	7	28.89%	58.38%	14	43.67%	88.24%	69	81.42%	164.53%
Mexico	205	429	326	1	14.81%	19.49%	2	26.73%	35.18%	3	37.89%	49.87%	11	74.82%	98.47%
Nigeria	202	19	-26	1	8.94%	-6.49%	2	31.15%	-22.62%	3	50.29%	-36.51%	11	91.53%	-66.45%
Poland	994	134	70	3	36.91%	71.32%	5	43.06%	83.20%	10	61.21%	118.26%	50	89.40%	172.72%
Russia	276	437	253	1	20.72%	35.77%	2	38.33%	66.16%	3	46.69%	80.60%	14	87.62%	151.26%
Saudi Arabia	201	683	610	1	33.87%	37.93%	2	53.76%	60.21%	3	62.01%	69.44%	11	79.93%	89.51%
South Africa	852	451	206	3	33.06%	72.45%	5	39.06%	85.60%	9	50.18%	109.99%	43	87.16%	191.04%
Thailand	923	386	226	3	26.89%	45.90%	5	37.19%	63.48%	10	52.11%	88.95%	47	84.65%	144.51%
Turkey	437	141	82	2	18.21%	31.25%	3	25.14%	43.12%	5	34.63%	59.40%	22	71.52%	122.70%
UAE	126	181	88	1	32.14%	66.30%	1	32.14%	66.30%	2	45.93%	94.75%	7	80.02%	165.09%

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