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## FREE FLOAT ADJUSTMENTS IN GLOBAL EQUITY PORTFOLIOS

DISCUSSION NOTE

Free float represents the portion of a company's shares that is publicly traded as opposed to locked-in shares held by strategic investors. In this note, we compare the rationale and various implications of using full market weights or free float adjusted weights in a global equity portfolio. Market capitalisation weights can be justified on a theoretical basis and better represent the relative economic importance of the companies in the portfolio. Free float weights take into account the trading opportunities but change the geographic and industry composition of the global portfolio. The market weighted portfolio has higher exposures to small cap, value and less liquid stocks in the global universe which have been documented to command premia over the long run.

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# SUMMARY

## FREE FLOAT ADJUSTMENTS IN GLOBAL EQUITY PORTFOLIOS

The starting point of our analysis is the global total market capitalisation portfolio. Total market capitalisation weights can be justified on a theoretical basis to ensure that all investors can follow the strategy at the same time (macro consistency).

However, a substantial portion of the global market capitalisation is not freely traded. Shares held by governments, strategic long-term investors, insiders, company founders and otherwise "restricted" shareholders can be considered unavailable for trading. Global market capitalisation is reduced by 30 percent when shares held by such owners are taken out, making free float adjustments an economically important topic for investors.

In recent years, free float weighting has largely replaced total market capitalisation weighting as the dominant equity index weighting scheme. Free float adjusted weights are introduced to provide a better representation of the investable and liquid opportunities in the market.

Although the calculation of free float adjusted capitalisation may seem straightforward, a number of practicalities complicate the process. Reliable shareholder data are not always available; there is no consensus on free float definitions across index providers; and precise free float calculations for individual companies are rarely disclosed in detail. Investors cannot replicate and verify index providers' free float calculations.

Free float adjustments alter the geographic and industry composition of the global equity portfolio. The weights are lower for countries with low average free float such as Japan, France, the BRICs and other emerging markets. Industries with significant state involvement (telecoms, oil and gas) also receive lower weights. Exposures to value stocks, small capitalisation stocks and less frequently traded stocks are also lower in the free float adjusted global portfolio.

We observe a positive relationship between stock liquidity and free float weights in the cross-section of global stocks. Thus, moving from full market weights to a free float adjusted portfolio means increasing investments in the more liquid stocks in the market and reducing investments in the less liquid ones. Investors in the total market capitalisation portfolio may capture a liquidity premium embedded in the less frequently traded stocks. In addition, a non-free float investors may benefit from supplying liquidity to the market at times when free float index followers rebalance their portfolios in response to changes in the free float factors of index constituents.

The global market capitalisation portfolio outperformed the free float adjusted portfolio by 41 basis points per annum over the period 2004-2012. This return differential can be attributed to differences in the country and industry exposure of the two portfolios, as well as to differences in exposure to known equity risk factors.

Some theoretical models suggest that companies with a controlling shareholder are riskier and therefore command higher expected returns for minority shareholders. Our analysis over the period 2004-2012 suggest that companies with large government, individual or public company ownership are indeed associated with higher returns. The excess returns of companies with large individual shareholders cannot be fully explained by known equity risk factors.

The total market capitalisation portfolio may expose the investor to illiquidity risk and other sources of risk and if implemented efficiently, yield higher returns over the long run. Investors may still find the free float adjusted portfolio advantageous because of its better investability and liquidity characteristics. The choice ultimately depends on the investor's characteristics, time horizon and liquidity needs. Harvey (2012) argues, a long-term investor like the Government Pension Fund Global should position its portfolio to better reflect total market capitalisation as opposed to free float because it is suited to absorb illiquidity risk and harvest a premium for bearing it.

# Introduction

A natural starting point for investors seeking passive exposure to global equity markets is the global market capitalisation portfolio. Capitalisation weighting makes intuitive sense as it gives more weight to the larger companies in the portfolio.<sup>1</sup> As Siegel (2003) points out, alternatives to market capitalisation indices require frequent rebalancing. Market capitalisation weighting, on the other hand, is fully consistent with a buy-and-hold strategy. Managers need only to reinvest dividends and keep track of index constituents. In the absence of any corporate actions and index changes, the market capitalisation portfolio is self-rebalancing. Siegel (2003) also emphasises that the market capitalisation index is the only weighting scheme that can be considered "macro-consistent". It is possible for all investors to hold the market capitalisation index. It is mathematically impossible for all investors to hold a non-market capitalisation index. Moreover, valuing stocks at market prices measures the market's assessment of the relative values of firms.

Capitalisation weighting can be further rationalised on the basis of the capital asset pricing model (CAPM) of Sharpe (1964), Lintner (1965), Mossin (1966) and Black (1972). The CAPM postulates that the capitalisation weighted market portfolio is mean-variance efficient and, ex ante, it has the highest expected risk adjusted return.<sup>2</sup> In equilibrium, all investors hold the market portfolio or a combination of the market portfolio and the risk free asset. In a static world with no frictions, an investor cannot do any better than holding the capitalisation weighted portfolio.

While in theory all investors should hold the total market capitalisation portfolio, this is not possible in practice. As Roll (1977) demonstrates, the market in the theoretical CAPM includes all wealth, both tangible assets like stocks, bonds, property and private companies and intangibles like human capital. Such a portfolio is unattainable in practice as it evidently contains non-traded components. Investors as a whole cannot hold the CAPM portfolio; they can only hold the freely traded portion of it. In this respect, the CAPM does not represent the trading and holding possibilities practically viable for investors. Real world portfolios need to take into account the fact that markets are not frictionless and that some parts of the market are either impossible (e.g. private companies) or prohibitively expensive to reach. No real world portfolio fits the definition of the true market in the theoretical CAPM.

Over the past ten years, free float weighting has become the standard for constructing market capitalisation portfolios. The free float of a company consists of those shares that are readily available for trading, the rest being held by special types of investors such as governments, family trusts, and insiders (collectively referred to as "stakeholders" or "restricted shareholders") who do not typically trade their holdings. Restricted shareholders are

<sup>1</sup> Total market capitalisation weights need to be adjusted for cross-holdings to avoid double counting. For example, if companies A and B are both worth 100 million dollars and company A owns 20 percent of company B's stock then the total market capitalisation of an index consisting of A and B is not 200 million dollars but rather  $200 - (0.2 \times 100) = 180$  million dollars as the true market capitalisation of company A (without company B's stock) is 80 million dollars.

<sup>2</sup> The market in the CAPM is not restricted to the equity market. In principle, it includes all traded and non-traded assets such as other financial securities, real estate, precious metals and human capital.

different from financial investors in the sense that they value control rights in addition to dividend rights. Under the free float weighting scheme, every company in the index receives a weight that is proportional to the market value of shares held by unrestricted shareholders. This is in contrast to total market capitalisation schemes which take into account the total number of shares in computing the market capitalisation of index constituents. For example, if restricted shareholders hold 50 percent of the shares of a company, the company's weight in the total market capitalisation index will be twice as large as that in the free float adjusted one.

Many commercial index providers consider free float adjusted capitalisation superior to total market capitalisation because it better represents the practically tradable opportunities in the market and makes the index a more liquid investment.<sup>3</sup> The holdings of certain strategic investors like governments or company founders are similar to unlisted company holdings. They are not traded on a regular basis and are generally inaccessible to financial investors. As a result, an index that treats restricted shares as part of the available supply may prove difficult and costly to replicate. On the other hand, critics of the free float methodology such as Seifried and Zunft (2012) argue that free float adjustments are often done in a non-transparent way, come with a significant lag and are difficult to justify on a theoretical basis. In their view, free float adjustments introduce distortions in the index by misrepresenting the relative market importance of index constituents.

In this note, we examine the implications of using free float adjusted market capitalisation in global equity portfolios. Specifically, we (1) discuss the rationale for using total market capitalisation and free float weighting schemes; (2) outline the practicalities of free float adjustments; (3) compare the risk/return profiles of the global total market capitalisation and free float adjusted portfolios and examine the factors contributing to any observed differences; and (4) argue that an investment strategy closer to total market capitalisation weights may yield higher returns in the long run by capturing an illiquidity premium embedded in the less liquid stocks in the market.

## The practicalities of free float adjustments

As Woods (2012) points out, the advent of the CAPM in the 1970s provided some initial impetus to investing in total market capitalisation weighted indices. However, it became clear over the ensuing decades that investors need to consider factors like investability and tradability when replicating such indices.

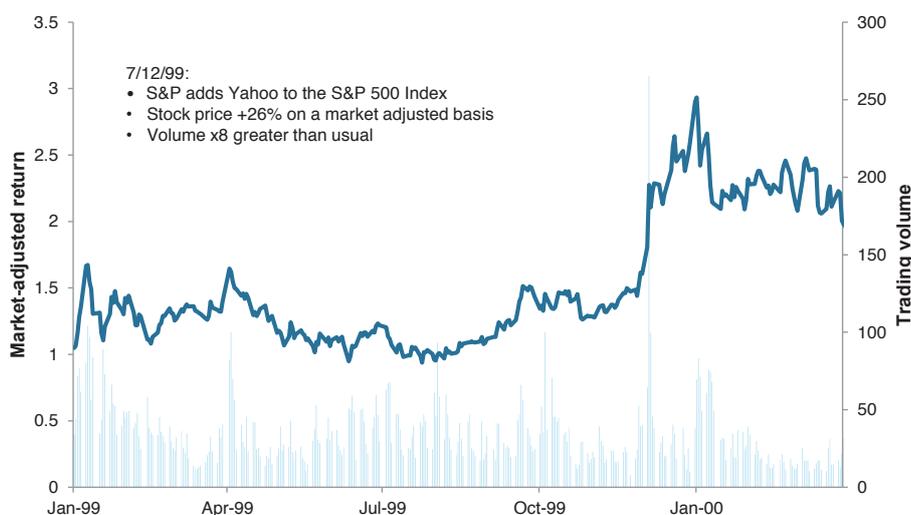
Vanguard pioneered index investing in the US when in 1976 it launched the first index mutual fund for individual investors. Similarly, many institutional

<sup>3</sup> See, for example, Christopherson, J., "The Making of a Better Benchmark," Russell Research, March 2012; "FTSE Free Float Methodology Change FAQ," FTSE, October 2012; "MSCI to Adjust for Free Float and to Increase Coverage to 85%," MSCI Press Release, 10 December 2000.

investors began to invest in capitalisation weighted portfolios that tracked major indices like the S&P 500. As passive investments' share of the overall market was initially small, index managers' actions had no significant effect on equity prices. However, as the share of passive mandates gradually increased and index products like exchange traded funds became popular among investors, index managers' desire to replicate the underlying index caused distortions in stock prices.

A notable example of the mismatch between demand and supply induced by index tracking occurred in 1999 when Yahoo! stock was added to the S&P 500 index. Yahoo! was to be included in the S&P 500 index at total capitalisation weight even though only 10 percent of the shares were freely traded. The majority of shares were held by employees and venture capitalists who faced restrictions on stock sales. On 7 December 1999, when index funds rushed to buy the stock in response to the stock's inclusion in the index, there was an insufficient supply of Yahoo! shares to meet the heightened demand. As shown in Chart 1, the Yahoo! stock posted an excess return of 26 percent on that day.<sup>4</sup> This obvious mismatch between demand and supply highlights the main advantage of using free float adjustments: the free float weights give a better representation of the trading opportunities in the market.

Chart 1: Cumulative abnormal return of Yahoo stock



Source: NBIM, Bloomberg

While the objective in building free float portfolios is clear, modifying stock weights to reflect shares available for purchase by the average investor is not a straightforward exercise. To calculate free float adjusted weights, index providers (1) decide which investor types to classify as restricted shareholders; (2) collect shareholding data and estimate the available supply of shares for each index constituent; (3) decide on how to transform the stakeholder data for each company into the index weight for that company taking into account, for example, limited turnover. In this section, we show that all of these steps pose a number of challenges.

<sup>4</sup> Excess return is measured relative to the market as proxied by the S&P 500.

Definitions of free float vary across index providers. For example, FTSE defines free float as the shares held by individuals, investment funds, ETFs, mutual funds, pension funds, sovereign wealth funds (if the holding is less than 10 percent) and retail investors. The shares held by governments, public companies, employees, company founders and investors subject to a lock-in clause are generally considered restricted holdings and therefore excluded from the company's free float. Another major index provider, MSCI, excludes the shares held by governments, companies, employees and individuals closely affiliated with the company from free float, but also considers shares held by banks as restricted. FTSE treats shares that are subject to ongoing contractual agreements (such as swaps) as restricted whereas MSCI does not. As Seifried and Zunft (2012) argue, splitting investors and entities into strategic and non-strategic holders is a rather imprecise exercise as certain "strategic" investors like banks may hold shares of the same stock for multiple purposes. For example, a bank may hold some of the shares in reserves (the bank's non-traded portfolio) and some as part of its trading portfolio. Yet, reported holdings of institutional investors do not differentiate between strategic and non-strategic uses of holdings.

Index providers frequently use discretion in determining free float weights for companies with complex ownership structures. For example, a firm can have a pyramidal corporate structure, where a minority shareholder holds a controlling stake in a holding company that, in turn, holds a controlling stake in an operating company (Bebchuk, Kraakman and Triantis 2000). Even more complex three- and four-tier pyramidal structures are possible. An extensive analysis of the company's shareholder agreements is required in such cases. Horizontal cross-ownership, which refers to publicly traded companies holding shares of other publicly traded companies, common in countries like South Korea and Japan, can also present challenges in assigning free float weights. The fact that index providers do not disclose in detail how they calculate the free float adjusted market capitalisation for individual companies makes it difficult for investors to replicate precisely the free float in many cases.

The calculation of free float weights inevitably depends on shareholder data availability and quality. In many countries, holdings data are limited or may become available only after a significant lag. While ownership data in countries like the US and UK are typically reported every quarter, institutional holdings in many emerging markets may be reported only once a year or not be reported at all. In cases where ownership data are unavailable, index providers rely on alternative proxies for free float such as trading volume or investor perception of freely traded shares. This adds yet another degree of subjectivity to the free float calculation process. Moreover, shareholder data for many companies is of questionable quality due to large short sale positions, asynchronous reporting (e.g. different owners reporting holdings as at different dates), double counting of holdings and other data errors.

In addition to differing definitions of free float, the implementation or methodology varies. For example, MSCI rounds free float numbers in multiples of five, whereas FTSE uses actual free float (rounded to the nearest percent). Up until March 2013, FTSE used a banded free float approach (Table 1), under

which the same weight was given to companies with floats falling within a pre-specified range. For example, a weight of 1 was given both to a company with actual free float of 0.76 and to one with free float of 0.99. FTSE justified its adoption of banded free float in 2000 on the poor quality of publicly available data in emerging markets and the need for less frequent changes in index weights.<sup>5</sup> A number of indices such as the Sansex index in India and the IPC, the primary index of the Mexican Stock Exchange, continue to follow FTSE's banded approach.

Table 1: FTSE's free float bands (used prior to March 2013)

Actual FF (%)	Adjusted FF within FTSE indices (%)
Under 15	0
15 - 20	20
20 - 30	30
30 - 40	40
40 - 50	50
50 - 75	75
Over 75	100

Source: FTSE, "FTSE Free Float Methodology Change FAQ," October 2012, p. 4.

Given that the calculation of free float is subject to several sources of uncertainty, it is not surprising to see that free float estimates for a single company vary from one index provider to another. Table 2 illustrates this point. Similar to Seifried and Zunft (2012), we list the same-day free float factors for a sample of companies across several informational sources as at March 2013. Our sample consists of the ten largest companies in Russia, a country with relatively high government ownership and low free float. We observe substantial differences in the free floats reported by the different sources. For example, S&P's free float factor for Gazprom, the largest company in Russia, is 2.5 times higher than the one reported by the Moscow Interbank Currency Exchange (MICEX). For Lukoil, free float factors range from 0.60 to 0.95, a difference of close to 17 billion dollars in terms of market capitalisation. The consequence of such differences is that a given company receives an entirely different weight in the index depending on the methodology or source used in the index calculation.

We further illustrate the discrepancies in free float factors provided by index providers in Charts 2 and 3. While free float factors tend to be clustered along the 45 degree line as expected, we observe significant dispersion. The discrepancies in free float factors range from 0.01 to 0.85 and appear to be particularly large for the smaller stocks in the universe as indicated by the size of the circles in the two charts. Discrepancies also tend to be larger in emerging and developed Asia-Pacific markets. In Table 3, we report the average discrepancy in free float factors by region as at March 2013. For each company, we calculate the discrepancy as the difference between the maximum and minimum free float factor across the three information sources FTSE, MSCI and S&P. For example, for OAO Gazprom, the discrepancy in free float

<sup>5</sup> See "FTSE Free Float Methodology Change FAQ," October 2012, available at [http://www.ftse.co.uk/Indices/FTSE\\_Index\\_Standards/Free\\_Float.jsp](http://www.ftse.co.uk/Indices/FTSE_Index_Standards/Free_Float.jsp)

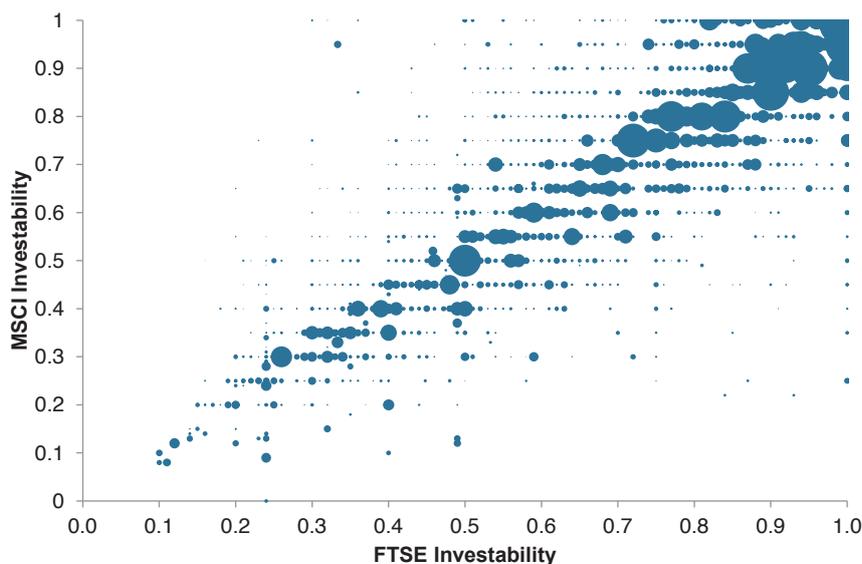
weight is 0.05 or 5 percent of the company's market capitalisation, calculated as the difference between the maximum factor of 0.50 (provided by S&P in this case) and the minimum factor of 0.45 (provided by MSCI). We then average the discrepancies across the companies in a given region using the total market capitalisation of companies as weights.<sup>6</sup> In emerging markets, the average discrepancy across the three sources is 8 percent of the companies' total market capitalisation compared to 4 percent in America (USA and Canada) and 5 percent for developed Europe. In dollar terms, this equates to 988 billion dollars for emerging markets, 820 billion dollars for America and 589 billion dollars for Europe.

Table 2: Variation in free float factors across index providers (March 2013)

Name	Market cap (USDm)	FTSE	MSCI	S&P	Lion-shares	Local exchange (MICEX)
OAO Gazprom	96 204	0.48	0.45	0.50	0.48	0.23
Rosneft Oil	69 931	0.13	0.12	n/a	0.11	0.01
Sberbank	68 243	0.50	0.50	0.48	0.40	0.48
Lukoil-Holding	48 094	0.69	0.60	0.61	0.54	0.95
Surgutneftegaz	39 408	0.20	0.20	0.27	1.00	1.00
NovaTek OAO	30 932	0.22	n/a	0.44	0.45	0.81
MMC Norilsk Nickel	26 656	0.30	0.25	0.37	0.40	0.40
Uralkali	22 394	0.45	0.45	0.42	0.45	0.13
Mobile Tele-systems CLS	18 091	0.50	n/a	n/a	0.49	0.49
VTB Bank	16 483	0.25	0.25	0.24	0.25	0.24

Source: NBIM, FactSet, Bloomberg

Chart 2: Free float factors calculated by FTSE and MSCI (global universe)

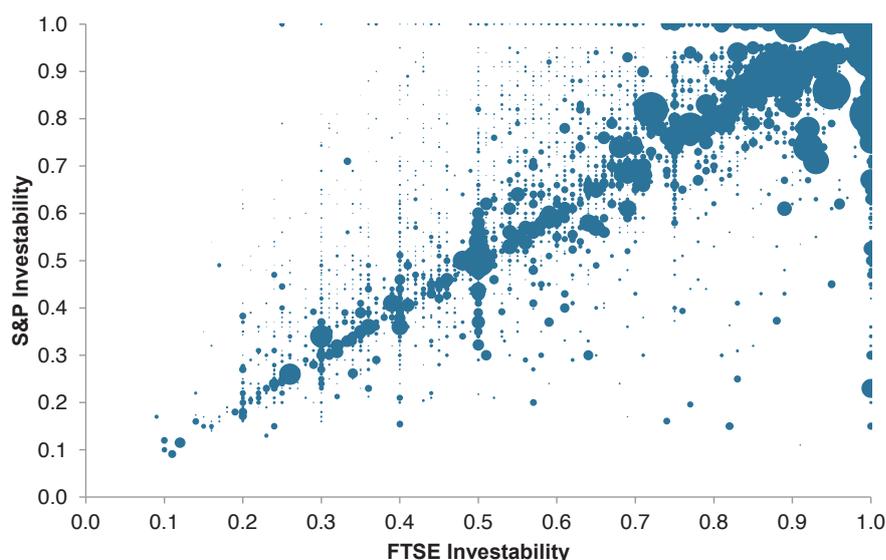


Note: Size of circles indicates the total market capitalisation of companies.

Source: NBIM, FactSet

<sup>6</sup> The sample consists of all companies in the FTSE Global All Cap universe (N=7,344 as of March 2013) for which free float factor data across all three information sources are available.

Chart 3: Free float factors calculated by FTSE and S&P (global universe)



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Note: Size of circles indicates the total market capitalisation of companies.

Source: NBIM, FactSet

Table 3: Variation in free float weights, FTSE Global All Cap universe, March 2013

Region	No. of companies	Market cap weighted average discrepancy FTSE, MSCI and S&P
America	2 160	0.04
Europe	1 148	0.05
Asia-Pac	1 937	0.08
Emerging	1 517	0.08
All	6 762	0.06

Source: NBIM, FactSet, Bloomberg

## How frequently do stakeholders trade?

Free float adjustments are built on the premise that all stakeholders trade their shares infrequently. Our analysis of ownership data provided by FactSet Ownership over the period Q4 2003 to Q4 2012 suggests this may not always be the case. In Table 4 below, we report the probability of a quarter-to-quarter change in stakeholder ownership over the sample period. The stock universe in the analysis is the historical FTSE Global All Cap constituents. We count the number of instances where the ownership stake of a restricted shareholder changed over two consecutive quarters both conditioned on the initial level of ownership and across ownership levels. We find that there is a high (19 percent) probability that a stakeholder changes its holdings by more than one percentage point of the company's market capitalisation in a given quarter. The average ownership change is 6.5 percentage points over the period. Trading patterns also vary across investor types and level of initial ownership. Governments are least likely to trade their shares (1 percent probability), but when they do, the change is usually significant.

On average, governments change their stake ownership by 10 percentage points. Individuals and other types of stakeholders such as trusts and endowments trade significantly more frequently. Shareholders who own between 20 and 50 percent of a company are also more likely to trade than smaller stake owners.<sup>7</sup> These results suggest that not all categories of restricted shareholders are the same. Excluding the holdings of investors who tend to trade frequently may underestimate the actual supply of shares available to minority investors.

Table 4: Probability of trading by stakeholders (Q4 2003 - Q4 2012)

Level of ownership	Probability of a change in stake ownership				
	Gvt	Public company	Individual	Other	All types
High ownership (>50%)	10 %	18 %	17 %	14 %	21 %
Med ownership (20-50%)	11 %	22 %	20 %	21 %	28 %
Low ownership (1-20%)	10 %	12 %	10 %	17 %	17 %
"No" ownership (<1%)	0 %	1 %	2 %	2 %	5 %
All	1 %	6 %	8 %	9 %	19 %
# Changes / qtr	49	406	497	615	1 270
# Companies / qtr	6 540	6 540	6 540	6 540	6 540
Size of change (%)	10.0%	6.3%	5.5%	5.5%	6.5%

Source: NBIM, FactSet Ownership

## Characteristics of free float adjusted and market capitalisation portfolios

In this section, we compare the risk-return characteristics of the free float adjusted and the total market capitalisation weighted global equity portfolios. We show that free float adjustments affect portfolio performance. We attribute the observed return differential to differences in industry, country and regional composition of the two portfolios, as well as to differences in exposure to known equity risk factors. In addition, we present results of backtest analyses that explore the potential relationship between the level and type of company ownership and expected equity returns.

The underlying equity universe in our analyses is the FTSE Global All Cap universe from January 2004 to January 2013. Currently, the FTSE Global All Cap covers over 7,300 stocks in 47 different countries. The total market capitalisation of companies ranges from 27.6 million to 424 billion dollars. In every month, we calculate the total market capitalisation weight ( $w_i^M$ ) of company  $i$  as:

$$w_i^M = \frac{MCAP_i}{\sum_{j=1}^N MCAP_j}$$

<sup>7</sup> For robustness, we report in the appendix the same statistics comparing the median free float over four quarters in a calendar year with the median quarterly free float in the next year. This approach should limit the impact of data errors in one specific quarter. We observe a higher probability of trading under this measure and similar patterns across investor categories.

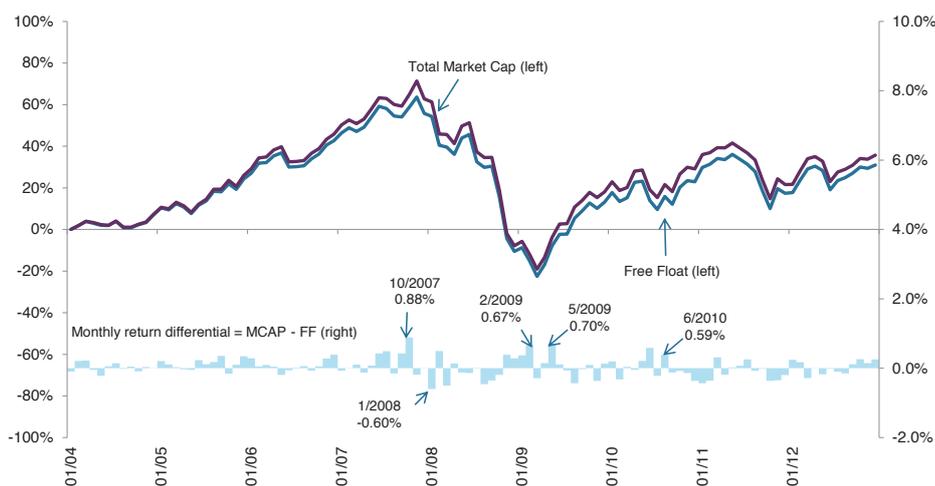
where  $MCAP_i$  is the company's total market capitalisation. The free float adjusted weight ( $w_i^{FF}$ ) is then calculated as:

$$w_i^{FF} = \frac{FF_i \times MCAP_i}{\sum_{j=1}^N FF_j \times MCAP_j}$$

where  $FF_i$  is the company's free float factor at the end of the previous calendar month. Free float factors are as calculated by FTSE using FTSE's banded free float methodology (see Table 1). All market capitalisations are measured in US dollars. The monthly return of the portfolio in month  $t$  is then calculated as the weighted average monthly return of all stocks in the universe using  $w_i^M$  and  $w_i^{FF}$  as weights.

Over the sample period from January 2004 to January 2013, the global total market capitalisation portfolio outperformed the global free float portfolio by 5.1 percent in local currency (Chart 4)<sup>8</sup>. The total market capitalisation portfolio had an average annual return of 4.41 percent compared to 4.0 percent for the free float portfolio. The return/risk ratio for the market capitalisation portfolio was also higher at 0.36 compared to 0.33 for the free float adjusted one. The monthly return differentials ranged from -62 to 89 bp and averaged 20 bp on an absolute basis. The annualised tracking error between the two series was 0.93 percent. These results suggest that free float adjustments may have a meaningful effect on portfolio performance. To understand the source of these differentials we take a closer look at the composition and risk characteristics of the free float adjusted and total market capitalisation portfolios.

Chart 4: Performance of the market capitalisation and free float weighted global portfolios



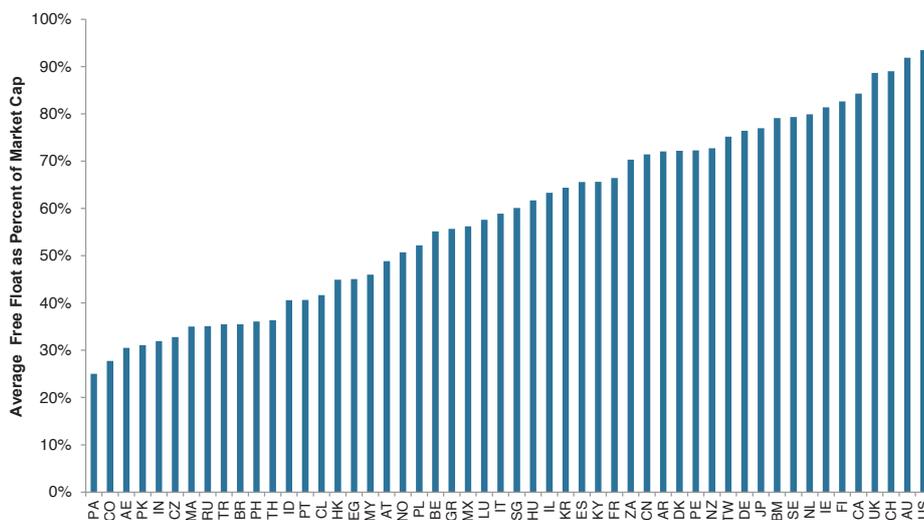
### Geographic and industry tilts in the free float and market capitalisation portfolios

Free float adjustments change the geographic exposure of the global equity portfolio. The free float adjusted portfolio gives higher weights to countries with above average free float factors and lower weights to those with be-

<sup>8</sup> The outperformance in common currency (US dollars) was 5.6 percent over this period.

low average factors. Chart 5 below shows the average free float factor for the countries in the FTSE Global All Cap universe in 2012. Average free float factors vary substantially across countries, ranging from 0.25 for Pakistan to 0.93 for the US. In countries such as the US, UK, Canada and Australia, securities markets are well developed and major business enterprises tend to have widely dispersed share ownership. In countries such as Pakistan, Russia, India, China, Hong Kong and Japan, large stakes held by strategic investors are common. Corporate traditions and practices, industry concentration and the level of state involvement in the economy account for this cross-country variation in average free float.

Chart 5: Average free float by country



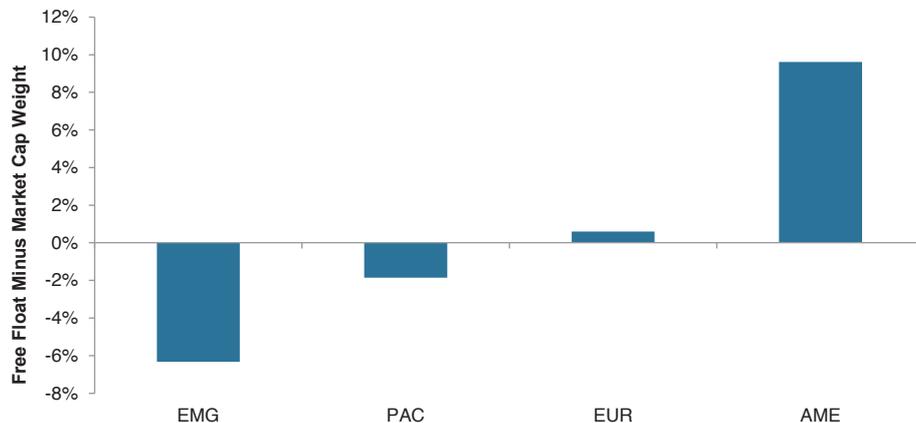
Source: NBIM, FactSet

Chart 6 illustrates the change in the portfolio's regional weights resulting from free float adjustments. Relative to its weight in the total market capitalisation portfolio, America receives a 9.6 percentage point higher weight in the free float adjusted portfolio. Europe's weight is approximately the same in both portfolios, and the weights for Asia Pacific and emerging markets are 1.8 and 6.8 percentage points lower, respectively. Free float adjustments thus result in a significant reshuffling of the portfolio's regional exposures.

Free float adjustments also change the industry composition of the global portfolio. Charts 7 and 8 show the differences in the industry composition of the free float and market capitalisation portfolios on a global and regional basis. High free float industries like technology and health care receive 1 percentage point larger weights in the free float adjusted portfolio relative to the total market capitalisation one, whereas low free float industries like utilities, consumer goods and telecoms receive 0.5-1 percentage point lower weights. At the regional level, differences in industry composition are even more pronounced. In America, there is little variation in average free float by industry, and with the exception of consumer goods, industries have similar weights in the total market capitalisation and free float adjusted American portfolio. In the rest of the regions, however, we observe significantly greater composition changes. In the free float adjusted emerging market portfolio, strategic

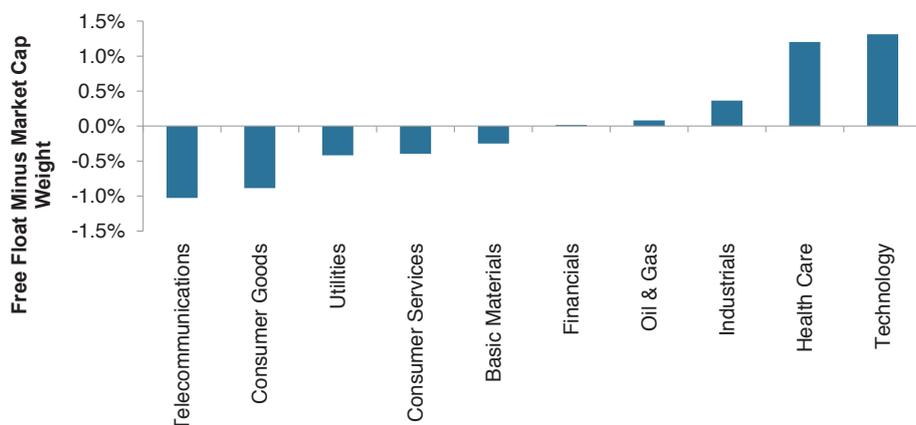
sectors such as oil and gas, utilities and telecoms, in which governments tend to have high ownership stakes, receive a combined 6 percentage point lower weight than in the non-adjusted emerging market portfolio. Industrial and technology companies on the other hand become relatively more important in the free float adjusted emerging market portfolio.

Chart 6: Differences in regional exposure (free float minus market capitalisation weight)



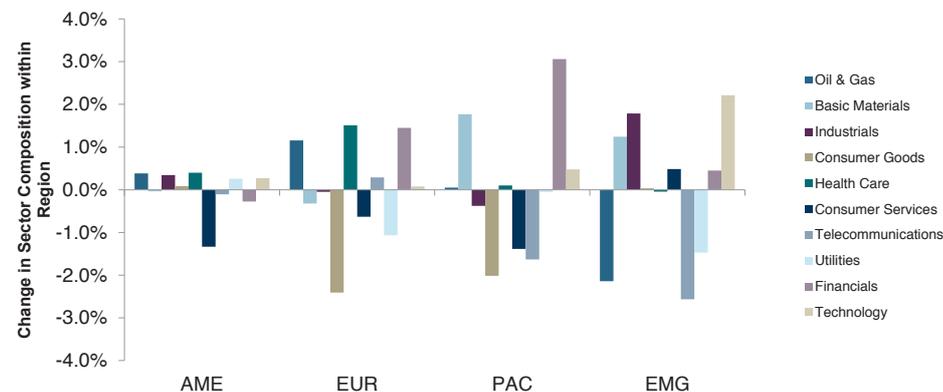
Source: NBIM, FactSet

Chart 7: Differences in industry composition (free float minus market capitalisation)



Source: NBIM, FactSet

Chart 8: Differences in industry composition by region (free float minus market capitalisation)



Source: NBIM, FactSet

Differences in geographic and industry composition account for much of the observed return differential between the total market capitalisation and free float adjusted portfolios. In Panel A of Table 5, we report the performance of five additional global free float adjusted portfolios that have been further adjusted for regional, country or industry differences with respect to the total market capitalisation portfolio.<sup>9</sup> The average return differential of 41 bp per annum in favour of the total market capitalisation portfolio remains unchanged after adjusting for differences in regional and industry composition and is reduced to 10 bp per annum once adjusted for differences in country composition. The risk adjusted return of the “raw” free float adjusted portfolio increases from 0.27 to 0.29 when we impose country neutrality with respect to the total market capitalisation portfolio whose risk adjusted return is 0.30. Thus, differences in country and industry composition account for a substantial part of the observed return differential.

In Panels B and C of Table 5, we perform the same analysis separately for developed and emerging markets. The raw return differential between the free float and total market cap portfolios is larger for emerging markets at 49 bp per annum compared to 6 bp for developed markets. Adjusting for differences in country and industry composition changes the raw differential to 8 bp for developed markets and 10 bp for emerging markets. For both types of markets, differences in country and industry composition account for a large part of the observed return differential.

### Factor exposures

An alternative way of considering the cross-section of portfolio returns is in terms of priced equity factors. It is well documented that factors formed on size (Fama-French 1993), book-to-market (Fama-French 1993), return momentum (Carhart 1997), liquidity (Ibbotson, Chen, Kim and Hu 2013) and volatility (Ang, Hodrick, Xing and Zhang 2006) can help explain the cross-sectional variation in portfolio returns. As reported in Table 5, portfolio metrics such as average company size, book to market, market beta and stock liquidity are affected by free float adjustments. The weighted average company size in the global total market capitalisation portfolio is 40.1 million dollars compared to 44.8 million dollars for the free float adjusted portfolio. The total market capitalisation portfolio thus has a relatively higher exposure to the smaller cap stocks in the FTSE Global All Cap universe. Moreover, the total market capitalisation portfolio has a “value” tilt relative to the free float adjusted portfolio as indicated by its higher weighted average book-to-price. As expected, the free float adjusted portfolio gives higher weights to the more liquid stocks in the universe and thus has a higher average liquidity as measured by the three month average daily share turnover of the stocks in the portfolio as a percentage of shares outstanding. This difference is even more pronounced for the stocks in the emerging market subuniverse (Panel C). The free float adjusted portfolio also exhibits a slight tilt toward the higher market beta stocks in the FTSE Global All Cap universe. Imposing country neutrality brings the fundamental characteristics of the free float portfolio closer to those of the total market capitalisation one, suggesting that, just

<sup>9</sup> The region-neutral portfolio is constructed by rescaling the weights of the stocks in the “raw” free float adjusted portfolio by constant regional factors chosen in such a way that the total regional weights match the total regional weights in the total market capitalisation portfolio. Industry- and country-neutral weights are constructed analogously by applying suitable industry and country factors.

as countries, fundamental stock characteristics can account for the return differentials.

*Table 5: Backtest results for global market capitalisation weighted and free float adjusted portfolios*

	Free float adjusted						
	Market Cap	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	Country and industry neutral
Panel A: Global universe							
Annual return (LOC)	4.41 %	4.00 %	3.97 %	4.31 %	4.00 %	4.00 %	4.34 %
Annual return (USD)	5.02 %	4.60 %	4.62 %	4.92 %	4.59 %	4.65 %	4.94 %
Volatility	14.9 %	14.9 %	14.9 %	15.1 %	14.8 %	14.8 %	15.0 %
Ret/Vol	0.37	0.34	0.34	0.36	0.34	0.34	0.36
Companies (#)	7 577	7 577	7 577	7 577	7 577	7 577	7 577
Market cap	40.1	44.8	42.5	41.5	44.2	42.2	41.4
Book/price	0.82	0.66	0.67	0.81	0.66	0.67	0.80
Liquidity	1.05 %	1.16 %	1.07 %	1.07 %	1.16 %	1.07 %	1.07 %
Beta	0.940	0.972	0.944	0.948	0.968	0.940	0.949
Panel B: Developed markets							
Annual return (LOC)	3.60 %	3.54 %		3.48 %	3.55 %		3.52 %
Annual return (USD)	4.28 %	4.16 %		4.17 %	4.17 %		4.21 %
Volatility	14.7 %	14.7 %		14.8 %	14.7 %		14.8 %
Ret/Vol	0.32	0.31		0.31	0.31		0.31
Companies (#)	6 065	6 065		6 065	6 065		6 065
Market cap	41.7	46.5		43.5	45.5		42.7
Book/price	0.58	0.56		0.58	0.57		0.58
Liquidity	1.12 %	1.24 %		1.13 %	1.23 %		1.14 %
Beta	0.952	0.975		0.949	0.976		0.952
Panel C: Emerging markets							
Annual return (LOC)	11.15 %	10.66 %		11.22 %	10.75 %		11.19 %
Annual return (USD)	11.42 %	11.04 %		11.46 %	11.17 %		11.45 %
Volatility	19.2 %	18.9 %		19.6 %	18.8 %		19.4 %
Ret/Vol	0.65	0.63		0.65	0.64		0.65
Companies (#)	1 451	1 451		1 451	1 451		1 451
Market cap	20.3	12.6		15.5	15.1		17.9
Book/price	3.08	2.10		2.97	2.06		2.98
Liquidity	1.20 %	1.05 %		1.29 %	1.04 %		1.25 %
Beta	0.887	0.900		0.901	0.890		0.902

Source: NBIM, FactSet

We formally test whether the outperformance of the total market capitalisation portfolio can be attributed to equity factors by estimating the model:

$$R_{t,t+1}^{MCAP} - R_{t,t+1}^{FF} = \alpha_t + \beta_t F_{t,t+1}^i + \varepsilon_t$$

where  $R_{t,t+1}^{MCAP} - R_{t,t+1}^{FF}$  is the monthly return differential of the market capitalisation and free float adjusted portfolios and  $F_{t,t+1}^i$  is a vector of monthly returns of factor portfolios formed on book to market (value), market capitalisation (size), past 12 month stock returns (momentum), three month average daily trading volume as a percentage of shares outstanding (illiquidity) and equity market beta calculated over the prior 24 months (low beta). The factor mimicking portfolios represent region-neutral, industry-neutral long-short portfolios constructed from FTSE Global All Cap data as follows:

- *Value*: Weighted average return of tenth decile by market capitalisation of stocks ranked by book to market (value stocks) minus weighted average return of first decile by market capitalisation of stocks ranked by book to market (growth stocks)
- *Size*: Weighted average return of first decile by market capitalisation of stocks ranked by market capitalisation (small caps) minus weighted average return of tenth decile by market capitalisation of stocks ranked by market capitalisation (large caps)
- *Momentum*: Weighted average return of tenth decile by market capitalisation of stocks ranked by past 12 month return (recent winners) minus weighted average return of first decile by market capitalisation of stocks ranked by past 12 month return (recent losers)
- *Illiquidity*: Weighted average return of first decile by market capitalisation of stocks ranked by three month average daily volume as a percentage of shares outstanding (infrequently traded stocks) minus weighted average return of tenth decile by market capitalisation of stocks ranked by three month average daily volume as a percentage of shares outstanding (frequently traded stocks)
- *Low beta*: Weighted average return of first decile by market capitalisation of stocks ranked by market beta (low beta stocks) minus weighted average return of tenth decile by market capitalisation of stocks ranked by market beta (high beta stocks)

The regression estimates for the global universe, developed markets and emerging markets are reported in Table 6. We observe that the variation in return differential between the global total market capitalisation portfolio and the free float adjusted portfolio is well explained by the equity risk factors. As shown in Panel A, R-squared ranges from 0.336 for the country-neutral differential to 0.559 for the region- and industry-neutral one. In the model for the non-adjusted (raw) differential, the coefficients on value, size and illiquidity are large, positive and statistically significant, whereas the coefficient on the low beta factor is negative and statistically significant. These results suggest that the total market capitalisation portfolio loads relatively more on

small cap, value, illiquid and high beta stocks relative to the free float adjusted portfolio. No statistically significant alpha is present after controlling for these factors. Imposing region and industry neutrality on the differential does not change substantially the estimated factor sensitivities. Imposing country neutrality, however, reduces the magnitude of the coefficients and renders some of the coefficients statistically insignificant. This result suggests a positive correlation between the factor and country portfolio returns. The country and factor tilts resulting from free float adjustments account for much of the outperformance of the total market capitalisation portfolio.

Table 6: Factor regressions for return differential of market capitalisation and free float adjusted portfolios

	Ret (MCAP) - Ret (FF)					
	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	Country and industry neutral
Panel A: Global universe						
Intercept	0.000 (0.35)	0.000 (1.64)	0.000 (0.69)	0.000 (0.63)	0.000 (1.94)	0.000 (0.55)
Value	0.043 (4.30)	0.038 (6.39)	0.005 (1.45)	0.044 (4.63)	0.036 (6.66)	0.004 (1.68)
Size	0.073 (6.91)	0.043 (6.78)	0.006 (1.68)	0.071 (7.08)	0.041 (7.34)	0.009 (3.92)
Momentum	-0.001 (-0.15)	-0.006 (-1.57)	0.001 (0.65)	-0.003 (-0.50)	-0.007 (-1.98)	0.002 (1.21)
Illiquidity	0.029 (2.30)	0.034 (4.46)	0.001 (0.24)	0.023 (1.92)	0.026 (3.83)	-0.002 (-0.77)
Low beta	-0.014 (-1.98)	-0.014 (-3.33)	0.006 (2.59)	-0.015 (-2.16)	-0.014 (-3.78)	0.005 (3.11)
R-sq.	0.431	0.543	0.336	0.443	0.559	0.375
df	103	103	103	103	103	103
Panel B: Developed markets						
Intercept	0.000 (-0.93)		0.000 (0.69)	0.000 (-1.12)		0.000 (0.40)
Value	0.009 (1.25)		0.004 (1.45)	0.009 (1.29)		0.003 (1.45)
Size	0.042 (5.62)		0.009 (2.93)	0.045 (6.25)		0.010 (4.71)
Momentum	0.007 (1.49)		0.002 (1.02)	0.007 (1.66)		0.001 (1.07)
Illiquidity	0.002 (0.27)		0.001 (0.25)	0.004 (0.50)		-0.001 (-0.28)
Low beta	-0.002 (-0.42)		0.002 (0.94)	-0.007 (-1.41)		0.004 (2.36)
R-sq.	0.250		0.205	0.294		0.323
df	103		103	103		103

	Ret (MCAP) - Ret (FF)					
	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	Country and industry neutral
Panel C: Emerging markets						
Intercept	0.000 (0.16)		0.000 (0.27)	0.000 (0.63)		0.000 (0.21)
Value	0.047 (1.89)		0.012 (0.92)	0.059 (2.69)		0.011 (1.20)
Size	0.024 (0.90)		-0.020 (-1.46)	0.033 (1.43)		0.000 (0.05)
Momentum	-0.011 (-0.70)		-0.005 (-0.59)	-0.013 (-0.97)		0.002 (0.38)
Illiquidity	0.111 (3.53)		0.001 (0.04)	0.054 (1.96)		-0.011 (-0.98)
Low beta	-0.034 (-1.90)		0.026 (2.71)	-0.025 (-1.63)		0.013 (1.98)
R-sq.	0.174		0.257	0.133		0.177
df	103		103	103		103

Note: t-statistics provided in parentheses.  
Source: NBIM, FactSet

The R-squared values in the models for developed and emerging markets are generally lower than those for the full sample, but alphas are again small and not statistically significant (Panels B and C). In all models for developed markets (Panel B), we observe a statistically significant exposure to the size factor and no statistically significant exposures to the rest of the factors. In the case of emerging markets, the raw return differential loads positively on the illiquidity factor, but the coefficient becomes insignificant once we impose country neutrality. Industry and country effects appear to subsume the effect of our global pricing factors.

## Free float and stock liquidity

The finance literature suggests that liquidity is not a “neutral” stock characteristic but rather has an important effect on asset prices. The extra returns on illiquid stocks cannot be explained by conventional risk models such as the Fama-French three factor model. In an early study on the topic, Amihud and Mendelson (1986) find that market-observed average returns are an increasing function of the bid-ask spread, suggesting that less liquid stocks may command a liquidity premium and in turn benefit investors with long trading horizons. Recent studies such as Pastor and Stambaugh (2003), Acharya and Pedersen (2005) and Korajczyk and Sadka (2008) go a step further and argue that liquidity may be a priced risk factor.<sup>10</sup> While the size of the

<sup>10</sup> For a comprehensive survey of the vast literature on asset returns and illiquidity, see Amihud, Mendelson and Pedersen (2006).

liquidity premium is difficult to estimate in practice and likely varies over time, there is evidence that ex ante illiquid stocks may be associated with higher expected returns.

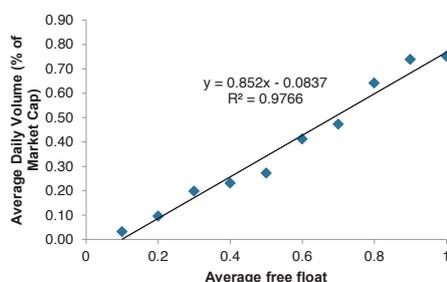
As the goal of free float adjustments is to improve the investability and tradability of indices, the level of free float is directly related to stock liquidity. In fact, FTSE explicitly takes into account stock liquidity (as measured by daily stock turnover) to determine an index constituent's eligibility for inclusion in the index. According to the FTSE index rules, the median daily turnover of a stock needs to be at least 0.05 percent of the stock's free float adjusted shares for the stock to be included in the index.<sup>11</sup> In this section, we discuss the link between stock liquidity and free float.

We find that free float is indeed strongly correlated with liquidity. In Chart 9 below, we illustrate this correlation by plotting two measures of liquidity as a function of stocks' free float factors. The first measure is the 3-month average trading volume as percent of market capitalisation; the second is a price impact (Amihud-like) measure calculated as the average absolute daily return over a month divided by dollar volume. Panels A and B show the two measures for stocks with free floats of 0.1, 0.2, 0.3 etc. Average trading volume increases on average with the level of free float. Stocks with free float factors of 0.9 have an average daily trading volume of 0.75 percent of shares outstanding compared to 0.09 percent for the stocks with free float factors of less than 0.2. The relationship between free float and price impact is reversed – the higher the free float, the lower the price impact of trading. As expected, both measures suggest a positive relationship between liquidity and level of free float.

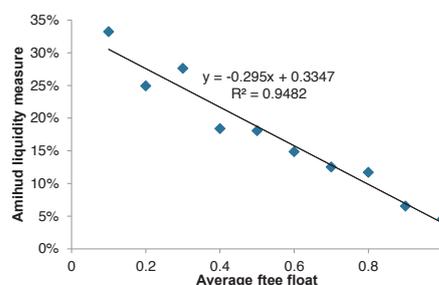
Even though small caps tend to be less liquid, the positive relationship between free float and liquidity cannot be explained by company size. As reported in Table 7, the relationship between free float and our two measures of liquidity holds controlling for size and country effects. At the margin, higher free float is associated with higher liquidity.

Chart 9: Average liquidity as a function of free float

Panel A: Liquidity measure: Average daily turnover as a percentage of market capitalisation



Panel B: Liquidity measure: Price impact



Source: NBIM, FactSet

<sup>11</sup> For more details, see FTSE, "Ground Rules for the Management of the FTSE Global Equity Index Series," December 2012, section 6.5.

Table 7: Regression of liquidity measures on free float

	Average daily volume	Price impact
Intercept	0.033 (0.72)	0.311 (17.71)
FTSE free float	0.383 (11.87)	-0.030 (-2.07)
log(market cap)	0.009 (1.72)	-0.074 (-20.56)
N	7 059	2 334
R <sup>2</sup>	26.89 %	57.32 %

NB: Regressions also contain 43 country dummies.  
Newey-West t-stats in parentheses.

Source: NBIM, FactSet

Because of the strong correlation between liquidity and free float, adjusting the market portfolio for free float is akin to taking an overweight position in the more frequently traded stocks in the global stock universe and an underweight position in the less frequently traded ones. It is a de facto liquidity position.

## Ownership structure and expected returns

While country composition and factor exposure seem to account for much of the outperformance of the total market capitalisation portfolio, we should also consider the possibility that closely held companies, which the total market capitalisation portfolio gives full weight to, are inherently different from companies with dispersed public shareholders. Indeed, the literature on corporate governance suggests a link between ownership structure and firm performance via the channel of agency costs. The separation of ownership and management in any publicly traded firm creates agency conflicts: managers have incentives to serve their own interests first before those of the firm owners. A controlling shareholder such as a family or government could reduce agency costs for minority shareholders because the controlling owner has a strong incentive to monitor management and promptly remove incompetent managers (Shleifer and Vishny 1986). As Grossman and Hart (1982) point out, if ownership is widely dispersed, no individual shareholder will have an incentive to monitor managers since each will regard the potential benefit from a takeover to be too small to justify the cost of monitoring. However, strong controlling ownership may impose costs on the firm if the threat of a takeover causes managers to become overly concerned with short term profits (Stein 1988); to overinvest in entrenchment activities (Shleifer and Vishny 1989); or to build empires (Sharfstein and Stein 2000). If so, the level of ownership concentration can affect firm performance negatively.

A number of authors emphasise that the effect of ownership structure on firm value also depends on the country's legal system and investor protection laws. Shleifer and Wolfenzon (2002) propose a model of an entrepreneur

going public in an environment with poor legal protection of outside shareholders. If the entrepreneur expropriates minority shareholders, he may be caught and fined, the probability of which increases with the level of shareholder protection. In equilibrium, better investor protection leads to larger and more valuable firms. Similarly, La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) present a model and some empirical evidence from 27 countries that weak minority shareholder protection is associated with lower firm valuation and higher expected returns. Giannetti and Koskinen (2010) argue that the price of weak governance stocks is not low enough to compensate investors for majority shareholders' extraction of benefits, leading to lower expected returns on such stocks.

Empirical studies on the relationship between ownership structure and firm performance are scarce and inconclusive. Based on a sample of 1,565 European firms over the period 1993-2006, Cella (2009) finds that family owned firms generate higher returns than non-family owned firms. Abnormal returns are statistically and economically significant and cannot be explained by industry effects or country-specific Fama-French three factor models. Desender, Cestona and Rafel (2008) also find a positive link between family ownership and stock returns. Similarly, Cortjens, Peyer and Heyden (2005) document higher raw returns for a sample of family owned firms in France, Germany, the UK and the US over the period 1992-2000. However, the premium on family ownership disappears once the authors introduce controls for Carhart's four factors. In a sample of 1,031 Chinese companies between 2000 and 2004, Hess, Gunasekarage and Hovey (2010) find a non-linear relationship between the level of government ownership and firm value as measured by Tobin's Q. Both high and low government stakes are associated with high valuations and possibly lower expected returns.

To examine the relationship between ownership structure and equity returns, we backtest the performance of portfolios formed on ownership type and stake over the period 2004-2012. The universe of analysis is the historical FTSE Global All Cap constituents for which ownership data from FactSet Ownership are available. At the beginning of each quarter we form 12 equity portfolios on stake owner type (public company, government, individuals and others) and that owner's stake in the company ("large" when the stake is more than 50 percent of the company; "medium" when the stake is between 20 and 50 percent; and "small" when the stake is between 1 and 20 percent). We then track the performance of the portfolios over time both in absolute terms and adjusted for differences in regional, country and industry exposure. All portfolios are total market capitalisation weighted. Results for the global universe are reported in Table 8 and in the appendix (Tables 2 and 3) for emerging and developed markets.

We find that companies with large stakeholders performed better than average over this period. Companies with government ownership of 50 percent or more returned 10.93 percent per year (N=127) compared to 1.84 percent for companies with small government ownership (N=148). The result cannot be explained by regional or industry effects; however, controlling for country and industry differences eliminates the differential. Companies closely held by individuals outperformed companies with minority individual ownership.

The result is robust to differences in regional, country and industry composition. For companies owned by other public companies (cross-holdings), the returns also appear to increase with the level of ownership but the differential is greatly reduced once we control for differences in country and industry composition. High government, individual and public company ownership is persistently associated with higher risk adjusted returns even after controlling for country and industry composition.

We observe similar results in the subsample for developed markets. Large public company, government and individual ownership is associated with higher average returns. Most notably, the average return for companies with large individual ownership (N=233) is 6.3 percent per annum compared to 3.1 percent for companies with small individual ownership (N=1,922). The presence of large stakeholders like founders, family trusts and insiders is associated with better performance. Country and industry effects cannot fully account for this differential. For emerging markets, we observe similar results but the differential is reduced substantially once we impose country neutrality.

While, on the surface, higher stake ownership appears to be generally associated with higher returns, we need to consider the possibility that equity risk factors may account for the return differentials. As reported in Table 8, the portfolios formed on type and level of stake ownership exhibit differences in average company size, valuation, liquidity and market beta. Companies with majority individual or public company shareholders tend to be small, whereas companies with high government ownership tend to be large. The average market capitalisation of companies with large individual ownership is half that of companies with small individual ownership. Moreover, high public company ownership and high individual ownership are associated with higher book to price (value tilt). High stake ownership of any type is consistently associated with lower liquidity. Imposing country, regional or industry neutrality does not eliminate the observed trends in average size, valuation and liquidity.

Similar to our factor regression analysis for the return differential of the total market capitalisation and free float adjusted portfolios, we estimate regression models for the return differentials of portfolios formed on level and type of stake ownership (Table 9). Specifically, we estimate the model:

$$R_{t,t+1}^{OWN>20\%} - R_{t,t+1}^{OWN<20\%} = \alpha_t + \beta_t F_{t,t+1}^i + \varepsilon_t$$

where  $R_{t,t+1}^{OWN>20\%} - R_{t,t+1}^{OWN<20\%}$  is the return differential of portfolios with medium and large stake ownership of a given type (government, public company, individual or other) and portfolios with small or no ownership of that particular type. The factors  $F_{t,t+1}^i$  are the same as those used in Section 6(a).

Table 8: Performance of portfolios formed on level and type of ownership

Raw	Public company			Government			Individual			Other		
	Large	Med	Small	Large	Med	Small	Large	Med	Small	Large	Med	Small
Monthly return (LOC)	0.56 %	0.57 %	0.34 %	1.01 %	0.16 %	0.28 %	0.81 %	0.53 %	0.42 %	0.58 %	0.68 %	0.27 %
Monthly return (USD)	0.67 %	0.69 %	0.48 %	1.15 %	0.34 %	0.40 %	0.94 %	0.63 %	0.48 %	0.82 %	0.77 %	0.37 %
Annual return (LOC)	5.63 %	5.74 %	2.83 %	10.93 %	1.08 %	1.84 %	8.05 %	5.29 %	3.64 %	3.03 %	6.42 %	2.25 %
Annual return (USD)	6.13 %	6.70 %	3.88 %	11.72 %	2.35 %	2.49 %	8.51 %	5.98 %	4.03 %	4.04 %	6.23 %	2.96 %
Volatility	15.6 %	15.8 %	16.0 %	18.3 %	13.3 %	17.0 %	19.5 %	15.5 %	16.9 %	27.5 %	19.4 %	14.2 %
Ret/Vol	0.43	0.43	0.26	0.66	0.15	0.19	0.50	0.41	0.30	0.25	0.42	0.23
Companies (#)	687	1 259	1 813	127	90	148	286	762	2 375	6	48	1 153
Market cap	21.2	28.3	40.9	62.5	46.6	37.7	15.0	44.2	35.3	15.7	32.2	39.3
Book/price	1.08	0.81	0.63	0.57	0.80	0.75	0.99	0.56	0.57	0.95	0.70	0.78
Liquidity	0.21 %	0.40 %	0.53 %	0.19 %	0.42 %	0.41 %	0.26 %	0.56 %	2.14 %	0.28 %	0.40 %	0.84 %
Beta	1.002	1.005	1.070	1.117	0.944	1.096	1.229	1.078	1.156	0.967	1.151	0.914
<b>Region-neutral</b>												
Monthly return (LOC)	0.67 %	0.65 %	0.41 %	1.09 %	0.42 %	0.69 %	0.94 %	0.58 %	0.44 %	0.28 %	0.75 %	0.39 %
Monthly return (USD)	0.81 %	0.78 %	0.54 %	1.42 %	0.55 %	0.87 %	1.04 %	0.67 %	0.52 %	0.30 %	0.78 %	0.46 %
Annual return (LOC)	7.09 %	6.82 %	3.67 %	11.67 %	3.98 %	6.97 %	9.58 %	5.89 %	3.86 %	2.56 %	8.15 %	3.75 %
Annual return (USD)	7.76 %	7.62 %	4.52 %	14.41 %	4.91 %	7.90 %	9.78 %	6.54 %	4.41 %	2.37 %	8.26 %	4.15 %
Volatility	15.2 %	15.2 %	16.3 %	19.9 %	14.8 %	17.6 %	20.0 %	15.3 %	16.9 %	13.1 %	14.7 %	13.9 %
Ret/Vol	0.53	0.51	0.30	0.66	0.34	0.47	0.56	0.45	0.31	0.26	0.61	0.34
Companies (#)	687	1 259	1 813	127	90	148	286	762	2 375	6	48	1 153
Market cap	21.1	23.0	37.3	60.7	34.0	30.4	15.7	46.4	32.8	4.5	11.8	39.8
Book/price	0.98	0.70	0.58	0.66	0.72	0.67	0.69	0.56	0.66	0.42	0.67	0.66
Liquidity	0.20 %	0.41 %	0.61 %	0.15 %	0.43 %	0.38 %	0.28 %	0.58 %	1.88 %	0.26 %	0.41 %	1.56 %
Beta	0.948	1.028	1.105	1.181	0.966	0.965	1.212	1.070	1.160	0.465	0.792	0.900

	Public company			Government			Individual			Other		
	Large	Med	Small	Large	Med	Small	Large	Med	Small	Large	Med	Small
<b>Country-neutral</b>												
Monthly return (LOC)	0.66 %	0.66 %	0.40 %	0.36 %	-0.20 %	0.17 %	0.84 %	0.58 %	0.47 %	0.03 %	0.67 %	0.55 %
Monthly return (USD)	0.76 %	0.75 %	0.50 %	0.42 %	-0.14 %	0.25 %	0.94 %	0.68 %	0.56 %	0.03 %	0.73 %	0.64 %
Annual return (LOC)	6.48 %	6.59 %	3.36 %	3.83 %	-3.63 %	-0.99 %	8.45 %	6.04 %	4.26 %	0.27 %	7.62 %	5.69 %
Annual return (USD)	7.08 %	7.27 %	4.05 %	4.48 %	-3.16 %	-0.51 %	9.09 %	6.85 %	4.96 %	0.36 %	8.21 %	6.37 %
Volatility	18.0 %	17.1 %	17.2 %	10.3 %	16.2 %	24.7 %	19.9 %	14.8 %	16.7 %	2.6 %	11.5 %	14.7 %
Ret/Vol	0.44	0.46	0.28	0.42	-0.15	0.08	0.51	0.47	0.34	0.11	0.70	0.45
Companies (#)	687	1 259	1 813	127	90	148	286	762	2 375	6	48	1 153
Market cap	17.5	17.2	34.2	21.7	21.6	14.2	14.4	42.6	29.6	0.3	5.5	36.2
Book/price	0.56	0.62	0.73	0.47	0.52	0.73	0.49	0.56	0.58	0.09	0.52	0.64
Liquidity	0.35 %	0.57 %	0.72 %	0.15 %	0.42 %	0.56 %	0.48 %	0.57 %	1.73 %	0.03 %	0.33 %	2.09 %
Beta	1.114	1.155	1.144	0.745	0.861	1.154	1.187	1.025	1.155	0.089	0.619	0.917
<b>Industry-neutral</b>												
Monthly return (LOC)	0.62 %	0.55 %	0.36 %	1.17 %	0.07 %	0.35 %	0.79 %	0.64 %	0.48 %	-0.10 %	0.78 %	0.25 %
Monthly return (USD)	0.73 %	0.66 %	0.50 %	1.27 %	0.24 %	0.48 %	0.92 %	0.77 %	0.55 %	0.01 %	0.88 %	0.35 %
Annual return (LOC)	6.34 %	5.45 %	3.05 %	12.87 %	-0.42 %	2.76 %	7.65 %	6.48 %	4.42 %	-2.05 %	8.33 %	1.91 %
Annual return (USD)	6.97 %	6.31 %	4.15 %	13.66 %	0.74 %	3.54 %	8.06 %	7.38 %	4.83 %	-1.32 %	9.13 %	2.68 %
Volatility	15.5 %	15.6 %	15.8 %	19.1 %	15.5 %	16.8 %	20.4 %	16.4 %	16.5 %	13.3 %	15.9 %	14.6 %
Ret/Vol	0.48	0.42	0.27	0.73	0.05	0.25	0.47	0.47	0.35	-0.09	0.59	0.20
Companies (#)	687	1 259	1 813	127	90	148	286	762	2 375	6	48	1 153
Market cap	18.4	25.7	40.8	31.2	23.3	26.3	9.8	32.0	29.3	2.9	14.8	36.2
Book/price	0.94	0.85	0.61	0.55	0.73	0.76	1.23	0.70	0.65	0.47	0.71	0.80
Liquidity	0.21 %	0.41 %	0.54 %	0.19 %	0.40 %	0.41 %	0.26 %	0.54 %	1.96 %	0.16 %	0.34 %	0.82 %
Beta	1.008	1.016	1.063	1.024	1.014	1.098	1.315	1.089	1.102	0.475	0.953	0.947

	Public company			Government			Individual			Other		
	Large	Med	Small	Large	Med	Small	Large	Med	Small	Large	Med	Small
<b>Region and industry-neutral</b>												
Monthly return (LOC)	0.59 %	0.64 %	0.47 %	0.84 %	0.24 %	0.63 %	0.86 %	0.67 %	0.52 %	-0.02 %	0.52 %	0.48 %
Monthly return (USD)	0.73 %	0.76 %	0.60 %	0.99 %	0.35 %	0.78 %	0.98 %	0.78 %	0.60 %	0.01 %	0.55 %	0.56 %
Annual return (LOC)	6.12 %	6.61 %	4.38 %	9.58 %	2.18 %	5.98 %	8.84 %	6.81 %	4.91 %	-0.39 %	5.91 %	4.92 %
Annual return (USD)	6.87 %	7.25 %	5.27 %	11.02 %	2.97 %	7.18 %	9.39 %	7.50 %	5.50 %	-0.10 %	6.18 %	5.28 %
Volatility	14.9 %	16.1 %	16.3 %	13.7 %	12.3 %	18.7 %	19.0 %	16.6 %	16.5 %	5.2 %	9.6 %	13.9 %
Ret/Vol	0.47	0.48	0.35	0.74	0.24	0.40	0.54	0.48	0.38	-0.05	0.65	0.42
Companies (#)	687	1 259	1 813	127	90	148	286	762	2 375	6	48	1 153
Market cap	14.7	17.4	33.6	21.5	12.0	14.9	7.4	26.9	26.8	0.9	5.2	31.3
Book/price	1.31	0.74	0.58	0.45	0.56	0.66	0.80	1.55	0.72	0.18	0.55	0.69
Liquidity	0.20 %	0.47 %	0.66 %	0.12 %	0.27 %	0.39 %	0.26 %	0.57 %	1.63 %	0.07 %	0.24 %	1.16 %
Beta	0.999	1.101	1.108	0.805	0.725	1.023	1.198	1.093	1.106	0.187	0.534	0.947
<b>Country and industry-neutral</b>												
Monthly return (LOC)	0.47 %	0.52 %	0.44 %	0.12 %	0.02 %	0.15 %	0.66 %	0.48 %	0.43 %	0.00 %	0.31 %	0.40 %
Monthly return (USD)	0.53 %	0.60 %	0.53 %	0.14 %	0.04 %	0.20 %	0.71 %	0.56 %	0.51 %	0.00 %	0.33 %	0.46 %
Annual return (LOC)	4.66 %	4.97 %	3.92 %	1.43 %	0.20 %	1.43 %	7.21 %	4.89 %	4.07 %	0.00 %	3.69 %	4.14 %
Annual return (USD)	5.21 %	5.57 %	4.57 %	1.66 %	0.42 %	1.84 %	7.73 %	5.60 %	4.69 %	0.02 %	3.82 %	4.72 %
Volatility	14.3 %	16.6 %	17.0 %	3.4 %	3.7 %	9.4 %	13.4 %	14.1 %	15.2 %	0.5 %	5.4 %	12.1 %
Ret/Vol	0.39	0.38	0.31	0.44	0.07	0.20	0.59	0.41	0.34	0.00	0.69	0.40
Companies (#)	687	1 259	1 813	127	90	148	286	762	2 375	6	48	1 153
Market cap	7.1	9.9	25.2	6.3	4.2	4.4	3.9	20.8	21.3	0.1	1.5	21.1
Book/price	0.53	0.57	0.55	0.14	0.16	0.29	0.38	0.45	0.54	0.02	0.31	0.48
Liquidity	0.26 %	0.52 %	0.75 %	0.04 %	0.10 %	0.21 %	0.28 %	0.54 %	1.45 %	0.01 %	0.14 %	1.36 %
Beta	0.957	1.082	1.110	0.232	0.224	0.492	0.826	0.909	1.003	0.014	0.277	0.789

NB: [1] Large = ownership > 50%; medium = 20-50%; small = 1-20%.

[2] Portfolios rebalanced quarterly. Period of analysis is 2004-2012.

NB: [1] Large (ownership > 50%); Medium (20- 50%); Small (1-20%)

[2] Portfolios rebalanced quarterly. Period of analysis is 2004-2012.

Source: NBIM, FactSet Ownership, FTSE

Table 9: Factor regressions for portfolios formed on level and type of ownership

	(1) High (>20%) minus low (<20%) government ownership					(3) High (>20%) minus low (<20%) individual ownership						
	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	Country and industry neutral	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	
Intercept	-0.001 (-0.52)	-0.001 (-0.20)	-0.007 (-1.69)	0.002 (0.83)	0.001 (0.49)	-0.003 (-1.18)	0.003 (2.70)	0.003 (3.28)	0.003 (3.18)	0.002 (2.29)	0.003 (2.99)	0.001 (1.45)
Value factor	0.154 (1.80)	0.184 (1.57)	-0.051 (-0.26)	0.357 (3.93)	0.134 (1.41)	-0.060 (-0.58)	0.246 (5.83)	0.257 (5.82)	0.143 (3.07)	0.271 (6.31)	0.293 (6.67)	0.046 (1.08)
Size factor	0.329 (3.68)	0.528 (4.31)	0.132 (0.65)	0.553 (5.82)	0.520 (5.24)	-0.022 (-0.21)	0.167 (3.79)	0.126 (2.73)	0.011 (0.22)	0.294 (6.54)	0.314 (6.83)	0.104 (2.30)
Momentum	0.083 (1.54)	0.068 (0.92)	0.054 (0.44)	0.012 (0.21)	0.009 (0.16)	-0.084 (-1.29)	-0.093 (-3.47)	-0.109 (-3.91)	-0.090 (-3.05)	-0.084 (-3.08)	-0.106 (-3.82)	-0.042 (-1.53)
Illiquidity	0.382 (3.54)	0.616 (4.17)	0.134 (0.54)	0.189 (1.64)	0.217 (1.81)	-0.023 (-0.18)	-0.043 (-0.81)	-0.056 (-1.01)	-0.148 (-2.50)	0.052 (0.95)	0.034 (0.61)	-0.057 (-1.04)
Low beta	-0.147 (-2.40)	-0.188 (-2.26)	0.090 (0.64)	-0.184 (-2.84)	-0.008 (-0.12)	0.542 (7.37)	-0.023 (-0.76)	-0.003 (-0.10)	0.083 (2.48)	-0.078 (-2.54)	-0.082 (-2.62)	0.046 (1.51)
R-sq.	0.306	0.324	0.044	0.368	0.273	0.551	0.379	0.332	0.140	0.525	0.579	0.119
df	103	103	103	103	103	103	103	103	103	103	103	103

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	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	Country and industry neutral	Raw	Region-neutral	Country-neutral	Industry-neutral	Region and industry neutral	Country and industry neutral
	<b>(2) High (&gt;20%) minus low (&lt;20%) public company ownership</b>						<b>(4) High (&gt;20%) minus low (&lt;20%) "other" ownership</b>					
Intercept	0.000 (-0.25)	0.001 (0.74)	0.001 (1.16)	0.000 (-0.26)	0.001 (1.12)	0.001 (0.66)	0.000 (0.05)	0.001 (0.47)	0.001 (0.56)	0.000 (-0.07)	0.001 (0.30)	0.000 (-0.02)
Value factor	0.018 (0.29)	0.016 (0.36)	0.077 (1.78)	-0.001 (-0.02)	0.024 (0.60)	0.014 (0.37)	-0.205 (-1.76)	-0.096 (-0.95)	-0.119 (-1.31)	-0.246 (-2.43)	-0.123 (-1.57)	-0.140 (-1.38)
Size factor	0.343 (5.42)	0.258 (5.74)	0.199 (4.41)	0.328 (5.45)	0.224 (5.34)	0.157 (3.87)	0.122 (1.00)	0.272 (2.56)	0.173 (1.82)	0.424 (4.00)	0.194 (2.37)	-0.039 (-0.37)
Momentum	0.068 (1.77)	0.047 (1.72)	0.048 (1.75)	0.066 (1.80)	0.029 (1.16)	0.019 (0.76)	0.075 (1.02)	0.011 (0.17)	-0.031 (-0.54)	0.143 (2.23)	-0.055 (-1.12)	-0.118 (-1.84)
Illiquidity	-0.003 (-0.04)	0.065 (1.19)	0.025 (0.45)	-0.052 (-0.71)	0.024 (0.48)	-0.017 (-0.35)	0.093 (0.63)	0.036 (0.28)	-0.002 (-0.01)	-0.063 (-0.50)	-0.194 (-1.97)	-0.137 (-1.07)
Low beta	-0.002 (-0.05)	0.008 (0.25)	-0.137 (-4.46)	0.030 (0.73)	0.001 (0.02)	-0.087 (-3.15)	-0.135 (-1.63)	0.189 (2.61)	0.318 (4.91)	0.110 (1.52)	0.456 (8.18)	0.636 (8.77)
R-sq.	0.225	0.290	0.348	0.229	0.230	0.353	0.111	0.189	0.343	0.206	0.508	0.575
df	103	103	103	103	103	103	103	103	103	103	103	103

Source: NBIM, FactSet Ownership, FTSE

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For portfolios formed on government, public company and other stake ownership, we observe no robust higher return differentials once we control for differences in stock characteristics. In none of these models are the alphas statistically significant. The raw differential in the models for government ownership (Panel 1) is accounted for by the size, illiquidity and low beta factors. Imposing country neutrality reduces the magnitude of the coefficients and renders them statistically insignificant. For public company ownership (Panel 2), the size factor is large, positive and statistically significant with or without controls for geographic and industry composition. The portfolio consisting of companies with large cross-holdings is persistently tilted toward the small cap stocks in the FTSE Global All Cap universe. Similarly, high individual ownership is associated with high exposure to the size factor (Panel 3). The return differential also exhibits negative momentum and positive exposure to the value factor. Notably, the alphas in the majority of these models are positive and statistically significant. Individual ownership appears to be associated with higher returns even after controlling for risk factors and country composition.

## Cost considerations

A number of studies have shown that tracking an index can be costly. If the demand curves for stocks are downward sloping, index trackers may pay a premium when they rebalance their portfolios in response to changes in the composition of an index. Shleifer (1986) shows that an addition to the S&P 500 results in a permanent stock price increase of 3 percent on average. Petajisto (2011) finds that stocks added to the S&P 500 index and Russell 2000 over the period from 1990 to 2005 had average abnormal returns of 8.8 percent and 4.7 percent, respectively, on the announcement date. Most of these effects do not appear to reverse in the following two weeks. Demand curves for stocks are found to be downward sloping and the slopes are also negatively related to firm size and idiosyncratic risk. The hidden costs borne by index trackers due to the existence of index premia range from 21-28 bp annually for the S&P 500 and 38-77 bp annually for the Russell 2000. Petajisto (2009) attributes the index premia to the supply of actively managed capital, which endogenously determines the slope of the demand curve. Madhavan (2003) presents evidence that the annual reconstitution of the Russell equity indices represents a significant cost to index trackers.

The hidden costs of index tracking affect the total market capitalisation and free float adjusted portfolios alike. However, in the case of the free float adjusted portfolio, additional trading is induced by changes in the free float factors of index constituents. Accordingly, the annual turnover ratio for the free float adjusted portfolio is 13.8 percent compared to 12.3 percent for the total market capitalisation portfolio. This additional trading implies a non-free float indexer may benefit from supplying liquidity to the market at times when free float index followers demand it. Index followers who try to minimise tracking error may be willing to pay a premium to the supplier of liquidity when they rebalance their portfolios.

A couple of event studies have examined how stocks react to the adoption of free float by indices. A redefinition of an entire index arguably does not convey any significant new information about a particular stock. Neumann and Voetmann (2001) study the response of stock prices to the introduction of free float adjustments in the Dow Jones STOXX index in 2000 and find statistically significant price effects for stocks during the event week. Companies with low float had a -1.33 percent abnormal return, whereas companies with high float had an average abnormal return of 0.5 percent. These price effects reversed in the following week, however, suggesting that price effects are not permanent. The authors interpret this result as evidence against the hypothesis of a downward sloping curve. On the other hand, Kaul, Mehrotra and Morek (2000), who study the adoption of free float weights by the Toronto Stock Exchange index, find a different result. The authors show that stocks whose floats increased as a result of the redefinition of the index experienced a statistically significant excess return of 2.3 percent on average, and no price reversal after trading volumes returned to normal.

In the spirit of the two studies above, we examine how stocks respond to changes in free float factors. In particular, we calculate the average absolute and abnormal returns (CAPM alphas) of the FTSE universe stocks that migrated from one free float band to another before FTSE's methodology change in 2013. When a stock's free float weight changes from 0.5 to 0.75, for example, both the supply of shares increases and the demand for shares increases as index investors rebalance their portfolios to match the stock's new higher weight in the index. Table 10 reports the net effects of the changes in supply and demand. Over the period 2003 to February 2013, there were 1,735 instances of stocks migrating upwards (stocks that received higher free float factors) and 1,698 instances of stocks migrating downwards. Across all regions, upward migrations are associated with higher returns during the month of the migration. Downward migrations on the other hand are typically associated with lower returns. On average, stocks that moved to a higher free float band earned a same-month return of 1.4 percent compared to -2.1 percent for the stocks that moved to lower free float bands. The result holds when returns are measured relative to the CAPM (abnormal returns). This suggests that stocks may experience price pressure when their weights within the global index increase. However, as shown in the bottom panel of Table 10, some of the extra return reverses in the month following the stock's movement (month t+1). The stocks moving up experience a -0.7 percent return, whereas the stocks moving down experience a 0.4 percent gain. At least some of the price pressure appears to be temporary.

Results of various regression models where we relate the stocks' abnormal returns to changes in the stocks' free float and firm size generally confirm the conclusions above. As shown in Table 11, an upward movement in the stock's free float weight (Model 1) is associated with positive and statistically significant abnormal returns during the month of the change and negative abnormal returns in the following month. This result suggests that around the time when stocks move to a higher band, index trackers may pay a high liquidity premium. Conversely, suppliers of liquidity may benefit from such movements. Downward movements are associated with negative, albeit not statistically significant, abnormal returns. In Models 2 and 3, we split the

upward and downward movements by size of move (jumps of one or more than one rank) and initial free float bucket. Generally, abnormal returns tend to be higher for larger moves and when the initial free float of the stock is low. These results suggest that the implicit transaction costs associated with demanding liquidity at times when constituent free float weights change may be significant.

Table 10: Price effects of changes in free float factors

Panel A: Absolute Return

	# Changes		Month t		Month t+1	
	Up	Down	Up	Down	Up	Down
America	631	201	2.5%	-0.9%	-1.0%	0.6%
Europe	327	472	0.7%	-0.3%	0.1%	0.7%
Asia-Pac	360	700	1.4%	-5.2%	-0.8%	0.2%
Emerging	417	325	0.3%	1.2%	-1.1%	0.1%
All	1 735	1 698	1.4%	-2.1%	-0.7%	0.4%

Panel B: Abnormal return (Actual return - CAPM predicted return)

	# Changes		Month t		Month t+1	
	Up	Down	Up	Down	Up	Down
America	631	201	0.6%	-1.7%	0.4%	-0.3%
Europe	327	472	0.0%	0.6%	2.8%	-0.3%
Asia-Pac	360	700	0.6%	-4.3%	1.0%	0.5%
Emerging	417	325	0.0%	0.5%	-0.3%	-0.7%
All	1 735	1 698	0.3%	-1.7%	-0.2%	1.2%

Month t: Month when stock changed free float factor

Table 11: Price effects of changes in free float factors

	Abnormal Return <sub>t</sub>			Abnormal Return <sub>t+1</sub>		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Jump up	0.590			-0.476		
	(2.27)			(-1.68)		
Jump down	-0.361			0.689		
	(-0.73)			(1.21)		
Jump up 1 rank		0.577			-0.285	
		(1.81)			(-0.83)	
Jump up > 1 rank		0.611			-0.805	
		(1.41)			(-1.86)	
Jump down 1 rank		0.518			-0.880	
		(0.46)			(-1.34)	
Jump down > 1 rank		-1.222			-0.189	
		(-2.37)			(-0.32)	
Jump up from bin 1 (0 < FF <= 0.15)			-0.007			0.544
			(-0.00)			(0.33)
Jump up from bin 2 (0.15 < FF <= 0.2)			1.329			0.653
			(1.21)			(0.70)
Jump up from bin 3 (0.2 < FF <= 0.3)			1.405			-0.218
			(2.17)			(-0.37)
Jump up from bin 4 (0.3 < FF <= 0.4)			0.679			1.184
			(1.16)			(2.19)
Jump up from bin 5 (0.4 < FF <= 0.5)			-0.316			0.233
			(-0.64)			(0.37)
Jump up from bin 6 (0.5 < FF <= 0.75)			0.563			0.535
			(1.27)			(1.17)
Jump down from bin 2 (0.15 < FF <= 0.2)			3.291			-0.519
			(0.61)			(-0.17)
Jump down from bin 3 (0.2 < FF <= 0.3)			-0.177			-1.006
			(-0.07)			(-0.33)
Jump down from bin 4 (0.3 < FF <= 0.4)			-1.711			1.049
			(-1.37)			(0.66)
Jump down from bin 5 (0.4 < FF <= 0.5)			-0.624			1.012
			(-0.79)			(0.89)
Jump down from bin 6 (0.5 < FF <= 0.75)			-0.996			-0.263
			(-1.28)			(-0.36)
Jump down from bin 7 (0.75 < FF <= 1)			-0.056			-1.279
			(-0.08)			(-1.72)
Company size	-0.105	-0.105	-0.105	-0.094	-0.094	-0.093
	(-5.63)	(-5.64)	(-5.64)	(-4.98)	(-4.97)	(-4.97)
N	947 370	947 368	947 360	934 806	934 804	934 796
R <sup>2</sup>	0.02 %	0.02 %	0.02 %	0.02 %	0.02 %	0.02 %

NB: Newey-West t-stats in parentheses.

Source: NBIM, FactSet

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# Appendix: FactSet Ownership data

The FactSet Ownership database collects global equity ownership data for 13,000 institutions, 33,000 unique mutual fund portfolios and 280,000 non-institutional "insiders/stakeholders". For each equity in the database, FactSet provides the number of shares owned by a particular shareholder along with a variety of descriptive information about the shareholder such as name of individual or institution, type of shareholder (e.g. pension fund, mutual fund, corporate insider) and others. Shareholders are classified into two main categories: public and "insider/stakeholder". The insider/stakeholder holdings are considered restricted and excluded from FactSet's calculation of company free float. Public holdings and the remaining retail holdings are considered part of the company free float.

Types of "insider/stakeholder" holdings for the stocks in the FTSE Global All Cap universe include 14 different categories. For the purposes of our analysis we aggregate the categories as follows:

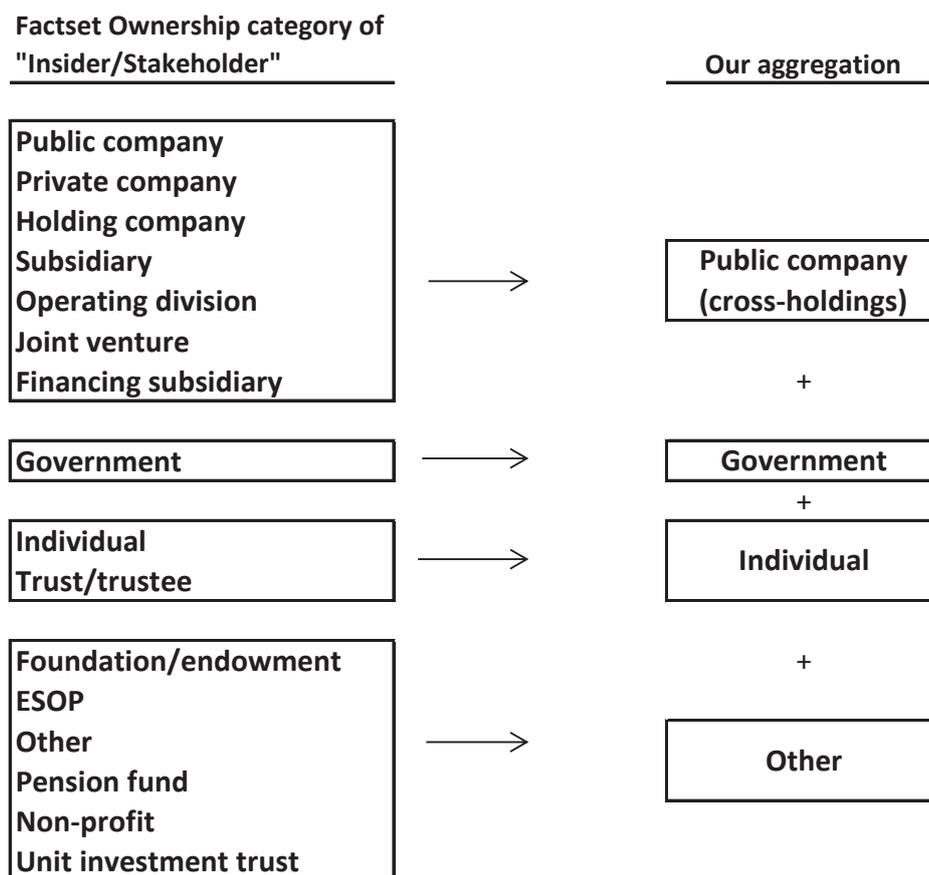


Table 1: Probability of trading by stakeholders  
Year-on-year change in median ownership over four quarters

Level of ownership	Probability of a change in stake ownership				
	Gvt	Public company	Individual	Other	All types
High ownership (>50%)	27 %	45 %	43 %	38 %	50 %
Med ownership (20-50%)	32 %	52 %	50 %	54 %	62 %
Low ownership (1-20%)	34 %	34 %	30 %	45 %	42 %
"No" ownership (<1%)	1 %	5 %	5 %	6 %	15 %
All	2 %	17 %	21 %	25 %	46 %
# Changes / qtr	35	268	321	398	716
# Companies / qtr	1 567	1 567	1 567	1 567	1 567
Size of change (%)	8.6%	6.4%	5.4%	5.6%	6.7%

Source: NBIM, FactSet Ownership, FTSE

Table 2: Performance of portfolios formed on level and type of ownership, emerging markets

Raw	Public company			Government			Individual			Other		
	Large	Med	Small	Large	Med	Small	Large	Med	Small	Large	Med	Small
Monthly return (LOC)	1.11 %	1.20 %	0.98 %	1.26 %	0.71 %	0.71 %	1.11 %	1.21 %	0.85 %	5.66 %	1.33 %	1.13 %
Monthly return (USD)	1.23 %	1.30 %	1.13 %	1.46 %	0.87 %	0.81 %	1.25 %	1.40 %	0.94 %	5.68 %	1.28 %	1.27 %
Annual return (LOC)	12.55 %	12.97 %	10.13 %	13.69 %	7.46 %	7.34 %	11.34 %	13.08 %	8.46 %	76.84 %	13.02 %	13.28 %
Annual return (USD)	12.56 %	12.83 %	10.70 %	14.90 %	8.29 %	7.59 %	11.24 %	13.72 %	8.42 %	74.15 %	9.85 %	13.40 %
Volatility	16.5 %	20.6 %	19.9 %	21.0 %	15.7 %	17.0 %	22.5 %	20.8 %	19.9 %	50.9 %	27.3 %	14.7 %
Ret/Vol	0.81	0.70	0.59	0.72	0.54	0.50	0.59	0.70	0.51	1.34	0.59	0.93
Companies (#)	238	280	415	79	41	68	58	125	440	1	8	158
Market cap	15.7	21.2	40.1	57.4	24.7	49.2	9.9	14.8	12.4	1.3	8.3	15.1
Book/price	2.80	1.34	0.62	0.58	0.75	0.66	2.64	1.51	1.14	0.45	0.69	2.01
Liquidity	0.14 %	0.25 %	0.32 %	0.15 %	0.27 %	0.20 %	0.16 %	0.34 %	0.45 %	0.26 %	0.58 %	0.22 %
Beta	1.063	1.177	1.126	1.137	0.925	1.036	1.300	1.218	1.215	0.890	1.387	0.886
<b>Country-neutral</b>												
Monthly return (LOC)	1.11 %	1.17 %	1.00 %	0.71 %	0.94 %	0.65 %	0.77 %	1.17 %	1.04 %	0.45 %	0.29 %	1.34 %
Monthly return (USD)	1.21 %	1.29 %	1.13 %	0.81 %	1.00 %	0.73 %	0.88 %	1.29 %	1.16 %	0.42 %	0.31 %	1.43 %
Annual return (LOC)	12.41 %	12.97 %	10.59 %	7.78 %	10.88 %	6.77 %	7.86 %	13.27 %	11.00 %	5.52 %	3.35 %	15.51 %
Annual return (USD)	12.42 %	13.10 %	10.77 %	8.51 %	11.04 %	6.90 %	8.27 %	13.62 %	11.14 %	5.07 %	3.52 %	15.66 %
Volatility	17.8 %	19.1 %	19.6 %	13.8 %	13.8 %	15.5 %	18.3 %	17.5 %	19.9 %	2.9 %	5.8 %	17.8 %
Ret/Vol	0.75	0.74	0.62	0.61	0.82	0.50	0.50	0.80	0.63	1.88	0.60	0.90
Companies (#)	238	280	415	79	41	68	58	125	440	1	8	158
Market cap	16.0	16.8	34.2	38.1	9.7	23.8	5.2	7.6	11.3	0.2	1.1	10.1
Book/price	1.20	1.34	2.38	0.50	0.50	1.43	0.86	1.42	0.91	0.04	0.16	1.12
Liquidity	0.15 %	0.25 %	0.30 %	0.13 %	0.15 %	0.18 %	0.16 %	0.29 %	0.30 %	0.01 %	0.08 %	0.15 %
Beta	1.049	1.126	1.123	0.816	0.728	0.929	0.935	1.067	1.238	0.105	0.186	0.857

	Public company			Government			Individual			Other		
	Large	Med	Small	Large	Med	Small	Large	Med	Small	Large	Med	Small
<b>Industry-neutral</b>												
Monthly return (LOC)	1.20 %	1.11 %	0.93 %	1.24 %	0.76 %	0.79 %	1.11 %	1.47 %	0.86 %	0.92 %	0.73 %	1.13 %
Monthly return (USD)	1.33 %	1.23 %	1.10 %	1.40 %	0.94 %	0.90 %	1.26 %	1.70 %	0.95 %	1.00 %	0.72 %	1.25 %
Annual return (LOC)	13.60 %	11.74 %	9.65 %	13.54 %	7.70 %	8.29 %	11.08 %	15.72 %	8.47 %	10.80 %	8.24 %	13.21 %
Annual return (USD)	13.80 %	11.86 %	10.48 %	14.43 %	8.90 %	8.48 %	11.01 %	16.70 %	8.23 %	11.68 %	7.68 %	13.32 %
Volatility	17.4 %	20.4 %	19.2 %	20.3 %	18.4 %	16.9 %	23.5 %	23.9 %	20.6 %	12.5 %	12.7 %	14.7 %
Ret/Vol	0.83	0.65	0.58	0.73	0.50	0.56	0.57	0.74	0.50	0.88	0.69	0.92
Companies (#)	238	280	415	79	41	68	58	125	440	1	8	158
Market cap	14.5	18.2	31.8	35.0	11.4	28.6	9.0	13.0	10.7	0.1	3.3	13.5
Book/price	2.43	1.80	0.62	0.52	0.73	0.97	1.64	3.12	1.45	0.09	0.32	1.40
Liquidity	0.16 %	0.27 %	0.36 %	0.16 %	0.33 %	0.19 %	0.19 %	0.38 %	0.43 %	0.06 %	0.26 %	0.22 %
Beta	1.106	1.173	1.116	1.094	1.010	0.981	1.281	1.297	1.159	0.116	0.606	0.878
<b>Country and industry-neutral</b>												
Monthly return (LOC)	0.75 %	0.89 %	0.83 %	0.40 %	0.39 %	0.39 %	0.44 %	0.53 %	0.69 %	0.07 %	0.06 %	0.51 %
Monthly return (USD)	0.82 %	0.97 %	0.93 %	0.46 %	0.42 %	0.43 %	0.46 %	0.61 %	0.74 %	0.07 %	0.06 %	0.55 %
Annual return (LOC)	8.09 %	9.89 %	8.72 %	4.53 %	4.43 %	4.37 %	4.79 %	5.62 %	7.09 %	0.82 %	0.72 %	5.64 %
Annual return (USD)	8.22 %	10.09 %	9.03 %	4.92 %	4.71 %	4.58 %	4.74 %	5.98 %	7.00 %	0.86 %	0.76 %	5.72 %
Volatility	15.2 %	15.5 %	17.5 %	8.9 %	7.6 %	9.2 %	10.6 %	13.7 %	16.4 %	0.7 %	1.6 %	10.7 %
Ret/Vol	0.59	0.69	0.57	0.54	0.61	0.51	0.50	0.47	0.50	1.25	0.45	0.57
Companies (#)	238	280	415	79	41	68	58	125	440	1	8	158
Market cap	8.9	10.0	21.0	19.6	3.8	11.1	2.1	3.9	6.9	0.0	0.3	4.5
Book/price	1.10	1.10	0.55	0.31	0.24	0.32	0.57	0.49	0.60	0.01	0.04	0.52
Liquidity	0.16 %	0.22 %	0.31 %	0.07 %	0.10 %	0.10 %	0.09 %	0.27 %	0.25 %	0.00 %	0.03 %	0.13 %
Beta	0.905	0.918	0.976	0.563	0.412	0.517	0.513	0.768	0.926	0.011	0.057	0.592

NB: [1] Large = ownership > 50%; medium = 20-50%; small = 1-20%.  
[2] Portfolios rebalanced quarterly. Period of analysis is 2004-2012.

Source: NBIM, FactSet Ownership, FTSE

Table 3: Performance of portfolios formed on level and type of ownership, developed markets

Raw	Public company			Government			Individual			Other		
	Large	Med	Small	Large	Med	Small	Large	Med	Small	Large	Med	Small
<b>Raw</b>												
Monthly return (LOC)	0.32 %	0.43 %	0.23 %	0.69 %	0.005 %	0.001 %	0.67 %	0.46 %	0.37 %	0.57 %	0.65 %	0.17 %
Monthly return (USD)	0.44 %	0.56 %	0.37 %	0.77 %	0.16 %	0.15 %	0.81 %	0.55 %	0.44 %	0.80 %	0.76 %	0.27 %
Annual return (LOC)	2.54 %	3.98 %	1.47 %	6.77 %	-0.84 %	-1.82 %	6.31 %	4.42 %	3.09 %	2.90 %	6.03 %	1.02 %
Annual return (USD)	3.49 %	5.17 %	2.66 %	7.12 %	0.29 %	-1.00 %	7.12 %	5.09 %	3.54 %	3.89 %	6.19 %	1.85 %
Volatility	15.9 %	15.5 %	15.8 %	18.7 %	13.4 %	19.0 %	19.2 %	15.3 %	16.8 %	27.5 %	19.3 %	14.6 %
Ret/Vol	0.24	0.33	0.17	0.45	0.00	0.00	0.42	0.36	0.27	0.25	0.40	0.14
Companies (#)	443	972	1 377	46	44	80	223	624	1 922	5	39	984
Market cap	23.7	30.1	40.5	65.0	51.8	28.8	16.5	48.8	38.2	15.8	34.4	42.5
Book/price	0.63	0.68	0.64	0.60	0.80	0.85	0.51	0.49	0.53	0.97	0.70	0.69
Liquidity	0.25 %	0.44 %	0.58 %	0.21 %	0.45 %	0.55 %	0.31 %	0.60 %	2.38 %	0.28 %	0.39 %	0.92 %
Beta	0.972	0.957	1.054	1.113	0.900	1.129	1.198	1.045	1.147	0.982	1.118	0.915
<b>Country-neutral</b>												
Monthly return (LOC)	0.61 %	0.60 %	0.33 %	0.30 %	-0.37 %	0.10 %	0.88 %	0.50 %	0.41 %	0.02 %	0.72 %	0.45 %
Monthly return (USD)	0.71 %	0.69 %	0.43 %	0.37 %	-0.31 %	0.18 %	0.97 %	0.60 %	0.51 %	0.03 %	0.79 %	0.54 %
Annual return (LOC)	5.77 %	5.80 %	2.50 %	3.13 %	-5.85 %	-2.43 %	8.65 %	5.01 %	3.55 %	0.16 %	8.12 %	4.34 %
Annual return (USD)	6.50 %	6.58 %	3.28 %	3.79 %	-5.33 %	-1.84 %	9.37 %	5.92 %	4.36 %	0.28 %	8.78 %	5.13 %
Volatility	18.4 %	17.3 %	17.4 %	10.7 %	17.8 %	26.9 %	20.7 %	14.8 %	16.6 %	3.0 %	12.9 %	15.0 %
Ret/Vol	0.40	0.41	0.23	0.34	-0.25	0.04	0.51	0.41	0.30	0.07	0.67	0.36
Companies (#)	443	972	1 377	46	44	80	223	624	1 922	5	39	984
Market cap	17.7	17.3	33.6	17.0	23.0	12.5	16.3	48.4	32.6	0.3	6.2	40.4
Book/price	0.52	0.54	0.59	0.36	0.50	0.69	0.45	0.48	0.55	0.10	0.58	0.58
Liquidity	0.39 %	0.62 %	0.80 %	0.13 %	0.46 %	0.64 %	0.53 %	0.62 %	2.02 %	0.03 %	0.37 %	2.45 %
Beta	1.120	1.154	1.145	0.565	0.857	1.205	1.223	1.010	1.139	0.106	0.692	0.924

FREE FLOAT  
ADJUSTMENTS  
IN GLOBAL EQUITY  
PORTFOLIOS

Raw	Public company						Government						Individual						Other							
	Large		Med		Small		Large		Med		Small		Large		Med		Small		Large		Med		Small			
	Large	Small	Med	Small	Large	Small	Med	Small	Large	Small	Med	Small	Large	Small	Med	Small	Large	Small	Med	Small	Large	Small	Med	Small		
<b>Industry-neutral</b>	<b>Large</b>	<b>Small</b>	<b>Med</b>	<b>Small</b>	<b>Large</b>	<b>Med</b>	<b>Small</b>																			
Monthly return (LOC)	0.37 %	0.26 %	0.40 %	0.26 %	0.89 %	-0.11 %	0.24 %	0.64 %	0.55 %	0.43 %	0.67 %	0.55 %	0.43 %	0.64 %	0.55 %	0.43 %	-0.12 %	0.67 %	0.15 %	0.67 %	0.55 %	0.43 %	0.67 %	0.15 %	0.15 %	
Monthly return (USD)	0.50 %	0.40 %	0.52 %	0.40 %	0.96 %	0.03 %	0.38 %	0.78 %	0.67 %	0.50 %	0.81 %	0.67 %	0.50 %	0.78 %	0.67 %	0.50 %	-0.01 %	0.81 %	0.25 %	0.81 %	0.67 %	0.50 %	0.81 %	0.25 %	0.25 %	
Annual return (LOC)	3.23 %	1.86 %	3.69 %	1.86 %	9.33 %	-2.47 %	0.83 %	5.90 %	5.45 %	3.82 %	7.13 %	5.45 %	3.82 %	5.90 %	5.45 %	3.82 %	-2.30 %	7.13 %	0.67 %	7.13 %	5.45 %	3.82 %	7.13 %	0.67 %	0.67 %	
Annual return (USD)	4.41 %	3.08 %	4.77 %	3.08 %	9.93 %	-1.46 %	1.65 %	6.84 %	6.45 %	4.34 %	8.32 %	6.45 %	4.34 %	6.84 %	6.45 %	4.34 %	-1.55 %	8.32 %	1.60 %	8.32 %	6.45 %	4.34 %	8.32 %	1.60 %	1.60 %	
Volatility	15.6 %	15.7 %	15.2 %	15.7 %	18.3 %	15.7 %	20.0 %	19.2 %	16.0 %	16.4 %	13.3 %	16.0 %	16.4 %	19.2 %	16.0 %	16.4 %	13.3 %	15.5 %	15.1 %	15.1 %	16.0 %	16.4 %	15.0 %	15.1 %	15.1 %	
Ret/Vol	0.28	0.20	0.32	0.20	0.58	-0.08	0.14	0.40	0.42	0.31	0.54	0.42	0.31	0.40	0.42	0.31	-0.11	0.54	0.12	0.54	0.42	0.31	0.54	0.12	0.12	
Companies (#)	443	1 377	972	1 377	46	44	80	223	624	1 922	5	624	1 922	46	44	80	5	39	984	39	624	1 922	5	39	984	
Market cap	19.6	41.4	25.9	41.4	20.5	22.1	18.8	8.7	33.4	32.0	3.0	33.4	32.0	20.5	22.1	18.8	3.0	15.3	37.7	15.3	33.4	32.0	15.3	37.7		
Book/price	0.62	0.61	0.69	0.61	0.66	0.66	0.88	0.56	0.51	0.52	0.71	0.51	0.52	0.66	0.66	0.88	0.48	0.71	0.70	0.71	0.51	0.52	0.71	0.70		
Liquidity	0.25 %	0.59 %	0.46 %	0.59 %	0.22 %	0.39 %	0.54 %	0.31 %	0.58 %	2.13 %	0.16 %	0.58 %	2.13 %	0.31 %	0.58 %	2.13 %	0.16 %	0.34 %	0.89 %	0.34 %	0.58 %	2.13 %	0.16 %	0.89 %		
Beta	0.960	1.051	0.971	1.051	0.939	0.869	1.234	1.266	1.040	1.094	0.916	1.040	1.094	0.939	0.869	1.234	0.491	0.916	0.949	0.916	1.040	1.094	0.916	0.949		
<b>Country and industry-neutral</b>																										
Monthly return (LOC)	0.43 %	0.41 %	0.48 %	0.41 %	0.08 %	-0.04 %	0.13 %	0.70 %	0.48 %	0.41 %	0.00 %	0.48 %	0.41 %	0.08 %	-0.04 %	0.13 %	0.00 %	0.35 %	0.39 %	0.35 %	0.48 %	0.41 %	0.35 %	0.39 %		
Monthly return (USD)	0.50 %	0.50 %	0.56 %	0.50 %	0.10 %	-0.02 %	0.17 %	0.77 %	0.56 %	0.50 %	0.00 %	0.56 %	0.50 %	0.10 %	-0.02 %	0.17 %	0.00 %	0.37 %	0.46 %	0.37 %	0.56 %	0.50 %	0.37 %	0.46 %		
Annual return (LOC)	4.19 %	3.40 %	4.38 %	3.40 %	0.95 %	-0.48 %	1.03 %	7.66 %	4.76 %	3.79 %	4.12 %	4.76 %	3.79 %	0.95 %	-0.48 %	1.03 %	-0.03 %	4.12 %	3.99 %	4.12 %	4.76 %	3.79 %	4.12 %	3.99 %		
Annual return (USD)	4.84 %	4.15 %	5.09 %	4.15 %	1.14 %	-0.29 %	1.51 %	8.29 %	5.53 %	4.55 %	4.28 %	5.53 %	4.55 %	1.14 %	-0.29 %	1.51 %	-0.01 %	4.28 %	4.67 %	4.28 %	5.53 %	4.55 %	4.28 %	4.67 %		
Volatility	14.5 %	17.4 %	17.2 %	17.4 %	2.6 %	3.4 %	10.0 %	14.4 %	14.5 %	15.4 %	6.3 %	14.5 %	15.4 %	2.6 %	3.4 %	10.0 %	0.6 %	6.3 %	12.7 %	6.3 %	14.5 %	15.4 %	6.3 %	12.7 %		
Ret/Vol	0.36	0.28	0.34	0.28	0.38	-0.13	0.15	0.59	0.39	0.32	0.67	0.39	0.32	0.38	-0.13	0.15	-0.05	0.67	0.37	0.67	0.39	0.32	0.67	0.37		
Companies (#)	443	1 377	972	1 377	46	44	80	223	624	1 922	5	624	1 922	46	44	80	5	39	984	39	624	1 922	5	39	984	
Market cap	6.7	25.6	9.9	25.6	3.6	4.1	3.2	4.2	23.6	23.7	0.1	23.6	23.7	3.6	4.1	3.2	0.1	1.7	23.7	1.7	23.6	23.7	0.1	1.7	23.7	
Book/price	0.49	0.55	0.52	0.55	0.10	0.14	0.29	0.37	0.46	0.55	0.36	0.46	0.55	0.10	0.14	0.29	0.02	0.36	0.49	0.36	0.46	0.55	0.36	0.49		
Liquidity	0.28 %	0.82 %	0.57 %	0.82 %	0.03 %	0.10 %	0.24 %	0.31 %	0.59 %	1.68 %	0.01 %	0.59 %	1.68 %	0.03 %	0.10 %	0.24 %	0.01 %	0.16 %	1.58 %	0.16 %	0.59 %	1.68 %	0.01 %	1.58 %		
Beta	0.964	1.131	1.107	1.131	0.146	0.186	0.493	0.878	0.926	1.012	0.319	0.926	1.012	0.146	0.186	0.493	0.017	0.319	0.817	0.319	0.926	1.012	0.319	0.817		

NB: [1] Large = ownership > 50%; medium = 20-50%; small = 1-20%.  
[2] Portfolios rebalanced quarterly. Period of analysis is 2004-2012.

Source: NBIM, FactSet Ownership, FTSE

FREE FLOAT  
ADJUSTMENTS  
IN GLOBAL EQUITY  
PORTFOLIOS

Table 4: Factor regressions for portfolios formed on level and type of ownership, emerging markets

	Raw		Country-neutral		Industry-neutral		Country- and industry-neutral		Raw		Country-neutral		Industry-neutral		Country- and industry-neutral	
	(1) High (>20%) minus low (<20%)	government ownership	(1) High (>20%) minus low (<20%)	government ownership	(3) High (>20%) minus low (<20%)	individual ownership	(3) High (>20%) minus low (<20%)	individual ownership	(3) High (>20%) minus low (<20%)	individual ownership	(3) High (>20%) minus low (<20%)	individual ownership	(3) High (>20%) minus low (<20%)	individual ownership	(3) High (>20%) minus low (<20%)	individual ownership
Intercept	-0.002 (-1.19)	-0.004 (-2.34)	-0.001 (-0.47)	-0.006 (-2.50)	0.001 (0.76)	0.002 (0.98)	0.002 (0.73)	-0.003 (-1.28)	0.001 (0.76)	0.002 (0.98)	0.002 (0.73)	0.002 (0.98)	0.002 (0.73)	0.002 (0.73)	0.002 (0.73)	-0.003 (-1.28)
Value	-0.022 (-0.25)	-0.175 (-2.10)	0.016 (0.21)	-0.294 (-2.96)	0.047 (0.55)	0.039 (0.44)	0.075 (0.71)	-0.089 (-0.98)	0.047 (0.55)	0.039 (0.44)	0.075 (0.71)	0.075 (0.71)	-0.089 (-0.98)	0.075 (0.71)	0.075 (0.71)	-0.089 (-0.98)
Size	0.159 (1.71)	0.026 (0.30)	0.234 (2.90)	-0.246 (-2.37)	-0.046 (-0.51)	-0.133 (-1.43)	0.160 (1.43)	-0.273 (-2.86)	-0.046 (-0.51)	-0.133 (-1.43)	0.160 (1.43)	0.160 (1.43)	-0.273 (-2.86)	0.160 (1.43)	0.160 (1.43)	-0.273 (-2.86)
Momentum	0.001 (0.01)	-0.003 (-0.06)	0.036 (0.73)	-0.007 (-0.11)	-0.124 (-2.27)	-0.144 (-2.55)	-0.073 (-1.09)	-0.218 (-3.79)	-0.124 (-2.27)	-0.144 (-2.55)	-0.073 (-1.09)	-0.073 (-1.09)	-0.218 (-3.79)	-0.073 (-1.09)	-0.073 (-1.09)	-0.218 (-3.79)
Illiquidity	0.417 (3.71)	0.131 (1.25)	0.092 (0.94)	-0.060 (-0.48)	0.148 (1.36)	-0.028 (-0.25)	0.206 (1.53)	0.053 (0.46)	0.148 (1.36)	-0.028 (-0.25)	0.206 (1.53)	0.206 (1.53)	0.053 (0.46)	0.206 (1.53)	0.206 (1.53)	0.053 (0.46)
Low beta	-0.058 (-0.91)	0.187 (3.15)	-0.031 (-0.55)	0.388 (5.48)	-0.077 (-1.26)	0.103 (1.62)	-0.159 (-2.09)	0.252 (3.87)	-0.077 (-1.26)	0.103 (1.62)	-0.159 (-2.09)	-0.159 (-2.09)	0.252 (3.87)	-0.159 (-2.09)	-0.159 (-2.09)	0.252 (3.87)
R-sq.	0.183	0.267	0.089	0.423	0.162	0.084	0.167	0.286	0.162	0.084	0.167	0.167	0.286	0.167	0.167	0.286
df	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103

	Raw		Country-neutral		Industry-neutral		Country- and industry-neutral	
	(2) High (>20%) minus low (<20%) public company ownership	(4) High (>20%) minus low (<20%) "other" ownership						
Intercept	0.001 (0.65)	0.001 (0.85)	0.001 (0.42)	0.000 (0.27)	-0.001 (-0.11)	-0.003 (-0.84)	-0.008 (-2.17)	
Value	-0.160 (-2.27)	-0.109 (-2.16)	-0.126 (-2.09)	-0.123 (-2.66)	-0.744 (-2.69)	-0.687 (-4.18)	-0.712 (-4.58)	
Size	-0.152 (-2.06)	-0.073 (-1.39)	-0.068 (-1.08)	-0.063 (-1.31)	-0.191 (-0.66)	-0.520 (-3.03)	-0.797 (-4.90)	
Momentum	0.019 (0.43)	0.059 (1.87)	0.013 (0.34)	0.033 (1.14)	0.145 (0.83)	0.070 (0.68)	-0.062 (-0.63)	
Illiquidity	0.088 (0.99)	0.176 (2.77)	0.059 (0.78)	0.185 (3.17)	-0.070 (-0.20)	-0.283 (-1.36)	-0.308 (-1.57)	
Low beta	0.096 (1.91)	0.088 (2.43)	0.052 (1.21)	0.130 (3.94)	-0.032 (-0.16)	0.533 (4.54)	0.982 (8.84)	
R-sq.	0.124	0.191	0.073	0.238	0.103	0.364	0.641	
df	103	103	103	103	103	103	103	

Source: NBIM, FactSet Ownership, FTSE

Table 5: Factor regressions for portfolios formed on level and type of ownership, developed markets

	Raw		Country-neutral		Industry-neutral		Country- and industry-neutral		Raw		Country-neutral		Industry-neutral		Country- and industry-neutral	
	(1) High (>20%)	minus low (<20%)	(1) High (>20%)	minus low (<20%)	(1) High (>20%)	minus low (<20%)	(1) High (>20%)	minus low (<20%)	(3) High (>20%)	minus low (<20%)	(3) High (>20%)	minus low (<20%)	(3) High (>20%)	minus low (<20%)	(3) High (>20%)	minus low (<20%)
Intercept	0.006 (1.69)	0.000 (0.03)	0.004 (1.29)	0.003 (1.39)	0.003 (1.39)	0.003 (1.39)	0.003 (1.39)	0.003 (1.39)	0.005 (2.29)	0.003 (1.40)	0.005 (2.29)	0.003 (1.40)	0.005 (2.13)	0.005 (2.13)	0.001 (0.38)	0.001 (0.38)
Value	0.515 (3.31)	0.213 (1.80)	0.666 (5.18)	0.254 (2.79)	0.254 (2.79)	0.254 (2.79)	0.254 (2.79)	0.254 (2.79)	0.647 (6.11)	0.179 (1.97)	0.647 (6.11)	0.179 (1.97)	0.615 (5.90)	0.615 (5.90)	0.071 (0.95)	0.071 (0.95)
Size	0.011 (0.07)	-0.100 (-0.81)	0.418 (3.11)	-0.209 (-2.20)	-0.209 (-2.20)	-0.209 (-2.20)	-0.209 (-2.20)	-0.209 (-2.20)	0.353 (3.19)	0.052 (0.55)	0.353 (3.19)	0.052 (0.55)	0.459 (4.21)	0.459 (4.21)	0.153 (1.96)	0.153 (1.96)
Momentum	-0.087 (-0.88)	-0.109 (-1.45)	-0.129 (-1.59)	-0.204 (-3.53)	-0.204 (-3.53)	-0.204 (-3.53)	-0.204 (-3.53)	-0.204 (-3.53)	-0.212 (-3.16)	-0.142 (-2.47)	-0.212 (-3.16)	-0.142 (-2.47)	-0.168 (-2.55)	-0.168 (-2.55)	-0.090 (-1.92)	-0.090 (-1.92)
Illiquidity	0.240 (1.22)	0.284 (1.90)	0.095 (0.58)	0.028 (0.24)	0.028 (0.24)	0.028 (0.24)	0.028 (0.24)	0.028 (0.24)	-0.103 (-0.77)	-0.279 (-2.43)	-0.103 (-0.77)	-0.279 (-2.43)	-0.069 (-0.53)	-0.069 (-0.53)	-0.202 (-2.14)	-0.202 (-2.14)
Low beta	-0.093 (-0.84)	0.095 (1.12)	-0.135 (-1.47)	0.380 (5.84)	0.380 (5.84)	0.380 (5.84)	0.380 (5.84)	0.380 (5.84)	-0.070 (-0.93)	0.220 (3.40)	-0.070 (-0.93)	0.220 (3.40)	-0.101 (-1.36)	-0.101 (-1.36)	0.189 (3.56)	0.189 (3.56)
R-sq.	0.172	0.208	0.282	0.498	0.498	0.498	0.498	0.498	0.350	0.125	0.350	0.125	0.375	0.375	0.157	0.157
df	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103

	Raw		Country-neutral		Industry-neutral		Country- and industry-neutral	
	(2) High (>20%) minus low (<20%) public company ownership		(4) High (>20%) minus low (<20%) "other" ownership					
Intercept	0.000 (0.36)	0.001 (0.52)	0.000 (0.39)	-0.002 (-0.73)	-0.004 (-1.06)	-0.002 (-0.99)	-0.002 (-0.54)	-0.002 (-0.54)
Value	-0.054 (-0.90)	0.029 (0.47)	-0.041 (-0.86)	-0.400 (-3.08)	-0.498 (-3.12)	-0.248 (-1.80)	-0.232 (-1.83)	-0.232 (-1.83)
Size	0.096 (1.52)	0.067 (1.03)	-0.019 (-0.37)	0.036 (0.26)	0.334 (1.99)	0.190 (1.32)	-0.214 (-1.61)	-0.214 (-1.61)
Momentum	-0.005 (-0.12)	-0.044 (-1.12)	-0.046 (-1.52)	0.098 (1.20)	0.251 (2.48)	0.072 (0.82)	-0.089 (-1.11)	-0.089 (-1.11)
Illiquidity	-0.017 (-0.23)	0.073 (0.93)	-0.030 (-0.49)	-0.156 (-0.95)	-0.257 (-1.27)	-0.345 (-1.98)	-0.105 (-0.65)	-0.105 (-0.65)
Low beta	0.028 (0.65)	-0.004 (-0.09)	0.082 (2.41)	0.553 (5.96)	0.458 (4.02)	0.570 (5.79)	0.701 (7.72)	0.701 (7.72)
R-sq.	0.070	0.055	0.098	0.458	0.325	0.380	0.556	0.556
df	103	103	103	103	103	103	103	103

Source: NBIM, FactSet Ownership, FTSE