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Global Asset Allocation Shifts*

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Abstract

We show that global asset reallocations of U.S. fund investors obey a strong factor structure, with two factors accounting for more than 90% of the overall variation. The first factor captures switches between U.S. bonds and equities. The second reflects reallocations from U.S. to international assets. Portfolio allocations respond to U.S. monetary policy, most prominently around FOMC events when institutional investors reallocate from basically all other asset classes to U.S. equities. Reallocations of both retail and institutional investors show return-chasing behavior. Institutional investors tend to reallocate toward riskier, high-yield fixed income segments, consistent with a search for yield.

JEL Classification: G11, G15, F30.

Keywords: Portfolio Rebalancing, Mutual Funds, Momentum, Search For Yield, Monetary Policy.

This paper studies global asset reallocation decisions of investors in U.S. domiciled mutual funds. Looking at a broad menu of asset classes, our goal is to provide a better understanding of fund investors' global asset reallocations and the link to U.S. monetary policy.

A more thorough understanding of global asset allocation decisions by fund investors is warranted for a variety of reasons. In recent years, the wealth intermediated by asset managers has risen considerably (e.g. Shin, 2013; Feroli, Kashyap, Schoenholtz, and Shin, 2014).[1] Strong fluctuations in international portfolio flows over the same period have raised concerns about potential contagion and amplification effects due to the behavior of fund investors and asset managers in response to shocks (e.g. Jotikasthira, Lundblad, and Ramadorai, 2012; Raddatz and Schmukler, 2012). Such movements in international portfolio flows have often been attributed to the policy actions by major central banks during the recent financial crisis. More specifically, U.S. monetary policy has been argued to have contributed to swings in international portfolio flows and to act as a global push factor (Fratzscher, Lo Duca, and Straub, 2012) for capital flows. Another line of argument is that the low interest rate environment (pre- and post-crisis) has contributed to a search for yield in fixed income markets (e.g. Rajan, 2005; Stein, 2013).

In our empirical analysis, we address these issues and tackle the following questions: (i) What are the main factors that characterize global reallocations? (ii) Given the important role of central bank policies in affecting financial markets in recent years, what is the link between monetary policy and global asset allocation shifts? (iii) Is there evidence that investors search for high returns internationally? More specifically, do investors chase past returns (consistent with momentum trading), and/or do reallocation decisions reflect a search for yield in fixed income segments?

A distinguishing feature of our work is to directly study the behavior of investors via quantities (reallocation decisions). Our results are based on detailed mutual fund data from EPFR Global, from which we can infer changes in fund investors' portfolio allocations to a variety of U.S. and foreign equity and fixed income segments. Moreover, we can distinguish

[1]In addition, the role of bond market financing has grown whereas cross-border bank lending has receded. Issuance of debt securities in primary markets worldwide grew particularly strongly in riskier parts of the spectrum, such as lower-rated corporate bonds and emerging market (EM) bonds (Gruic and Schrimpf, 2014). Large parts of these debt securities are indirectly held via investment funds. Via collective investment vehicles, investors have gained access to asset classes which were previously unavailable to them. A better understanding of the portfolio decisions of investors in such vehicles is thus clearly warranted.

between retail and institutional investors, and the data allow us to track *portfolio allocations* – as opposed to simple fund flows.[2] This distinction is important, as shown in Curcuru, Thomas, Warnock, and Wongswan (2011) because flows are not necessarily informative about active reallocation decisions, when portfolio wealth is not constant over time. Our data are sampled at a weekly frequency, allowing us to investigate drivers of allocation shifts at a fairly high frequency. The period we study ranges from January 2006 – December 2014, and hence covers the global financial crisis, its run-up period and the aftermath.

Our first contribution is to document a striking pattern in international portfolio reallocations of fund investors: Global asset allocation shifts obey a strong factor structure, with two factors accounting for more than 90% of the overall variance of reallocations. The first factor captures around 80% of the overall variance and can be interpreted as a rotation (ROT) factor: It tracks rotation out of U.S. bonds and into U.S. equities. The second factor tracks shifts out of U.S. assets (bonds and equities) and into foreign assets. This factor captures reallocation decisions driven by international diversification motives (DIV) of fund investors.

Our second contribution is to draw on these reallocation factors to study the link between monetary policy and global asset allocation decisions. To do so, we first test for abnormal portfolio reallocations around scheduled FOMC meetings, that is, episodes containing significant news about the course of monetary policy.[3]

We find that institutional investors reallocate from basically all other asset classes to U.S. equities in the week prior to and during the week of FOMC meetings. On average, the overall amount reallocated from U.S. bond to U.S. equity funds in the week prior to and during the week of an FOMC meeting is USD 9.5 billion, a 22 basis point shift in the asset allocation. The amount reallocated from foreign to U.S. assets is USD 7.7 billion , which translates into an asset allocation change of 18 basis points. These results suggest that U.S. monetary policy also triggers asset reallocations in foreign assets, corroborating the view that U.S. monetary

[2]Funds are categorized as institutional in the EPFR database if the minimum investment in the fund exceeds USD 100,000. These funds will therefore cater to a more sophisticated clientele than those classified as retail. For the sake of brevity, we will refer to this group as “institutional”, although it should be noted that this classification does not perfectly identify retail and institutional investors.

[3]Recently, evidence of anomalous behaviour of the U.S. stock market around scheduled FOMC events has documented. For example, Lucca and Moench (2015) document a significant price drift in the immediate run-up to FOMC meetings, whereas Cieslak, Morse, and Vissing-Jorgensen (2014) document a cyclical pattern in U.S. stock returns that is linked to the FOMC cycle. Both papers look mostly at the behavior of prices and returns. The results in this paper provide a complementary perspective based on quantities.

policy affects capital flows around the globe.

We find evidence of an abnormal shift into U.S. equities irrespective of whether the FOMC meeting was associated with an easing (downward shift in the front end of the yield curve) or a tightening (upward shift). Hence, it is unlikely that our evidence on abnormal reallocations into U.S. equities (and out of everything else) is a mere artefact of our sample period, characterised by extraordinary monetary accommodation by the Federal Reserve, which may have resulted in an unusual sequence of positive surprises for equity markets.

In line with our results on reallocation shifts around FOMC meetings, we also find that the volatility of portfolio reallocations by institutional investors is much more pronounced during FOMC weeks. This may be related to the arrival of new information on the course of monetary policy and the macroeconomy, which are typically processed around FOMC meetings (see e.g. Cieslak, Morse, and Vissing-Jorgensen, 2014). Moreover, the FOMC-related asset allocation shifts that we document in the paper are robust to controlling for macroeconomic news releases. More generally, the surprise content of macroeconomic news releases (e.g. changes of nonfarm payrolls, GDP, or the unemployment rate) does not have an effect on global portfolio reallocations that matches that of scheduled FOMC events.

To further explore the link between monetary policy and global asset allocation shifts, we also look at the sensitivity of our reallocation factors to changes in the shape of the U.S. yield curve.[4] Overall, we find that monetary easing induces U.S. fund investors to actively raise allocations to international assets, consistent with the view that investors search for higher returns abroad. At the same time, a yield curve flattening and a compression in term premia are associated with a shift out of equities and into U.S. bonds. All these effects tend to be more pronounced for institutional fund investors as opposed to retail investors.

Aside from these monetary policy-related effects, we find that reallocations are also influenced by other drivers as well. For instance, rotation between U.S. stocks and bonds (ROT) is negatively related to changes in the VIX. Similarly, we find that an increase in the VIX and in credit spreads induces U.S. mutual fund investors to cut back positions in foreign asset classes (DIV). Taken together, these results imply that investors retrench from basically all other

[4] McCauley, McGuire, and Sushko (2015) have recently stressed the role of compression of U.S. long-term yields – a stated goal of U.S. unconventional policies – as a driver of off-shore issuance in USD-denominated debt securities and mutual fund flows.

assets and reallocate towards U.S. bonds in times of higher uncertainty and risk aversion.[5]

Our third contribution is to investigate whether U.S. mutual fund investors chase returns when investing abroad or whether their decisions reflect a search for yield, especially in fixed income segments (Rajan, 2005; Stein, 2013). We find that both retail and institutional investors chase returns internationally, in both equities and bonds. Moreover, our results show that institutions search for yield in fixed income markets, actively reallocating towards higher-yielding and riskier bond segments (e.g. sub-investment grade or emerging markets). No such search for yield behavior can be observed for retail investors.

Related literature. Our paper is related to various strands of literature. It contributes to the previous literature that studies the global investment behavior of U.S. investors (e.g. Bohn and Tesar, 1996; Brennan and Cao, 1997; Froot, O'Connell, and Seasholes, 2000; Curcuru, Thomas, Warnock, and Wongswan, 2011). This literature generally finds mixed results on whether investors chase returns (or act as contrarians) and whether mutual fund flows contain information for future asset prices. The results of our paper also relate to literature that studies the role of portfolio rebalancing for asset prices (e.g. Hau and Rey, 2006, 2009), the literature on international portfolio flows (e.g. Fratzscher, 2012; Fratzscher, Lo Duca, and Straub, 2012), and work on the impact of foreign investors on local asset prices, especially in emerging markets (e.g. Jinjarak, Wongswan, and Zheng, 2011; Jotikasthira, Lundblad, and Ramadorai, 2012; Raddatz and Schmukler, 2012).

Moreover, we contribute to the literature that studies the impact of monetary policy for asset markets.[6] The role of monetary policy in driving investor behavior was originally emphasized in the literature on risk-taking channel of monetary policy (Borio and Zhu, 2012; Adrian and Shin, 2010). While this literature has typically focused on banks (Gambacorta, 2009), most recently, the focus has shifted to how risk premia and various bank and non-bank market participants respond to monetary conditions more broadly (e.g. Bekaert, Hoerova, and Duca, 2013; Chodorow-Reich, 2014). Related in spirit to our study, Hau and Lai (2014) study how monetary policy affects fund asset allocations in the Eurozone while Joyce, Zhuoshi, and Tonks (2014) study the impact of QE in the U.K. on asset allocations of insurance compa-

[5] See Beber, Brandt, and Cen (2014) and Bekaert, Baele, Inghelbrecht, and Wei (2014) for related papers that look at prices instead of quantities during episodes of heightened uncertainty.

[6] See e.g. Gilchrist and Leahy (2012) for a survey.

nies and pension funds. In a similar vein, La Spada (2015) and Becker and Ivashina (2012) investigate search for yield of money market funds and of insurance companies, respectively.

The paper proceeds as follows: Section I describes how we measure portfolio reallocations based on our mutual fund data and presents summary statistics. Section II shows that there is a strong factor structure in portfolio reallocations and that the two dominant factors lend themselves to an intuitive interpretation as rotation (switches between U.S. equities and bonds) and Diversification (switches between U.S. and foreign assets). To shed light on the impact of monetary policy on investor behavior and risk-taking, Section III draws on this factor structure to investigate allocation shifts around scheduled U.S. monetary policy events (FOMC weeks). It also investigates the relationship between reallocation shifts and monetary and financial conditions more broadly. Section IV explores whether investors in U.S. domiciled mutual primarily chase returns or if they reach for yield. Section V concludes.

I. Measuring Portfolio Reallocations

We think of asset allocation shifts as *active* decisions by investors to increase or decrease the overall portfolio share of a particular asset class at the expense of another. It is common to use flows into investment funds to track investors' portfolio choice decisions and to relate such quantities to fluctuations in asset prices. However, fund flows into asset classes do not necessarily measure shifts in investors' portfolio allocation.

Consider, for example, the situation in which the investors' wealth increases for exogenous reasons. They might spread the additional wealth into all assets which would show up as a positive flow. But, if the additional money is invested in exactly the same proportions as before, this will not lead to an active change in portfolio weights (Curcuru, Thomas, Warnock, and Wongswan, 2011). A positive relation between raw fund flows and past returns or yields therefore does not necessarily indicate return chasing (RC) or search for yield (SFY) if such wealth effects are not properly taken into account. In the following, we outline the necessary adjustments to fund flow data to adequately identify global asset allocation shifts in the presence of wealth effects.

I.A. *Wealth-weighted Reallocation Measure*

Our starting point is the Grinblatt, Titman, and Wermers (1995) and Curcuru, Thomas, Warnock, and Wongswan (2011) measure of the active change in portfolio allocation to asset class i at time t

$$X^W_{t;i} = w_{t;i} - w_{t-1;i}\frac{R_{t;i}}{R_{t,p}}, \tag{1}$$

where $w_{t;i} = A_{t;i}/\sum_{i=1}^N A_{t;i}$ is the weight of asset class $A_{t;i}$ in the aggregate portfolio, and $R_{t,p}$ denotes the gross return of that portfolio, $R_{t,p} = \sum_{i=1}^N w_{t-1;i}R_{t;i}$. This portfolio reallocation measure captures the component of flows into investment funds that induces a change in the asset allocation in relation to aggregate portfolio wealth (expressed in % or basis points). To see this more clearly, re-write $X^W_{t;i}$ as

$$X^W_{t;i} = \frac{A_{t;i}}{\sum_{i=1}^N A_{t;i}} - \frac{A_{t-1;i}R_{t;i}}{\sum_{i=1}^N A_{t-1;i}R_{t,p}}. \tag{2}$$

The sum of total assets is equal to total wealth, $W_t = \sum_{i=1}^N A_{t;i}$. In the absence of active changes in the portfolio composition, total wealth would evolve as $W^*_t = \sum_{i=1}^N A_{t-1;i}R_{t,p}$. Thus, the portfolio reallocation measure is given by

$$X^W_{t;i} = \frac{A_{t;i} - A_{t-1;i}R_{t;i}\frac{W_t}{W^*_t}}{W_t}, \tag{3}$$

where W_t/W^*_t is an adjustment factor accounting for the fact that wealth varies over time. Hence, allocation shifts will always be measured relative to aggregate wealth, which we refer to as the wealth-weighted asset reallocation in the remainder of the text.

I.B. *Asset-weighted Reallocation Measure*

The portfolio reallocation measure defined in Eq. 1 captures asset allocation changes in relation to total portfolio wealth. A potential problem arising when relying on total wealth as the benchmark is that small portfolio positions (e.g. emerging market bonds), by construction, will be subject to only fairly small portfolio reallocations relative to total wealth. But, such reallocations might actually be quite sizeable in relation to the amount invested in that asset class and could prove destabilising by creating strong price pressure effects (e.g. Jinjarak, Wongswan, and Zheng, 2011; Jotikasthira, Lundblad, and Ramadorai, 2012; Puy, 2013).

To better measure reallocation shifts in smaller asset classes, we define an alternative reallocation measure. This measure, denoted $X^A_{t;i}$, also uses the same numerator as $X^W_{t;i}$ above, but puts the allocation shift in relation to the net asset value of the amounts invested in the specific asset class

$$X^A_{t;i} = \frac{A_{t;i} - A_{t-1;i} R_{t;i} \frac{W_t}{W^*_t}}{A_{t-1;i}}. \tag{4}$$

Notice that this expression is very similar to the standard definition of flows expressed in percentage points. The only difference is the correction term for wealth effects. Intuitively, the asset-weighted reallocation measure can be thought of as an *active* flow in the sense that it measures the part of the flow which pushes the asset allocation away from its initial point.

The focus in this paper is on the wealth-weighted reallocation measures $X^W_{t;i}$, as it allows us to take a broad-based portfolio perspective. When we rely on $X^A_{t;i}$ in later parts of the paper (e.g. in Section III.B), we refer to this as the asset-weighted perspective on asset reallocation.

I.C. Data

The source of our global mutual fund data is the EPFR Global database.[7] Our data comprise information on U.S. domiciled funds denominated in U.S. Dollars, that is, funds that are primarily marketed towards local investors. We focus on this subset of the EPFR data to ensure that the investor base of mutual funds is primarily U.S. residents.

The funds in our sample have approximately USD 6.6 trillion Assets under Management (AuM) at the end of 2014. This splits into USD 2.3 trillion AuM of retail and USD 4.3 trillion AuM of institutional investors (see Figure A.1). According to the Investment Company Institute, the total AuM of U.S. mutual funds are approximately USD 11.8 trillion.[8] Therefore, the U.S. fund coverage is relatively high in EPFR (approximately 50%) when compared to the

[7]EPFR global fund data have been used inter alia by Jinjarak, Wongswan, and Zheng (2011), Jotikasthira, Lundblad, and Ramadorai (2012), Fratzscher, Lo Duca, and Straub (2012), Fratzscher (2012), Lo Duca (2012), Raddatz and Schmukler (2012), Puy (2013).

[8]See http://www.ici.org/research/stats/trends; sum of domestic equity, world equity, and bond funds as of the end of 2014.

coverage of other countries available in the database (e.g. Fratzscher (2012) reports a range of 5% to 20%).[9] At the micro level of the EPFR data, Jotikasthira, Lundblad, and Ramadorai (2012) provide a fund by fund comparison for AuM and returns for the overlap of the EPFR and CRSP mutual fund data (see their Online Appendix). Both databases seem to be well aligned. At a more aggregate level, Miao and Pant (2012) compare EPFR-based country flows with capital flow data from Balance of Payments statistics. They show that both data provide very similar dynamics.

The sampling frequency of our mutual fund data is weekly, with the sample period ranging from January 2006 to December 2014 (470 observations). EPFR collects information from fund managers on beginning-of-period and end-of-period total net assets $A_{t;i}$ as well as on the change in the net asset value (NAV) of the different funds over the period. Fund flows are constructed by EPFR on 5pm EST each Thursday and refer to the 7-day period ending close of business on Wednesday. Fund flows are then measured as end-of-period assets minus both beginning-of-period assets and the change in NAV (based on the beginning-of-period portfolio positions). Also note that the underlying mutual fund data include investments in both passively and actively managed funds, and that a large part of the former includes Exchange Traded Funds (ETFs).

We base our analysis on EPFR's aggregate groupings according to *dedicated* fund flows across various regions and market segments.[10] The equity funds in our sample are grouped into nine dedicated geographic regions: Global, U.S. (North America), Europe (Western), Asia Pacific (Japan and Australia), Emerging Markets, Latin America, EMEA, and Asia ex Japan. Notice that Global excludes Emerging Markets and includes the U.S. as well. Furthermore, we distinguish eight asset classes for fixed income: Global, U.S., Global ex U.S. (which we label DM for simplicity), Global High Yield, U.S. High Yield, Emerging Markets Hard Currencies, Emerging Markets Blend Currencies.[11]

[9]That is, most of the studies mentioned before rely on an international sample of the EPFR data which offers a lower coverage compared to the U.S. sample on which we base our analysis.

[10]We do not use EPFR's finer country breakdown ("country flows"). These are computed as weekly fund flows weighted by prior month country allocations. EPFR collects the latter only at a monthly frequency. As a result, there is no inter-country reallocation within months, which generates excess co-movement in the reported fund flows and performance. The dedicated fund flows we use are immune against this issue.

[11]The bond series Global, U.S., and Global ex U.S., as reported by EPFR, include High Yield funds. We carefully separate High Yields funds from these series. Furthermore, we merge the EPFR series EM Blend funds and EM Local funds to Emerging Markets Blend Currencies.

In addition, the database enables us to distinguish all 15 asset classes according to the investor type (institutional and retail). Funds categorized as "institutional" require a minimum investment of USD 100,000 and are marketed towards institutional investors (like pension funds, endowments etc.), but could also include family offices for instance. Reallocations within this universe of investment funds thus represent the allocation decisions of a much more attentive and sophisticated group of investors than reallocations based on funds targeted to retail investors.

It should be mentioned that institutional investors (especially large pension funds) will typically also hold large positions in separately managed accounts (SMAs) or collective investment trusts (CITs). Their investments thus clearly extend beyond the mutual fund universe (e.g. Miyajima and Shim, 2014). Comprehensive SMA and CIT data at the level of granularity needed for our analysis, however, are very scarce (see Elton, Gruber, and Blake, 2014). Thus, the analysis in this paper is confined to reallocations of institutional investors within the mutual fund universe.[12]

I.D. *Consistent Assets*

The EPFR database provides information on raw fund flows in asset class i ($f_{t;i}$), the total assets investors hold in asset class i ($A_{t;i}$), and the gross return on fund assets (change in the net asset value deflated by assets) over the observation period ($R_{t;i}$). It also provides information on fund flows relative to total net assets, calculated as $fP_{t;i} = f_{t;i}/A_{t-1;i}$.

Some further adjustments of the data are needed to make them amenable to our analysis. Recall that the fund flow identity is given by

$$f_{t;i} = A_{t;i} - A_{t-1;i}R_{t;i}. \tag{5}$$

Assets at the beginning of the period can be computed as $A^b_{t-1;i} = (A_{t;i} - f_{t;i})/R_{t;i}$. Since some funds enter while some funds leave the database during the sample, we typically face the situation that $A_{t-1;i} \neq A^b_{t-1;i}$. The reported series of flows, assets, and returns are hence not consistent with each other. Using the inconsistent series of reported assets would cause the

[12]Given this definition in the EPFR database, reallocations by very large institutional players will therefore likely be underrepresented.

reallocation measure to be distorted by funds which enter or leave the sample. Notice that this problem does not carry over to all flow variables (i.e. flows relative to total assets and returns). Therefore, to account for this effect in the EPFR data, we derive an adjusted series of total assets that is consistent with flows and returns

$$A^c_{t-1;i} = \frac{A^c_{t;i}}{fP_{t;i} + R_{t;i}}, \tag{6}$$

where we rely on $A^c_{T;i}$ as the fund assets as reported at the end of our sample. All other values are recovered from a backwards recursion. Whenever we compute one of the portfolio re-balancing measures as in Equations (3) and (4) above, we use the consistent measure of fund assets ($A^c_{t-1;i}$).

I.E. Summary Statistics

Table I provides summary statistics for our weekly portfolio reallocation measures, both from a wealth-weighted and asset-weighted perspective. It also provides summary statistics of returns and yields for the particular asset classes.[13]

Fund investors reallocated heavily towards bonds during our sample, while they switched away from U.S. equities during the sample period (Table I). They actively reduced positions in U.S. equities by about 2 basis points per week during the sample period, while raising the share of global equity holdings by 0.6 basis points per week.[14] Notice that portfolio reallocations sum to zero (on average and within in each period), and the remaining 1.46 basis point increase can be attributed to the bond markets.

[Insert Table I about here]

We also find that reallocations are generally positively related to past returns (column

[13]Returns are computed from NAV changes of the funds. For yields, we rely on the main benchmarks tracked by the different fund types. Datastream country indices serve as the main data source for dividend yields in equity markets. For bond yields, we rely on the corresponding indices tracking the specific region or asset class (ML Global Broad, ML U.S. Broad, JPM Global Broad ex U.S., ML Global High Yield, MS U.S. High Yield 100, JPM EMBI Global Composite, JPM EMBI+ Composite).

[14]0.60=-0.03+0.12+0.03+0.41+0.01+0.06.

$\rho_{r_{t-1}}$), U.S. equities again being the main exception.[15] Reallocation measures are also highly autocorrelated. The main exceptions are U.S. equity and U.S. High Yield reallocations, where autocorrelation coefficients are smaller, albeit still positive.

As the Table I further shows, shifts into EM assets do not play a very big role from a wealth-weighted perspective given their smaller share in U.S. fund investors' portfolios.[16] The standard deviation of the $X^W_{t;i}$ measure for U.S. equities, for instance, is more than four times that of EM equities. We also see, however, that – when taking an asset-weighted perspective – flows into EM assets (both bonds and equities) tend to be much more volatile, and EM asset classes have generally seen large rises in allocations when benchmarked against assets. Depending on the perspective and the question at hand, it therefore makes sense to either investigate $X^W_{t;i}$ or $X^A_{t;i}$ in the remainder of the text.

Furthermore, it is important to keep in mind that a reallocation of $x\%$ does not necessarily go hand in hand with an increase in the portfolio weight of the same amount. For example, U.S. equites show by far the most negative average reallocation (over the full sample: -9.4% = -2.06 bp $\times$ 470), but the weight in aggregate portfolio wealth decreased only slightly (from 54.26% to 52.77%), since the return on U.S. equities was greater than that of the aggregate wealth portfolio. Our reallocation measure only captures active allocation changes and ignores the part driven by the relative performance of the assets (see Eq. 1).

Table I also reports risk-and-return characteristics of the broad asset classes corresponding to our reallocation measures. In fixed income, EM bonds and High Yield bonds offered the largest bond yields, rendering them attractive as targets for yield-oriented investors (e.g. Hanson and Stein, 2014).[17] These observations suggest that there were some clear incentives to search for yield and enhance returns by investing in fixed income assets outside of the U.S. during our sample period. We will investigate this much more formally in Section IV of the paper.

[15]A positive correlation with past returns serves as a first indication of positive-feedback (momentum) trading, whereas a negative correlation suggests contrarian trading. In Section IV, we will investigate more formally if the behavior of retail and institutional fund investors can be characterised by these terms.

[16]Table A.1 provides summary statistics for retail and institutional investors. We find that reallocations of institutional investors tend to be more volatile, and the reallocations of U.S. equities and U.S. bonds tend to be less autocorrelated compared to their retail counterparts.

[17]Such investors may search for yield rather than focus on expected return, for instance as they face fixed liabilities, fixed return promises to their clients or other institutional features.

II. The Factor Structure of Asset Allocation Shifts

In this section, we characterise primary shifts in reallocations and present new stylized facts about global asset allocation shifts. Whereas most of the literature has investigated reallocations or flows into equity funds and (to a much lesser extent) bond funds in isolation, our approach takes a holistic *cross-asset class* perspective.

We show that global asset reallocations by U.S. fund investors can be described by two factors, rotation (ROT) and diversification (DIV). In later sections, we then assess the main drivers and motives inducing investors to perform such allocation shifts along these two dimensions, with a primary focus on the role of monetary policy.

II.A. Asset Allocation Factors

To understand broad-based allocation shifts, we pool our 15 wealth-weighted portfolio reallocation measures ($X^W_{t;i}$) for bond and equity markets, covering the main regions and asset classes across the world. We then perform a principal component analysis (PCA) on the covariance matrix of the reallocation measures.[18] The insights from this statistical exercise then serve as the basis for constructing allocation factors that are easier to interpret from an economic perspective, and we rely on these economic reallocation factors throughout the remainder of the paper.

Statistical factors. The PCA results reported in Table II unveil a strong factor structure in asset reallocations. The first principal component clearly stands out, explaining almost 80% of the variance of portfolio reallocations. Both U.S. equities and U.S. bonds load heavily on this first factor, but with *opposite* signs. From an economic perspective, the first reallocation factor thus largely reflects "rotation" out of U.S. bonds and into U.S. equities.

As shown by Table II, the second factor also explains a sizeable fraction of variation in portfolio reallocations. It largely reflects international "diversification" aspects of U.S. asset allocations, as it captures shifts out of U.S. assets (both bonds and equities) and into all

[18] The focus of our study is on portfolio-wide reallocation factors, but we also study asset-class specific reallocations in Section IV. An asset-weighted perspective is particularly useful for smaller asset classes, such as emerging market bonds.

other markets.[19] Given that most foreign asset classes have also offered attractive returns, return enhancement motives may also play a role in driving DIV over the period we study, on top of international diversification motives. However, for ease of reference, we simply refer to this factor as "diversification". Reallocation shifts of U.S.-based investors due to international diversification (and/or return enhancement) motives explain about 12% of the overall variance. By contrast, the remaining principal components only explain fairly small fractions of variation.[20]

Repeating the analysis separately for institutional and retail investors, we find very similar results for both (see Appendix Table A.2). Judged by the variance explained, the rotation factor is more dominant for institutional investors (87%) compared to retail investors (76%). We find the opposite for the diversification factor (8% vs. 13%).

[Insert Table II about here]

Economic portfolio reallocation factors. To facilitate the analysis of rotation and diversification and to provide a deeper understanding of the primary economic determinants of global asset allocation shifts, we consider reallocation factors computed as

$$\begin{bmatrix} X_t^{ROT} \\ X_t^{DIV} \end{bmatrix} = \mathbf{q} \times \begin{bmatrix} \mathbf{X}'_{t;E} & \mathbf{X}'_{t;B} \end{bmatrix}'$$

$$\mathbf{X}_{t;E} = \begin{bmatrix} X_{t;E}^{Global} & X_{t;E}^{US} & \dots & X_{t;E}^{EM-Asia} \end{bmatrix}'$$

$$\mathbf{X}_{t;B} = \begin{bmatrix} X_{t;B}^{Global} & X_{t;B}^{US} & \dots & X_{t;B}^{EM-Blend} \end{bmatrix}'.$$

For the reallocation measures, we set the weighting matrix $\mathbf{q}$ to

[19]Except for Global Bonds, which also includes U.S. bonds.

[20]In unreported additional tests, we run a factor analysis for a different normalization of portfolio reallocations – i.e. results for corr($X_{t;i}^{W}$) as well as corr($X_{t;i}^{A}$). We generally find similar factors, but the ordering of the factors and the specific principal component coefficients differ. This is not surprising, as total wealth weighted portfolio reallocations show fairly heterogeneous variability: The core asset classes (U.S. equities and bonds) feature much greater variability compared to smaller asset classes (see Table I). When taking an asset-weighted view, however, shifts in and out of U.S. equities and bonds become less dominant and more similar in magnitude to the other asset classes.

$$\mathbf{q} = \begin{bmatrix} 0 & 1 & \mathbf{0}_{1\times 6} & 0 & -1 & \mathbf{0}_{1\times 5} \\ 1 & -1 & \mathbf{1}_{1\times 6} & 1 & -1 & \mathbf{1}_{1\times 5} \end{bmatrix}. \tag{7}$$

Asset allocation factors computed this way can be more easily interpreted than the ones derived from the purely statistical analysis above.[21] For example, the "rotation" factor is given by $ROT_t = X^{US}_{t;E} - X^{US}_{t;B}$, and simply measures the total shift away from U.S. bonds towards U.S. equities. Given our weighting matrix $\mathbf{q}$, the factors can be interpreted as follows. Suppose an investor starts at t=0 with 50% U.S. equities, 30% U.S. bonds, and 20% foreign assets in her portfolio. Furthermore, suppose for simplicity that all assets have the same return in t=1, such that the relative performance does not affect the asset allocation. A rotation factor of 1% (or 0.01), for example, indicates that the weight of U.S. equities increased by 1% relative to U.S. bonds. In terms of portfolio weights, the new allocation could be 51%-30%-19%, or 50%-29%-21%, or 52%-31%-17%, and so forth. In a similar spirit, the "diversification" factor is "short" in U.S. equities and U.S. bonds and "long" in the other 13 mainly foreign assets. It therefore measures active weight changes of international assets at the expense of domestic assets.[22]

II.B. A First Look at Rotation and Diversification

Time-variation of reallocation factors. Figure I provides (centered) quarterly moving averages for the *rotation* (upper figure) and the *diversification* (lower figure) reallocation factors. The black dotted line tracks all investors, the blue line depicts reallocations by retail investors, while the red line shows those of institutional investors. Notice that active reallocations of institutional investors within the mutual fund universe generally tend to be *more* volatile than those of retail investors, but overall follow a similar pattern.

The implications we draw from this observation are twofold. First, on a week-to-week basis, institutional investors reallocate faster and more aggressively than retail investors. In other

[21]Furthermore, these two economic reallocation factors are indeed highly correlated (99% and 80%) with the first two principal components from the statistical analysis.

[22]Our data are sampled weekly, which means that a rotation of 1% within one week is a very large change in absolute terms (approximately USD 66 billion = 0.01 × USD 6.6 trillion , at the end of our sample). A rotation of 10 bp at the weekly frequency would still reflect an economically sizeable reallocation within one week (approximately USD 6.6 billion).

words, an additional transitory element seems to be affecting institutional reallocations, which is absent from reallocations of retail investors. This could be because we are dealing with a more active group of investors, that generally tends to react faster to news and evolving financial conditions. Second, rotation and diversification factors of retail and institutional investors overall share a similar behavior. For example, rotation peaks for both groups around the same time (e.g. turn of the year 11/2008, 12/2010, and 07/2013). Similar qualitative features can be observed for diversification.

[Insert Figure I about here]

Some of the most striking movements in the figure can be summarized as follows. Investors rotated into U.S. stocks prior and around the climax of the global financial crisis around the turn of the year 2008/2009. This is in line with Raddatz and Schmukler (2012), who find signification flows into U.S. equity funds even after the collapse of Bear Stearns in early 2008. During the period of elevated financial volatility late 2008 and over large parts of the first phase of the Federal Reserve's Quantitative Easing (QE) policies, investors rotated into U.S. bonds, while they shifted back into equities early 2011, when there were signs of a recovery around the QE2 period.

It is also worth noting that over some prolonged phases investors increasingly raised allocations to funds dedicated to foreign assets and thus diversified more heavily abroad. However, when the Federal Reserve communicated its intent to phase out its asset purchases programme – an episode known as the taper tantrum in May/June 2013 (Feroli, Kashyap, Schoenholtz, and Shin, 2014) – we see a rotation back into U.S. equities once again, and asset allocations also become less diversified as investors shifted out of foreign assets.

Connection between reallocation factors and changes of portfolio weights. Before we proceed, it is useful to build some more intuition on the difference between active reallocations (a measure of investors' active asset allocation decision) and simple changes of portfolio weights (i.e., the sum of these active decisions and the component due to the relative performance of assets).

From Figure I, it is apparent that reallocations of institutional investors within the mutual fund universe are more volatile. However, this observation does not necessarily imply that the changes of portfolio weights of institutional investors are more volatile as well. To see this, consider Figure II, which is constructed similarly except that it displays simple changes in portfolio weights $w_{i;t} - w_{i;t-1}$, that is, it shows the total effect of active reallocations *and* of weight changes due to the relative performance of the underlying assets.

[Insert Figure II about here]

Despite the fact that institutional investors tend to reallocate faster when looking at portfolio weight changes, the *rotation* series of institutional investors is *less* volatile than that of retail investors. This suggests that rotation-related reallocations of institutional investors tend to lean against the wind to counteract performance differentials between U.S. equities and U.S. bonds, resulting in an overall more stable asset allocation (see e.g. Hau and Rey, 2006, 2009, who emphasize the importance of portfolio rebalancing).

The picture for *diversification* is quite different, however, in that that the simple portfolio weight changes of institutional investors are substantially *more* volatile. Accordingly, active reallocations of institutional investors tend to allow for an active drift in weights in line with the relative performance between domestic and foreign assets, which may result in greater volatility in weight changes. These features of the data are also mirrored in the descriptive statistics for the rotation and diversification factors, reported in Table A.3 of the Appendix.

III. Reallocations and Monetary Policy

This section investigates the drivers of the rotation and diversification factors, especially how portfolio reallocations are influenced by monetary policy. In Section III.A, we first provide evidence of abnormal allocation shifts of fund investors around scheduled monetary policy events. Section III.B then looks at the relation of our reallocations factors with changes in the shape of the U.S. yield curve, as well as financial and economic conditions more broadly.

III.A. FOMC Meetings and Portfolio Reallocations

Several facts related to U.S. monetary policy events have recently been documented. Lucca and Moench (2015) present evidence of a pre-FOMC price drift in the U.S. stock market.

Stock returns are abnormally high in the immediate run-up of scheduled FOMC meetings, irrespective of whether the actual FOMC meeting surprised market participants or not.[23] In addition, Cieslak, Morse, and Vissing-Jorgensen (2014) document a cyclical return pattern in stock returns related to FOMC meetings. They find that the equity premium is entirely earned in even weeks in FOMC cycle time (weeks 0, 2 and 4), which tend to be the periods when news coming from the Federal Reserve are typically released.

Motivated by these recent findings in the literature, we look at portfolio reallocations of U.S. fund investors around scheduled FOMC events. Our goal here is to study if there are any abnormal reallocation shifts by U.S. fund investors around these periods. More precisely, we regress the ROT and DIV reallocation factor in the subsequent event analysis on a constant, and a dummy which takes a value of one in weeks containing a scheduled FOMC event (t). We also include two leads and lags of the dummy variable ($t-2$ to $t+2$) to estimate abnormal reallocations in the weeks before and after an FOMC week.

Overall, we have 72 FOMC meetings during our sample period with 470 observations. On average, there is an FOMC meeting every 6.5 weeks. Because our event window spans 5 weeks, we do not include dummies for the two weeks before (or after) an FOMC week when there are not at least two (non-event) weeks between two FOMC event windows. Therefore, depending on how many weeks there are between two FOMC meetings, the exact length of the event window will slightly vary (as it does in Cieslak, Morse, and Vissing-Jorgensen, 2014).[24]

The pre-FOMC allocation shift. Figure III visualises the abnormal weekly reallocations (in basis points) of both retail and institutional investors based on the dummy variable regressions. We report the corresponding coefficient estimates and t-statistics based on HAC-robust standard errors in Table III.

[Insert Figure III about here]

[23]Explanations for the high pre-FOMC returns considered in Lucca and Moench (2015) include, among others, i) a premium for non-diversifiable risk associated with monetary policy news, ii) a premium required by attentive investors for bearing market risk in news-intensive episodes, and iii) that the pre-FOMC price drift may just reflect a sequence of unexpectedly good news, given the downward trend in the Federal Funds Rate target over the past decades. Lucca and Moench (2015) assess the empirical validity of these possible explanations of the pre-announcement drift, but conclude that none is entirely consistent with the data.

[24]From $t-2$ to $t+2$, there are 34 ($t-2$), 72 ($t-1$), 72 (t), 71 ($t+1$), and 67 ($t+2$) weeks covered in the event window. The remaining weeks that do not fall in any event window sum to 154.

Figure III shows that *institutional investors* heavily shift from U.S. bonds towards U.S. equities (positive rotation), and from foreign to U.S. assets (negative diversification) in the week before (10.49 bp rotation and -7.68 bp diversification) and the week of a scheduled FOMC meeting (12.02 bp rotation and -10.25 bp diversification). In effect, investors reallocate from all other asset classes to U.S. equities. The overall reallocation from U.S. bonds to U.S. equities amounts to 22 basis points of total portfolio wealth in the week prior to and during the week with a scheduled FOMC meeting (rotation). These 22 basis points correspond to USD 9.5 billion in absolute terms (as of the end of our sample). The overall reallocation from foreign to U.S. assets corresponds to 18 basis points or USD 7.7 billionin absolute terms.

[Insert Table III about here]

Interestingly, the FOMC reallocation shift is specific to institutional portfolio reallocations. We do not observe a statistically or economically significant abnormal FOMC-related behavior in the portfolio decisions of retail investors. Hence, FOMC meetings move allocations of more sophisticated and active investors only, whereas the broad segment of retail clients is not sensitive to these monetary policy events. Notice that most FOMC announcements take place on Wednesdays (typically 14:15, EST), while our weekly portfolio reallocation data are measured from Thursday (beginning of day) until Wednesday (close of business). Thus, reallocations in FOMC weeks might largely happen before the actual FOMC meeting.

[Insert Figure IV about here]

Figure IV depicts the volatility of reallocations of retail and institutional investors in FOMC weeks. We find a pattern consistent with the previous findings. In FOMC weeks, the standard deviation of institutional investors' portfolio reallocations is about 50% higher than the two weeks before/after an FOMC meeting (36 bp vs. 24 bp). Again, no such pattern exists for the reallocations of retail investors.

This result is in line with the idea that the policy making process of the Federal Reserve may convey key information about macroeconomic conditions and the future course of monetary policy (e.g. Cieslak, Morse, and Vissing-Jorgensen, 2014). Our results suggest that the anticipation or revelation of such news, in turn, triggers significant portfolio adjustments, especially by active market participants such as institutional investors. Since these adjustments are not limited to U.S. assets but also affect global asset allocations as shown above, U.S. monetary policy can exert an impact on local asset markets.

Distinguishing FOMC events by easing and tightening. Over large parts of our sample, the Federal Reserve has eased monetary policy in response to the crisis and slow post-crisis recovery. In fact, ever since since late 2008, the Fed Funds rate has been stuck at the zero lower bound, and hence the central bank resorted to unconventional policies like forward guidance and quantitative easing. Thus, a possible explanation for the pre-FOMC allocation shift documented above could be that these reallocations just resulted from a sequence of Fed easing decisions that were unexpected by market participants but were good news for stock markets.

In the following, we therefore assess if the sizable abnormal shift out of bonds and into equities prior to FOMC meetings depends on the particular nature of the FOMC events and the overall highly accommodative monetary policy stance over our sample period. We classify the 72 FOMC events by whether they effectively resulted in an "easing" or "tightening" of monetary conditions. To do so, we compute the change in the two-year Treasury yield $y(2)$ around the two days of each FOMC event, either categorizing them as tightening ($\Delta y(2)>0$) or easing ($\Delta y(2) < 0$).[25] The idea behind the measure is to identify changes in expectations about the medium-term path of monetary policy as reflected in the front end of the yield curve (see Hanson and Stein (2014) and Gilchrist, Lopez-Salido, and Zakrajsek (2014)). Then, we run our dummy variable regressions where the FOMC week dummy is split into two separate dummies for easing and tightening events.

[Insert Table IV about here]

The results for these extended dummy variable regressions are shown in Table IV.[26] It seems interesting to see that the distinction by FOMC event type does not alter the conclusion that there are large abnormal shifts out of all other assets and into U.S. equities prior to FOMC meetings. Abnormal allocations from bonds to equities for FOMC events associated with a tightening are, if anything, even higher than for FOMC events classified as easing (28 bp vs. 18 bp over the week of the FOMC meeting itself and one week before).

[25] We use daily zero-coupon yield curve data from Gürkaynak, Sack, and Wright (2007), and compute yield changes as the difference in (end of day) yields one day after and before the FOMC meeting.

[26] We omit retail reallocations and focus on institutional investors here, given our prior results that their reallocations are much more sensitive to changing monetary conditions.

The timing of the abnormal reallocations and the associated statistical differences do depend on the classification of FOMC events, though. Focusing on FOMC events associated with a downward shift in the yield curve front end (indicated by "easing"), we observe that most of the rotation out of bonds and into equities occurs in week $t-1$ in FOMC time. At the same time, institutional investors reallocate from foreign to U.S. assets in $t-1$ (as can be seen from the diversification factor). The largest reallocation, however, occurs for FOMC meetings associated with a tightening of monetary conditions in the week of the actual FOMC event. When the FOMC meeting is associated with an upward shift in the front end of the yield curve, institutional investors raise positions in U.S. equities by around 19 bp, at the expense of U.S. bonds. Tighter U.S. monetary conditions also go along with a repatriation to domestic assets, as illustrated by the -16 bp response of the diversification factor in FOMC weeks.

We also classify FOMC events by the reaction of the longer end of the yield curve (Table A.4 reported in the Appendix). We look at the reaction of the component of changes in the 10-year Treasury yield which is orthogonal to changes in the two-year yield ($\Delta y(10\perp)$), which is a common proxy for the term premium (see Hanson and Stein (2014) and Gilchrist, Lopez-Salido, and Zakrajsek (2014)).[27] The results, reported in Table A.4 suggest that the abnormal reallocation shift into U.S. equities and out of everything else, as documented above, is independent of whether the FOMC event was associated with a monetary tightening ($y(10\perp)>0$) or easing ($y(10\perp)<0$). In both cases, institutional fund investors reallocate heavily towards U.S. equities in FOMC week $t-1$ and $t=0$ and move out of all other asset classes.[28]

Cumulative reallocation shifts around FOMC events. Figure V depicts the *cumulative* abnormal reallocations in FOMC week time (in basis points, per week). The blue line corresponds to all 72 FOMC events. The green and red lines distinguish whether an FOMC meeting is associated with a tightening of monetary conditions (rise in $y(2)$, number of events: 31) or an easing (downward shift in $y(2)$, number of events: 41), respectively. Figure V shows

[27] Quantitative easing policies are often thought to mainly operate via term premia (portfolio rebalancing channel). In fact, term premium compression has been a stated goal of QE policies, and Gagnon, Raskin, Remache, and Sack (2011) find evidence that these Federal Reserve policies were quite effective in lowering term premia on longer dated Treasury bonds.

[28] In Table A.5 of the Appendix, we also classify FOMC events by whether they contained news regarding Quantitative Easing (QE) policies. The results indicate that both types of FOMC events are associated with large abnormal reallocation shifts. Statistical significance is more pronounced for non-QE FOMC events, likely due to the much fewer QE-related FOMC observations.

that there is an abnormal reallocation shift of institutional investors into U.S. equities (and out of everything else) irrespective of whether the FOMC meeting is associated with an easing or a tightening of monetary conditions. For FOMC events associated with a tightening (green dotted line) the effect is even stronger than for those associated with a tightening (red dotted line).

[Insert Figure V about here]

Macroeconomic News. The Appendix (Table A.7) provides results for FOMC dummy regressions, where we also control for the surprise component of a large number of macroeconomic announcements.[29] We find that the revelation of news about macroeconomic variables does not have any sizeable effect on the FOMC shift. If anything, the FOMC allocation shift gets slightly stronger after adding the controls. We also do not find a more general relationship between macroeconomic news and portfolio reallocations in the data. The latter finding is visualized in Figure VI. We find that – relative to FOMC weeks (Figure IV) – reallocations exhibit much smaller variability in weeks when macroeconomic news are released.

[Insert Figure VI about here]

Summary. Our results provide a perspective on quantities that complements that in Lucca and Moench (2015) and Cieslak, Morse, and Vissing-Jorgensen (2014) who study price behavior related to FOMC meetings. More specifically, Lucca and Moench (2015) show that there is a drift in U.S. stock market returns prior to FOMC meetings. Our findings suggest that portfolio reallocation decisions of institutional investors could be an ingredient to better understand the FOMC drift puzzle of Lucca and Moench (2015). The results above suggest that institutions reallocate from basically all other assets to U.S. equities in the week t and $t-1$ in FOMC time. Our results therefore suggest that portfolio reallocations of active investors are much more pronounced in in the week before and during FOMC meetings. If such portfolio shifts create price pressures, this may give rise to some temporary price drifts.[30] That said, the

[29]More specifically, we consider the 15 most relevant announcements according to Bloombergs' relevance score: nonfarm payrolls, GDP, ISM manufacturing index, consumer confidence index, Michigan sentiment index, new home sales, unemployment rate, housing starts, industrial production, factory orders, personal spending, leading index, durable goods orders, CPI core, and retail sales ex auto.

[30]See e.g. Koijen and Yogo (2015) for a recent estimate of the price impact of U.S. institutional investors.

motives behind such reallocation shifts in FOMC weeks by institutional investors remain unclear. Given that we are dealing with a group of fairly sophisticated players, their behavior seems a-priori less prone to behavioral biases (such as investor inattention). A deeper and complete understanding can only be obtained with complementary information on investor behavior at a higher frequency, including that of key intermediaries like asset managers and broker-dealers.

III.B. Monetary Conditions and Reallocation Shifts

We now investigate the relationship between monetary conditions and reallocation shifts more generally, that is, not conditioning on whether there is an FOMC event or not. This could be relevant if investors gather information about the path of monetary policy besides the FOMC announcements, a point made by Cieslak, Morse, and Vissing-Jorgensen (2014).

To investigate if rotation and diversification bear a relation to the stance of U.S. monetary policy, and financial and macroeconomic conditions more broadly, we regress our reallocation factors on a set of contemporaneous covariates. We focus mostly on variables capturing changes in the shape of the U.S. yield curve which are related to the stance of U.S. monetary policy.[31] As before, we use changes in two-year Treasury yields $\Delta y(2)$ to proxy for expectations about the near-term path of the policy rate. We use the orthogonal component of changes in the ten-year yield (relative to two-year yields) $\Delta y(10\perp)$ as a proxy for the term premium. As additional explanatory variables, we include changes in corporate credit spreads (yield differential between BBB-rated and A-rated bonds, from Merrill Lynch) and changes in the VIX (as a composite proxy of uncertainty and risk aversion). Furthermore, to capture the state of the economy, we add changes of the Aruoba, Diebold, and Scotti (2009) Business Conditions Index (ADS index). All explanatory variables (including the yield curve variables) in this section are weekly changes aligned with the timing of the reallocation factors (Wednesday-Wednesday).

There could be situations in which (particularly institutional) investors are already quite far away from some fixed benchmark allocation that they want (or are required) to meet. Thus, the room to react to changing economic conditions might be limited. In these situations, we expect to see that changes of portfolio weights and active portfolio reallocations have opposite

[31] The role of the shape of the U.S. yield curve in affecting offshore issuance of USD-denominated debt securities has recently been highlighted by McCauley, McGuire, and Sushko (2015).

signs, i.e. active reallocations counteract changes in portfolio weights due to the relative performance of the assets and the asset allocation does not move too much away from the initial allocation.[32] On the contrary, if we observe that changes in portfolio weights and active reallocations move in the same direction, this will shift the asset allocation away from the initial allocation, indicating that mechanical rebalancing may not be a main force behind the reallocation. In these cases, asset allocation decisions are likely to be relatively unconstrained and not subject to benchmarking issues. Following this idea, we add a dummy variable to our regression which takes a value of one if active reallocations and changes in portfolio weights move in the same direction and interact this dummy variable with all explanatory variables. This specification works the same way as exclusively looking at all observations in the sample when reallocations and changes in portfolio weights move in the same direction.

[Insert Table V about here]

Rotation. Table V presents regression results for the ROT factor. For ease of interpretation, all covariates in the regressions reported in Table V and VII are standardized. The table shows that rotation-related reallocations are associated with changes in the shape of the U.S. yield curve. A one standard deviation downward move in the front end of the yield curve ($\Delta y(2)$) is associated with a shift out of equities into bonds by 6 basis points during the same week (institutional investors). A decline in term premia (as captured by $\Delta y(10\perp)$) by one standard deviation corresponds to an additional rotation into U.S. bonds by 5 bp. Conversely, this suggests that institutional investors respond to easier monetary conditions by shifting out U.S. equities and into U.S. bonds. Reallocations by retail investors – when judged from the magnitude of the regression coefficients – are much less sensitive to changes in the shape of the U.S. yield curve. Note, however, that the result on the effect of $\Delta y(2)$ only holds when we control for rebalancing via the dummy specification, while the effect of $y(10\perp)$ shows up in all specifications.

Table V further shows that investors prefer U.S. equities over bonds when credit spreads rise (increases in DEF), but they prefer U.S. bonds in times of elevated stock market uncertainty and heightened risk aversion. For instance, a one standard deviation rise in the VIX translates

[32] See Section II.B for a more detailed discussion on the interaction between active reallocations and simple changes of portfolio weights.

into a 5 basis point reallocation by institutional investors away from equities and into bonds. The relation to changes in business cycle conditions is negative but appears quantitatively less important. Sensitivities of institutional reallocation factors to the explanatory variables tend to be about 2 to 3 times larger than those of retail investors. This result suggests that institutional investors are more attentive fund investors, while retail investors react in a more sluggish manner to changing monetary and financial conditions.

[Insert Table VII about here]

Diversification. Table VII presents regression results for the DIV factor. We find that reallocations by institutional investors related to diversification (and return enhancement) show a significant sensitivity to changes in the U.S. yield curve. For example, declines of two-year yields by about one standard deviation are associated with institutional investors raising positions in foreign assets by about 5 basis points per week. Effects of a similar magnitude are observed for changes in term premia. In turn, this suggests that monetary easing – as captured by a downward shift in the yield curve – led to a pickup in institutional investors' allocations to foreign asset classes. These results on the sensitivity of DIV to changes in the shape of the U.S. yield curve only hold, however, when controlling for mechanical rebalancing effects via the dummy variable specification and for other variables capturing financial and economic conditions.

Both investor groups shun foreign assets when corporate credit spreads and the VIX move up, suggesting that investors retreat from investments in riskier asset classes (for instance, EM assets) when risk appetite wanes and uncertainty picks up.[33] Our findings in Table VII suggest that this applies more generally to broad-based reallocations of U.S. fund investors driven by international diversification and return-enhancement motives (DIV). Once again, the results indicate that institutional investors are more sensitive to changes in monetary and financial conditions compared to retail investors.

A Closer Look at Bond Reallocations. Table VI sheds further light on investors' reallocation decisions and its relation to monetary and financial conditions by looking at asset-weighted reallocations (Section I.B) to the individual six bond markets U.S., DM, Global HY,

[33] Also see Fratzscher (2012) and Puy (2013) for similar evidence.

U.S. HY, EM-Hard, and EM-Blend. The latter markets, in particular, have a relatively small weight in the aggregate portfolio of U.S. fund investors and are therefore less represented in our wealth-weighted factors. The ordering of the markets closely matches their riskiness from low to high risk as measured by the standard deviations of returns (Table I).

[Insert Table VI about here]

We find that investor reallocations to riskier fixed income segments (high yield and emerging markets) respond more strongly to changes in the shape in the U.S. yield curve than safer bond market segments do. In the case of institutional investors, this pattern is highly monotonic. As a response to a one standard deviation upward shift in U.S. term premia ($\Delta y(10\perp)$), institutional investors reduce allocations to the six bond markets by 8, 4, 7, 12, 30, and 36 basis points, respectively (on an asset-weighted basis). These results illustrate that fund investors' allocations in global bond markets (especially emerging markets) are fairly sensitive to U.S. monetary conditions (also, see Burger, Sengupta, Warnock, and Warnock, 2014, in this context).

IV. Return-Chasing and Search for Yield

In this section, we analyze return chasing and search for yield behavior of retail and institutional investors across global equity and global bond markets. We start with a pure time-series analysis to explore the relationship between the rotation and diversification factor and each factors' own lagged return (return chasing), or own lagged yield (search for yield) differentials. Next, we switch to a cross-sectional analysis in the spirit of Grinblatt, Titman, and Wermers (1995) and Curcuru, Thomas, Warnock, and Wongswan (2011). In this context, we investigate how investors reallocate within the cross-section of the investment universe of equities and bonds given the assets own lagged returns or yields.

IV.A. Time-series

We start with a look at how the *rotation* and *diversification* factors measured over a 1, 4, and 12-weeks horizon are related to the factors' own return differentials over the previous week

ret_{t-1}, and the lagged yield differentials y_{t-1}. Yield differentials are computed from bond yields and dividend yields for equities. As before, all right hand side variables are standardized such that regression coefficients measure reallocations in basis points (bp) per k-week horizon if the predictor changes by one standard deviation. The reported t-statistics are based on Newey and West (1987) standard errors.

When we compute return differentials, or yield differentials, corresponding to the two reallocation factors, we have to take into account the fact that different asset classes are differently weighted in the overall portfolio. Thus, to allow for a meaningful interpretation of the factor returns (yields) we specify the weighting matrix $\mathbf{q}$ such that it is always one unit "long" and one unit "short",

$$\mathbf{q} = \begin{bmatrix} 0 & 1 & \mathbf{0}_{1\times 6} & 0 & -1 & \mathbf{0}_{1\times 5} \\ 1/13 & -1/2 & \mathbf{1/13}_{1\times 6} & 1/13 & -1/2 & \mathbf{1/13}_{1\times 5} \end{bmatrix}, \tag{8}$$

where the weighting is simple equally weighted within each leg. This weighting of the reallocation factors bears some similarity to how return-based factors are often constructed in the empirical asset pricing literature.

Reallocation factors and past return differentials. The regression results in Table VIII show that rotation (ROT) does not bear a particularly strong relationship with past performance, suggesting that return-chasing is not a main determinant of investors' decision to switch between the core asset classes, bonds and equities. For institutional investors, the relation between lagged returns and rotation is negative, albeit insignificant. For example, when U.S. equities outperform U.S. bonds, the simple portfolio weight of the former will mechanically increase relative to the latter. The results are in line with Section II.B and suggest that institutional investors rebalance against such a "drift" effect. In this sense, institutions may act as a stabiliser in episodes of sharp asset price movements as they lean against the wind (e.g. to maintain a fixed target allocation between bonds and equities).

Diversification-related reallocations of retail *and* institutional investors, by contrast, are both strongly related to past performance. Thus, high past returns to foreign as opposed to domestic assets induce fund investors to reallocate more heavily towards foreign assets. At the 12-week horizon, both types of investors raise their allocation to international assets significantly by about 10 bp when international assets outperform domestic assets by one standard deviation.

The results also tell us something about how fast both investor groups respond to lagged performance differentials. Institutional investors react considerably faster when high foreign returns are observed. At 4.3 bp per week, the response of institutional is about twice as large as that of retail investors. Comparing results for a horizon of one-week and a quarter, we see that institutional investors perform 40% (4.3/10.7) of their performance-driven reallocation within one week, whereas the proportion for retail investors is just 20%. In this sense, institutional investors may amplify international asset price movements in the short run.

[Insert Table VIII about here]

Reallocation factors and past yield differentials. Over our sample, U.S. bond yields declined relative to the yield on U.S. equities (dividend yield), partly driven by the monetary easing policies of the U.S. Federal Reserve. Despite the widening gap between dividend yields and bond yields, however, investors did not shift into equities. Inspecting results for the DIV factor, we find that lagged yield differentials predict DIV negatively, but only for retail investors. Thus, higher yields on foreign compared to those of domestic assets actually induced retail investors to reallocate away from the higher-yielding asset class. Coefficients for institutional investors, however, are positive but insignificant.

[Insert Table IX about here]

IV.B. Cross-section

We now take a closer look at "return-chasing" and "search for yield" behavior of mutual fund investors. In this subsection, we move away from the reallocation factors studied previously, but move to cross-sectional shifts at the asset class level. Our analysis in this section largely draws on the Grinblatt, Titman, and Wermers (1995) and Curcuru, Thomas, Warnock, and Wongswan (2011) measures of momentum trading. We amend this momentum measure, in order to not only investigate return-chasing but also if fund investors search for yield by reallocating towards higher-yielding assets (e.g. Rajan, 2005; Stein, 2013).

To do so, we compute an LZ-statistic for a horizon k, which is given by

$$LZ_{k;l} = \frac{1}{T} \sum_{t=1}^{T} \sum_{i=1}^{N} X_{i;t+k}^{W} \times Z_{i;t-l}, \tag{9}$$

that is, the time-series average of the sum of wealth-weighted portfolio reallocations ($X_{i;t+k}^{W}$) cumulated over k-weeks scaled by an asset-specific lagged instrument $Z_{i;t-l}$ (lagged returns or lagged yields). We compute heteroscedasticity and autocorrelation robust GMM standard errors for statistical inference.

The LZ statistic can be interpreted as a comparison between the return, or yield, of two asset allocations. To see this, recall the formula for $X_{i;t}^{W}$ in Equation (1), and ignore for a moment the correction term capturing the relative asset performance. The left-hand side as well as the right-hand side of this difference sum to one, as these are portfolio weights. Now multiplying each side with a vector of returns, or yields, results in differences of portfolio returns (yields) between the asset allocation on the left and the allocation on the right.

Since the LZ-statistic corrects for the relative performance of the assets, it measures the extent to which investors *actively* change their portfolio over time to assets that recently saw a high realization of the instrument $Z_{i;t-l}$. We consider two types of instruments: i), lagged 1-,2-, and 12-week cumulative returns on asset class i, ii) the lagged yield of asset class i.

Depending on the instrument, the LZ-statistic bears a different interpretation. With lagged *returns*, the LZ-statistic measures the degree to which U.S. fund investors actively change portfolio weights in the direction of past returns. A positive LZ-statistic thus indicates return chasing or where investors raise allocations of assets with high lagged returns (buying winners) while lowering weights for those with low past returns (selling losers). By contrast, a negative LZ-statistic indicates contrarian trading, that is, a reduction in the weights of assets performing well in the past (selling winners), while raising weights of assets with poor returns (buying losers). We use this measure to test if investors actively chase high lagged returns to enhance future returns.[34]

When lagged *yields* are used as instruments, a positive LZ-statistic would indicate that investors actively rebalance to assets with higher yields than other asset classes. Such behavior would be akin to a search for yield by investors (as emphasized e.g. by Stein, 2013).

[34] Greenwood and Shleifer (2014) show that stock market investors raise their expectation about future U.S. stock returns in response to high past returns. Koijen, Schmeling, and Vrugt (2015) show, among other things, that the same is true in international equity and fixed income markets.

[Insert Table X about here]

Test results for the LZ-statistics at the one week horizon ($k = 1$) for different types of instruments are summarised in Table X. All LZ-statistics are reported in percentage points (per annum) for the ease of interpretation. This means that weekly returns are multiplied by 52, whereas yields are already expressed in annual terms. The Panels of the Table differ by the asset classes included in the broad portfolio used for LZ-statistic construction. In the top Panel, we look at both equity and bond reallocations jointly, that is, we look at return-chasing and search for yield *across* asset classes. In the Panel below, we look at equity market reallocations (in isolation), while in the lower Panel we focus on reallocations among bond markets. Hence, in the latter two cases we look at return-chasing and search for yield effects *within* the available asset menu of a particular asset class.

The results reported in Table X strongly indicate that investors in bond and equity funds chase past returns. LZ-statistics are generally statistically significant when using one-week lagged returns as instruments. For example, the LZ statistics for retail and institutional investors when we consider the allocation of equities and bonds are 1.3 and 1.9. These numbers indicate that investors would have earned 1.3% p.a. (1.9% p.a.) in addition to the return on their aggregate wealth portfolio, had they performed the new allocation already a week earlier (after controlling for the purely mechanical change of portfolio weights due to differences in the relative performance of the assets). Effects of similar magnitude can be found in the other panels when looking at within asset class effects.[35]

The results reported in the right-hand columns of Table X, however, do not in general support the notion that investors would generally tilt portfolios to asset classes with higher yields at the expense of lower-yielding asset classes. LZ-statistics are generally insignificant when taking a cross-asset class perspective or when looking at equity markets in isolation.

When constraining the investment universe to bonds, however, we find that institutional investors reallocate more heavily to segments with a high prior yield, consistent with search for yield behavior. These investors tend to increase their bond allocation within a week such that they increase the (per annum) yield by an additional 6 bp.

[35] This differs from Curcuru, Thomas, Warnock, and Wongswan (2011) who find that U.S. investors do not chase returns when investing in foreign equity markets, but instead sell foreign assets with relatively high lagged returns.

Since these effects capture only reallocations at the horizon of one week, they can cumulate quickly over longer horizons, if there is persistence in investor behavior. For that reason, Figures VII and VIII report results for the LZ-statistic computed over horizons of $k = 1, ..., 12$. The instruments are the lagged (one-week) return and lagged yield.[36] Figure VII investigates the degree by which investors tilt portfolios over a 12-week horizon in direction of past performance for the particular asset universe. Based on these results, we can assess how persistent return chasing or search for yield effects are in the data.

[Insert Figure VII about here]

When looking at equities *and* bonds, we find that the short-term return chasing behavior is partially (retail investors) or fully (institutional investors) reversed as all LZ-statistics turn insignificant when considering a longer horizon. When we restrict the sample to equities, however, we obtain highly significant and economically large LZ-statistics of 4.3 (retail) and 7.9 (institutional). Thus, the return chasing of equity fund investors, is not just limited to short horizons but is also still visible over a 12-week horizon. Within the fixed income universe, return chasing effects are not very persistent as shown in the bottom of the figure. Only in the case of retail investors, we observe a (marginally) significant LZ-statistic, when using one-week lagged returns as the instrument.

[Insert Figure VIII about here]

Finally, as shown by Figure VIII, institutional investors' reallocations in the direction of higher-yielding assets are not just limited to a short-horizon only. The LZ-statistic for a 12-week horizon is 0.86, and is still statistically significant at the 5% level. This suggests that they persistently reallocate towards higher-yielding assets during a horizon of up to one quarter.[37]

[36]Table A.8 in the Appendix reports LZ-statistics for reallocation measures cumulated over 12-weeks.

[37]In quantitative terms, LZ-statistic indicates that had the new asset allocation by institutional investors already been in place in $t - 1$, they would have gained an additional yield of 86 basis points (per annum) relative to the yield on their aggregate bond portfolio.

V. Conclusion

We study global asset reallocation decisions of investors in U.S. domiciled mutual funds and looking at a broad menu of asset classes. Importantly, we track active allocation changes of investors and not just mutual fund flows.

We find that global reallocations obey a strong and intuitive factor structure in which two factors account for more than 90% of the overall variation. The first factor tracks rotation from U.S. bonds to U.S. equities (rotation), whereas the second factor captures shifts between U.S. assets and international assets (diversification).

Our results show that reallocations of fund investors, especially those of institutional investors, are sensitive to U.S. monetary policy. First, we find that institutions reallocate from basically all other asset classes to U.S. equities in the week prior to and the week of FOMC meetings. This result holds irrespective of whether the FOMC meeting effectively leads to an easing or tightening of monetary conditions. Via this channel, U.S. monetary policy affects allocations not just in U.S. assets but also internationally. Second, we find that downward shifts in the front end of the U.S. yield curve and term premia are associated with reallocations out of U.S. equities and into U.S. bonds as well as from U.S. assets into foreign, higher-yielding, assets. Especially, investor reallocations to riskier fixed income segments (high yield and emerging markets) respond more strongly to changes in the shape in the U.S. yield curve than safer bond market segments do.

Moreover, our results show that reallocations are positively related to lagged returns, especially those captured by the diversification factor, consistent with a channel where fund investors chase equity and bond returns internationally. In the case of institutional investors, we also find behavior consistent with a search for yield (e.g. Rajan, 2005; Stein, 2013), as they tend to reallocate towards higher-yielding segments within fixed income markets.

Overall, our results thus provide a more thorough understanding of global asset allocation shifts in equity and bond markets. Understanding these broad portfolio shifts is relevant given the recent large swings in capital flows and asset prices and an increasing trend towards bond market financing (intermediated via asset managers) at the expense of traditional cross-border bank lending. Moreover, our results can inform policy discussions about the effects of monetary policy on investor behavior, international capital flows, and asset prices.

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Table I: Global Portfolio Reallocations and Performance

This table provides summary statistics of U.S. investors' global asset allocations based on the EPFR mutual fund database. The panel "Quantities" presents descriptives of wealth- and asset-weighted portfolio reallocations in basis points (per week): mu is the mean, std is the standard deviation, ac1 is the first order autocorrelation, $\rho_{r_{t-1}}$ and $\rho_{y_{t-1}}$ are correlations with the own return and yield lagged by one week. The panel labelled "Prices" shows summary statistics for annualized returns and yields in percentage points for the different asset classes. All statistics are computed over "all" investors (retail and institutional). Characteristics specific to retail or institutional investors can be found in the Appendix (Table A.1). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Quantities - Portfolio Reallocations							Prices			
	wealth weighted, X_t^W (weekly basis points)					asset w., X_t^A (weekly bp)		return, ret_t (% p.a.)		yield, y_t (% p.a.)	
	mu	std	ac1	$\rho_{r_{t-1}}$	$\rho_{y_{t-1}}$	mu	std	mu	std	mu	std
Equities											
Global	-0.03	3.51	0.23	0.07	-0.32	-0.43	23.50	5.28	19.41	2.60	0.48
U.S.	-2.06	9.62	0.19	-0.11	-0.02	-4.30	18.97	8.34	18.23	2.01	0.29
Europe	0.12	0.67	0.62	0.19	-0.20	22.71	113.91	6.53	21.82	3.36	0.73
AsiaPac.	0.03	0.67	0.44	0.20	-0.10	4.42	107.82	4.28	18.95	2.54	0.51
EM	0.41	2.33	0.26	0.26	0.04	10.00	60.34	7.73	23.40	2.69	0.61
LatAm.	-0.00	0.45	0.28	0.28	-0.03	0.16	158.54	10.51	31.71	3.19	0.69
EMEA	0.01	0.15	0.45	0.24	-0.18	13.19	140.61	3.48	30.61	2.60	1.07
EM-Asia	0.06	0.94	0.47	0.33	0.06	9.15	91.86	9.92	23.57	2.53	0.52
Bonds											
Global	0.31	0.63	0.40	0.16	-0.01	22.33	40.22	4.37	4.58	2.98	1.05
U.S.	0.90	6.80	0.43	0.20	-0.26	3.04	28.91	2.76	3.52	3.43	1.42
DM	0.02	0.29	0.70	0.14	0.28	8.47	60.41	3.95	6.77	2.72	0.63
Global-HY	0.01	0.63	0.04	0.12	0.03	7.02	218.54	4.70	8.22	9.05	3.34
US-HY	0.12	1.64	0.44	0.34	0.15	4.30	59.93	4.92	7.66	7.77	1.91
EM-Hard	0.04	0.23	0.35	0.22	-0.12	15.65	74.50	5.91	8.66	6.42	1.12
EM-Blend	0.06	0.23	0.51	0.05	-0.32	19.65	79.43	4.37	9.92	6.36	1.09

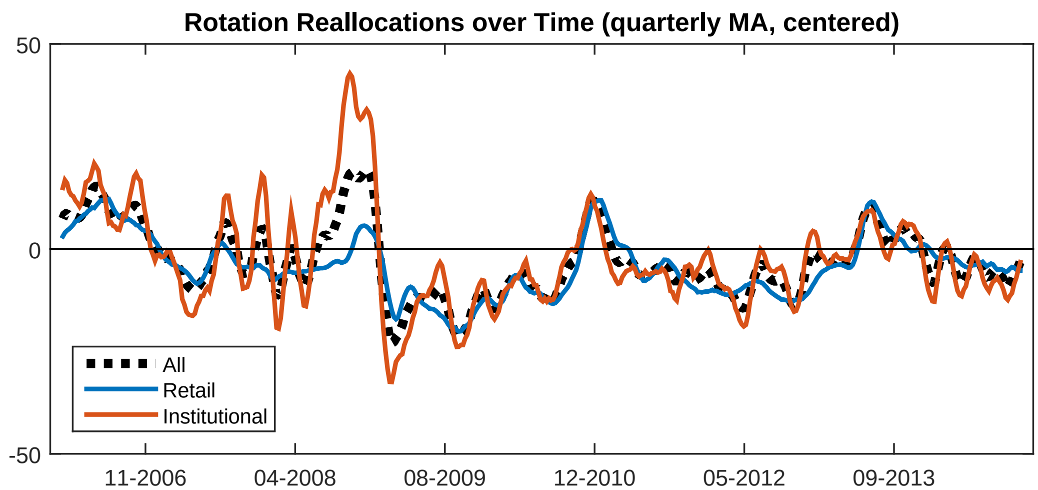
Table II: The Factor Structure of Portfolio Reallocations

This table shows principal component loadings of the wealth-weighted portfolio reallocations presented in Table I. The last row reports the variance explained by each principal component. Results for a sample restricted to retail or institutional investors can be found in the Appendix (Table A.2). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	PC1	PC2	PC3	PC4	PC5	PC6
Equities						
Global	-0.16	0.49	0.71	-0.14	-0.29	-0.16
U.S.	0.83	-0.35	0.18	-0.10	-0.18	-0.13
Europe	-0.00	0.06	0.03	0.03	0.05	0.03
AsiaPac.	-0.00	0.05	-0.01	0.05	0.23	-0.01
EM	-0.05	0.23	-0.61	-0.54	-0.41	-0.11
LatAm.	-0.01	0.03	-0.04	-0.01	0.14	-0.08
EMEA	-0.00	0.01	-0.01	0.00	0.02	0.01
EM-Asia	-0.02	0.09	-0.10	-0.04	0.67	-0.51
Bonds						
Global	-0.03	-0.00	-0.01	0.00	0.07	0.49
U.S.	-0.52	-0.74	0.14	-0.10	-0.18	-0.16
DM	-0.01	0.01	0.01	-0.00	0.04	0.10
Global-HY	-0.01	0.01	-0.01	0.01	0.17	0.61
US-HY	-0.02	0.10	-0.26	0.81	-0.35	-0.18
EM-Hard	-0.01	0.00	-0.02	0.02	0.01	0.03
EM-Blend	-0.00	0.00	-0.01	-0.01	0.01	0.08
% Var expl.	79.35	12.01	5.23	1.62	0.59	0.30

Figure I: Portfolio Reallocations over Time

The figure shows U.S. fund investors' quarterly "rotation" and "diversification" reallocation factors over time (centered 13-weeks moving averages). The rotation factor measures portfolio reallocations from U.S. bonds to U.S. equities (corresponding to the first principal component of global portfolio reallocations, see Table II). The diversification factor measures shifts from U.S. assets to foreign assets (corresponding to the second principal component). Blue lines track reallocations of institutional investors, red lines track reallocations of retail investors, and black dotted lines correspond to all investors. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.



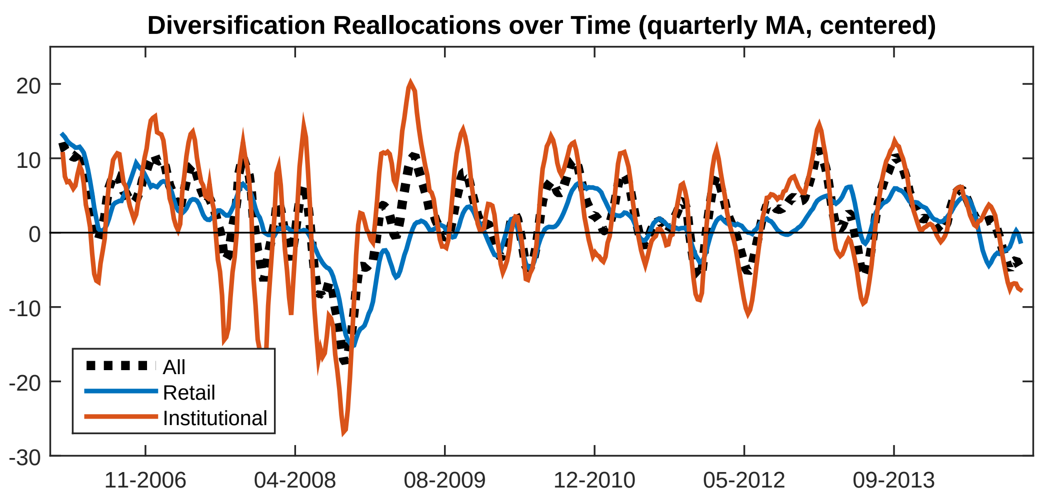
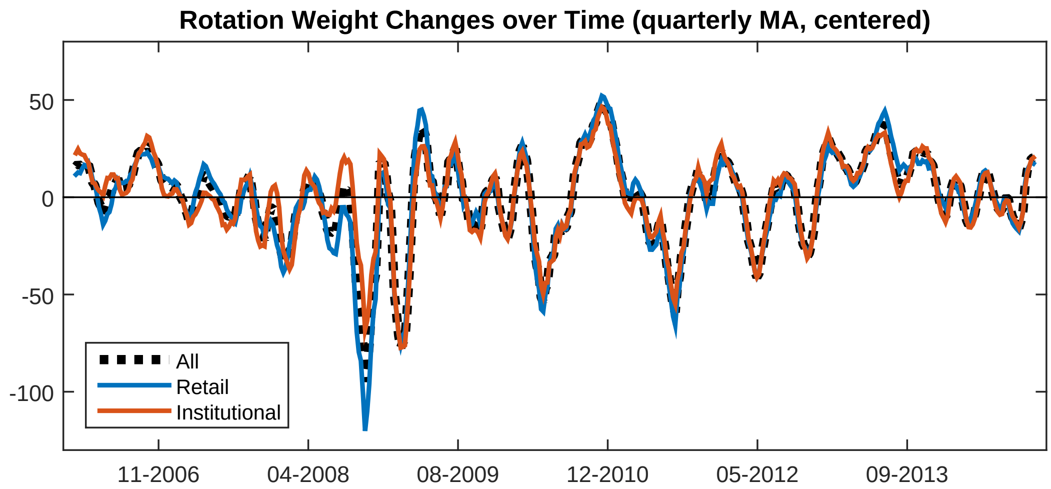


Figure II: Portfolio Weight Changes over Time

The figure shows U.S. fund investors' quarterly "rotation" and "diversification" portfolio weight changes corresponding to the "rotation" and "diversification" factors, as shown in Figure 1. In contrast to the reallocation measure (Figure 1), simple portfolio weight changes do not take into account the relative performance of an asset class. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.



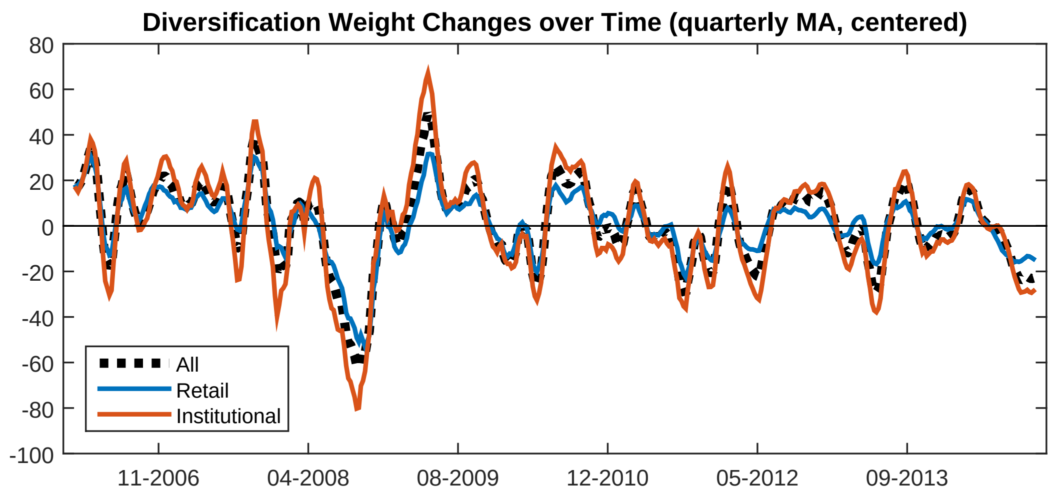


Figure III: Portfolio Allocation Shifts in FOMC Week Time

The figure shows weekly abnormal portfolio reallocations (measured in basis points) in FOMC week time. The upper figures provide results for the rotation factor, a measure of portfolio reallocations between U.S. equities and U.S. bonds. The lower figures provide results for the diversification factor, a measure of shifts from U.S. assets to foreign assets. Reported abnormal reallocations are estimated from dummy variable regressions of the respective wealth-weighted reallocation factor on a constant and weeks prior, with, and after scheduled FOMC announcements. Red lines indicate 90% confidence intervals. Dummy regression details are reported in Table III. The sample period is from 01/2006 - 12/2014, covering 470 weekly observations, and 72 FOMC announcement weeks.

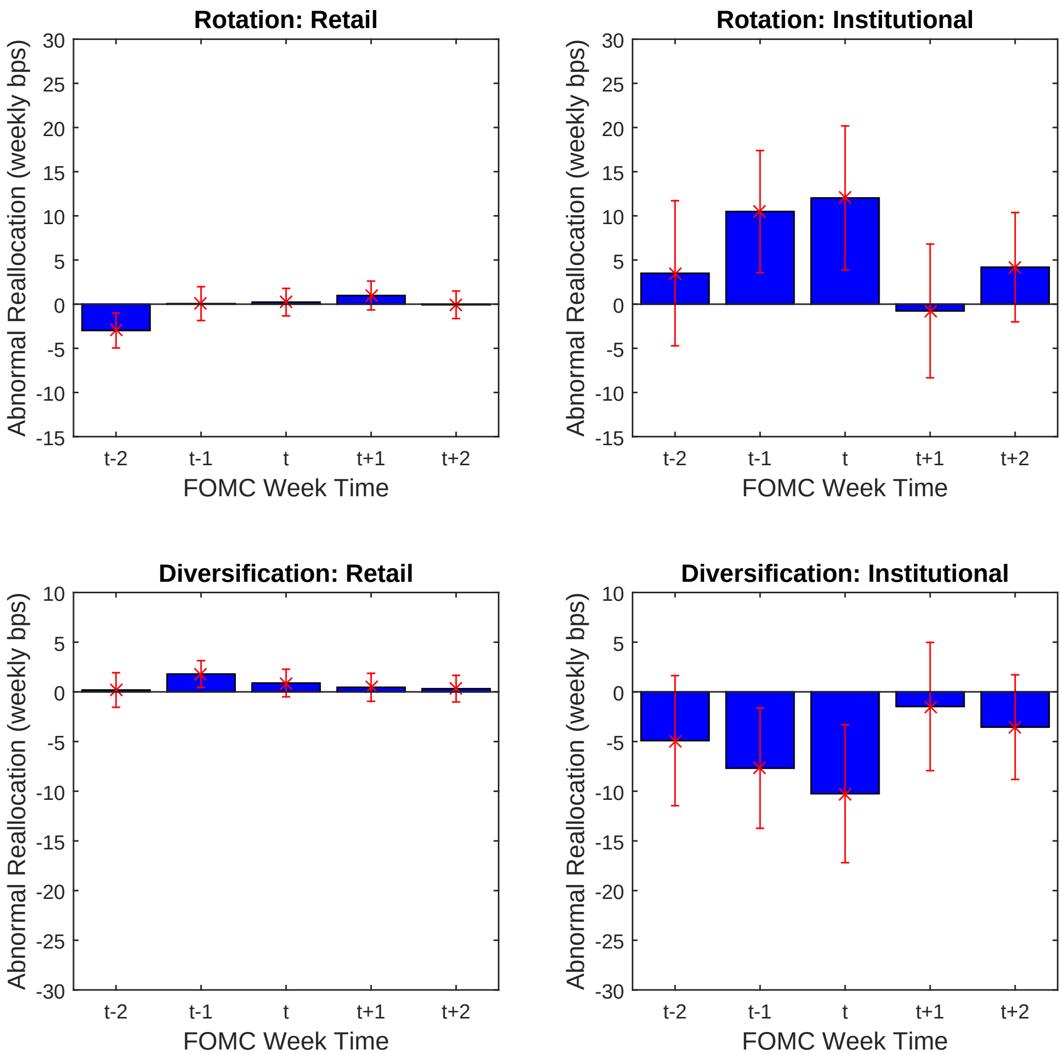


Figure IV: Volatility of Reallocation Factors in FOMC Week Time

The figure shows weekly volatilities of portfolio reallocations (measured in basis points) in FOMC week time. For example, reallocation volatilities during FOMC weeks (t) are estimated as the conditional sample standard deviation on all 72 FOMC announcement weeks in the sample period. Red lines indicate 90% confidence intervals. Full sample statistics of the reallocation factors are provided in Table A.3. The sample period is from 01/2006 - 12/2014, covers 470 weekly observations, and 72 FOMC announcement weeks.

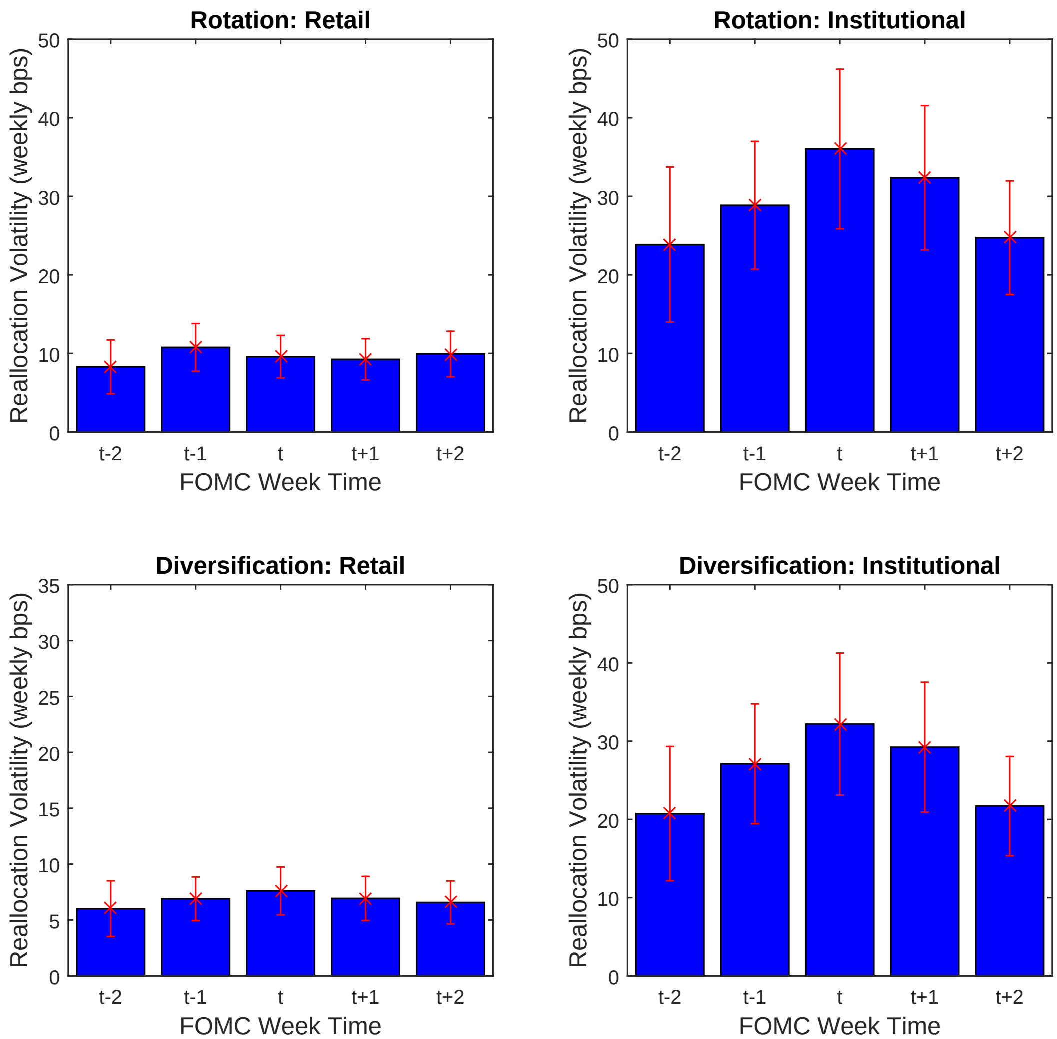


Table III: Pre-FOMC Reallocation Shift

This table provides weekly *abnormal* Rotation (ROT) and diversification (DIV) reallocations in basis points in weeks before, with, and after an FOMC announcement. Results are based on the FOMC week dummy regression:

$$X_{i;t}^{W} \times 100 = a + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}(FOMC - Week) + e_t.$$

The FOMC week dummy captures 72 weeks with a scheduled FOMC announcement in the sample period from 01/2006 - 12/2014 (470 weekly observations). The two weeks before/after FOMC meetings are not not included as dummies when there are not at least two (non-event) weeks between two FOMC event windows. Therefore, depending on how many weeks there are between two FOMC meetings, the exact length of the event window will slightly vary (similar to Cieslak, Morse, and Vissing-Jorgensen, 2014). From $t-2$ to $t+2$, there are 34 ($t-2$), 72 ($t-1$), 72 (t), 71 ($t+1$), and 67 ($t+2$) weeks covered in the event window. The remaining weeks that do not fall in any event window sum to 154. Newey-West t-stats are in parentheses (automatic lag length according to Andrews (1991)).

	Reallocation Factors in FOMC Week Time			
	Retail		Institutional	
	ROT	DIV	ROT	DIV
$FOMC_{t-2}$	-2.98	0.19	3.50	-4.91
	(-2.53)	(0.18)	(0.72)	(-1.26)
$FOMC_{t-1}$	0.06	1.79	10.49	-7.68
	(0.05)	(2.24)	(2.55)	(-2.13)
$FOMC_{t}$	0.23	0.89	12.02	-10.25
	(0.25)	(1.08)	(2.48)	(-2.48)
$FOMC_{t+1}$	0.98	0.46	-0.77	-1.48
	(1.01)	(0.55)	(-0.17)	(-0.38)
$FOMC_{t+2}$	-0.07	0.32	4.18	-3.55
	(-0.08)	(0.40)	(1.14)	(-1.13)
constant	-4.18	0.83	-6.25	6.03
	(-3.36)	(1.04)	(-2.61)	(3.55)

Figure V: Cumulative Reallocations in FOMC Week Time

The figure shows cumulated weekly abnormal portfolio reallocations (measured in basis points) in FOMC week time. Abnormal reallocations are estimated from dummy variable regressions of the respective wealth-weighted reallocation factor on a constant and weeks prior, with, and after scheduled FOMC announcements and then additively accumulated. Shaded areas indicate 90% confidence intervals as of $t-1$. Green/red dotted lines provide results for when the two year treasury yield increases/decreases the two days around the FOMC announcement. Dummy regression details are reported in Table III/IV. The sample period is from 01/2006 - 12/2014, covering 470 weekly observations, and 72 FOMC announcement weeks.

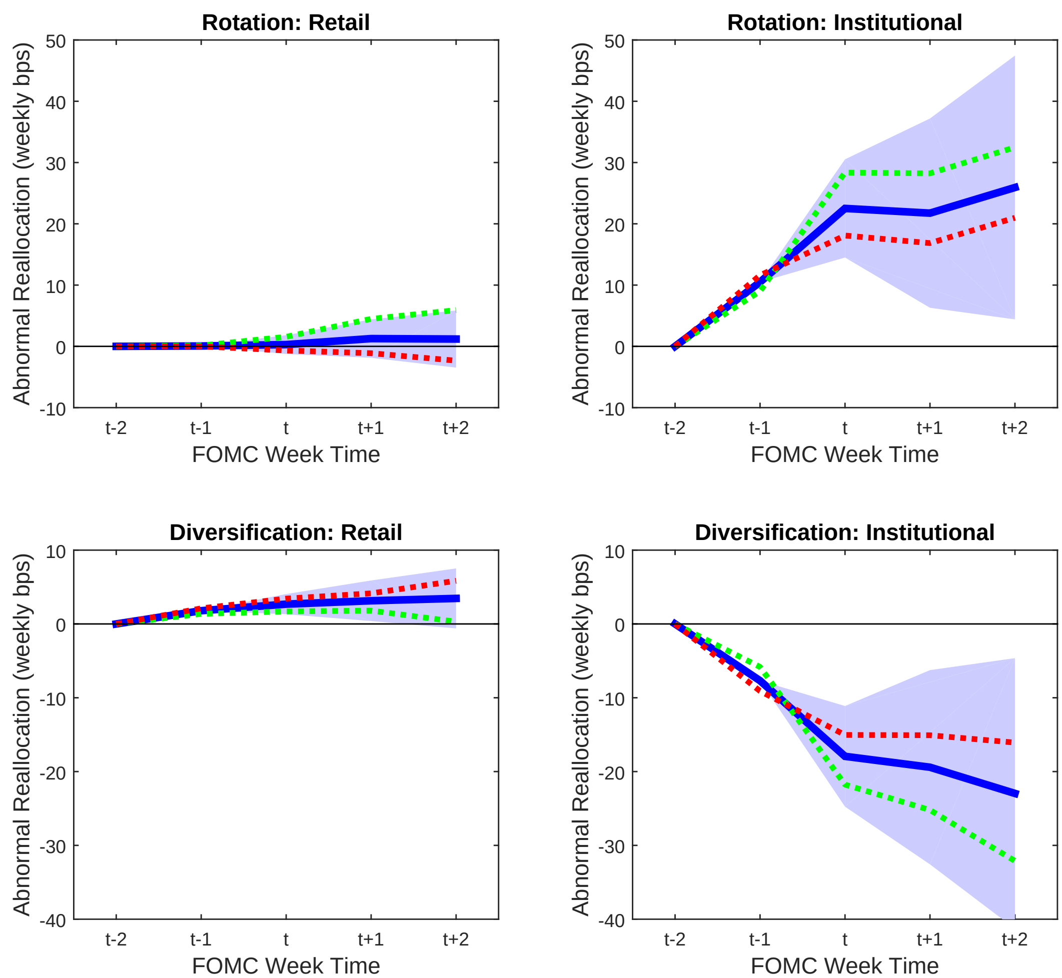


Table IV: Institutional Reallocation Shifts by FOMC Types

This table provides weekly *abnormal* rotation and diversification reallocations in basis points in weeks before, with, and after an FOMC announcement by FOMC type. Results are based on the FOMC week dummy regression:

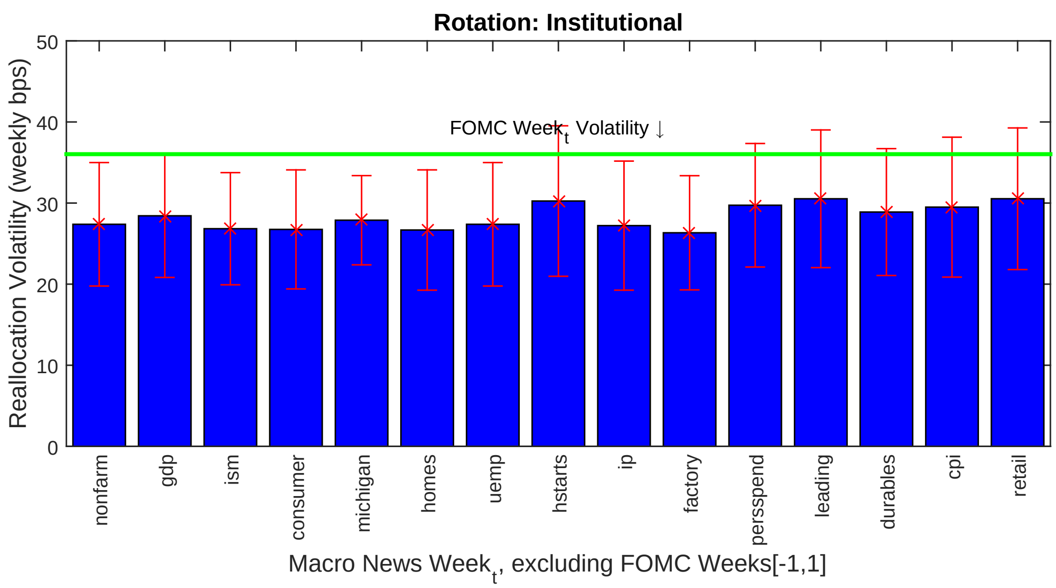
$$X_{i;t}^{W} \times 100 = a + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}^{y>0}(FOMC - Week) + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}^{y<0}(FOMC - Week) + e_t.$$

The FOMC week dummy captures 72 weeks with a scheduled FOMC announcement in the sample period from 01/2006 - 12/2014 (470 weekly observations) and is classified by whether the front end of the yield curve moves up ("tightening") or down ("easing") around the FOMC announcement. The split is according to whether two year treasury yields $\Delta y(2)_t$ increase (31) or decrease (41) the *two days* around the FOMC announcement day. The two weeks before/after FOMC meetings are not included as dummies when there are not at least two (non-event) weeks between two FOMC event windows. Therefore, depending on how many weeks there are between two FOMC meetings, the exact length of the event window will slightly vary (similar to Cieslak, Morse, and Vissing-Jorgensen, 2014). From $t-2$ to $t+2$, there are 34 ($t-2$), 72 ($t-1$), 72 (t), 71 ($t+1$), and 67 ($t+2$) weeks covered in the event window. The remaining weeks that do not fall in any event window sum to 154. Newey-West t-stats are in parentheses (automatic lag length according to Andrews (1991)).

	Institutional Reallocations in FOMC Week Time			
	Rotation		Diversification	
	tightening	easing	tightening	easing
	$\Delta y(2) > 0$	$\Delta y(2) < 0$	$\Delta y(2) > 0$	$\Delta y(2) < 0$
$FOMC_{t-2}$	9.12	-1.50	-5.12	-4.73
	(1.63)	(-0.23)	(-1.53)	(-0.75)
$FOMC_{t-1}$	9.02	11.60	-5.82	-9.09
	(1.58)	(2.32)	(-1.41)	(-1.79)
$FOMC_{t}$	19.34	6.49	-15.94	-5.95
	(2.76)	(1.11)	(-2.51)	(-1.21)
$FOMC_{t+1}$	-0.13	-1.24	-3.44	-0.04
	(-0.02)	(-0.20)	(-0.71)	(-0.01)
$FOMC_{t+2}$	4.25	4.14	-6.89	-1.00
	(0.86)	(0.91)	(-1.69)	(-0.25)
constant	-6.25		6.03	
	(-2.61)		(3.55)	

Figure VI: Volatility of Reallocation Factors in Weeks with Macroeconomic News

The figure shows weekly volatilities of portfolio reallocations (measured in basis points) in weeks with a macroeconomic news event. The reported reallocation volatilities during macro week t are estimated as the conditional sample standard deviation on all weeks in the sample, except the weeks before, with, and after an FOMC announcement (i.e., the FOMC event week window [-1,1]). The macroeconomic news dates come from Bloomberg and are sorted from left to the right according to Bloombergs' relevance score. They cover news about: changes in nonfarm payrolls (107 total observations / 74 after excluding the FOMC event week window), GDP (108/80), ISM manufacturing index (107/86), consumer confidence index (107/76), Michigan sentiment index (216/146), new home sales (108/74), unemployment rate (107/74), housing starts (108/61), industrial production (108/67), factory orders (107/80), personal spending (108/87), leading index (108/74), durable goods orders (108/78), CPI core (108/67), and retail sales ex auto (108/70). The sample period is from 01/2006 - 12/2014 and covers 470 weekly observations.



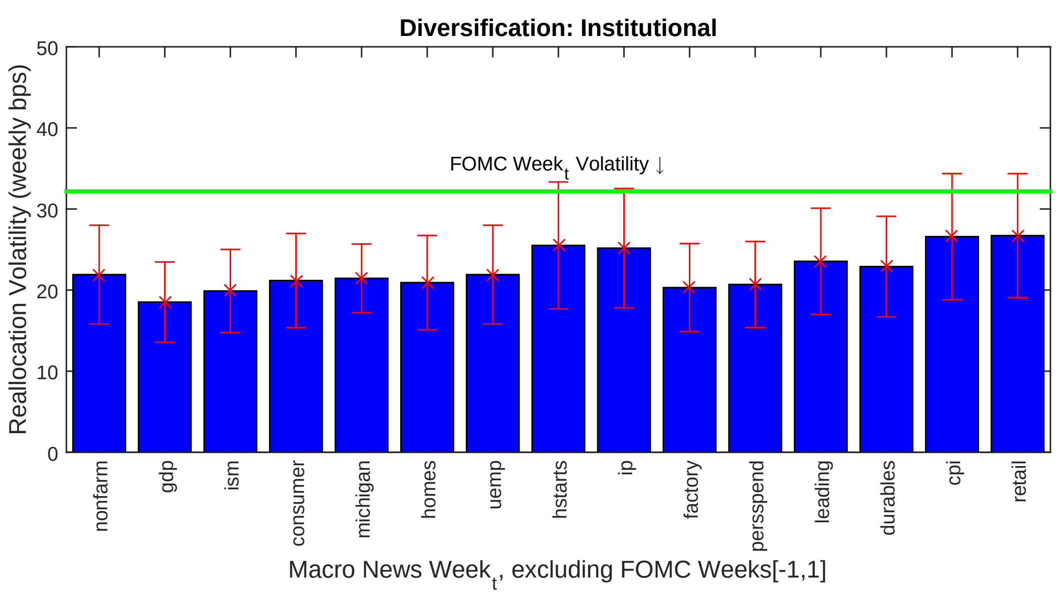


Table V: Rotation and Monetary and Financial Conditions

The table provides regression results of rotation reallocation shifts ROT on several explanatory variables. The explanatory variables are the change of the yield of US treasuries with a maturity of 2 years ($\Delta y(2)$), the change of the yield of US treasuries with a maturity of 10 years ($\Delta y(10\perp)$) orthogonalized with respect to $\Delta y(2)$, the change of the default spread (Δdef; ML US corporates BBB-A rated), the change of the CBOE Volatility Index (Δvix), and the change of the Aruoba-Diebold-Scotti Business Conditions Index (Δads; Aruoba et al 2009, updated 2014). Ψ is a dummy variable which is one if reallocations and portfolio weights move in the same direction in a given period. In columns 3 and 6, all explanatory variables are interacted with Ψ, i.e. we measure the effect of the explanatory variables when no rebalancing takes place. All explanatory variables are scaled such that they have a standard deviation of 1%; regression coefficients measure reallocations in basis points given a one standard deviation shock of a right-hand side variable. Newey-West t-stats are in parentheses. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	$ROT_t = a + d\,\Psi_t + \mathbf{b}'\,\mathbf{Z}_t \times \boldsymbol{\Psi}_t + e_t$					
	Retail			Institutional		
	(1)	(2)	(3)	(4)	(5)	(6)
constant	-0.04	-0.04	-0.05	-0.02	-0.02	-0.04
	(-7.48)	(-7.61)	(-7.65)	(-1.41)	(-1.38)	(-2.10)
Ψ_t			0.02			0.03
			(2.56)			(1.40)
$\Delta y(2)$	0.38	0.65	1.59	-0.03	1.79	6.18
	(0.83)	(1.31)	(2.28)	(-0.02)	(0.91)	(2.29)
$\Delta y(10\perp)$	0.86	0.87	1.56	4.38	4.63	5.02
	(1.77)	(1.85)	(2.21)	(2.29)	(2.59)	(2.13)
$\triangle def_t$		1.46	1.56		6.01	6.55
		(2.31)	(2.21)		(2.89)	(2.10)
$\triangle vix_t$		-1.12	-3.04		-1.89	-5.23
		(-2.24)	(-4.48)		(-0.98)	(-2.09)
$\triangle ads_t$		-1.00	-0.77		-2.68	-2.08
		(-2.23)	(-1.37)		(-1.82)	(-1.06)
$\bar{R}^2$	0.01	0.04	0.10	0.02	0.05	0.07

Table VII: Diversification and Monetary and Financial Conditions

The table provides regression results of diversification reallocation shifts DIV on several explanatory variables. The explanatory variables are the change of the yield of US treasuries with a maturity of 2 years ($\Delta y(2)$), the change of the yield of US treasuries with a maturity of 10 years ($\Delta y(10\perp)$) orthogonalized with respect to $\Delta y(2)$, the change of the default spread (Δdef; ML US corporates BBB-A rated), the change of the CBOE Volatility Index (Δvix), and the change of the Aruoba-Diebold-Scotti Business Conditions Index (Δads; Aruoba et al 2009, updated 2014). Ψ_t is a dummy variable which is one if reallocations and portfolio weights move in the same direction in a given period. In columns 3 and 6, all explanatory variables are interacted with Ψ, i.e. we measure the effect of the explanatory variables when no rebalancing takes place. All explanatory variables are scaled such that they have a standard deviation of 1%; regression coefficients measure reallocations in basis points given a one standard deviation shock of a right-hand side variable. Newey-West t-stats are in parentheses. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	$DIV_t = a + d\,\Psi_t + \mathbf{b}'\,\mathbf{Z}_t \times \boldsymbol{\Psi}_t + e_t$					
	Retail			Institutional		
	(1)	(2)	(3)	(4)	(5)	(6)
constant	0.01	0.01	0.01	0.02	0.02	0.03
	(3.92)	(4.01)	(3.01)	(1.77)	(1.69)	(2.24)
Ψ_t			0.00			-0.02
			(0.28)			(-0.97)
$\Delta y(2)$	1.28	0.09	0.14	0.19	-2.62	-5.27
	(3.14)	(0.26)	(0.32)	(0.11)	(-1.39)	(-2.20)
$\Delta y(10\perp)$	0.37	0.12	0.29	-0.83	-1.57	-3.77
	(0.72)	(0.35)	(0.68)	(-0.72)	(-1.24)	(-2.16)
$\triangle def_t$		-2.43	-2.16		-5.66	-10.43
		(-6.04)	(-4.91)		(-2.75)	(-4.53)
$\triangle vix_t$		-0.98	-1.97		-2.42	-6.05
		(-2.25)	(-4.02)		(-1.86)	(-3.70)
$\triangle ads_t$		0.25	0.38		1.67	1.07
		(0.67)	(0.94)		(1.53)	(0.71)
$\bar{R}^2$	0.03	0.18	0.17	-0.00	0.05	0.11

Table VI: Bond Reallocations (Asset Weighted) and Monetary and Financial Conditions

The table provides regression results of asset weighted bond reallocation shifts X_t^A on several explanatory variables. The explanatory variables are the change of the yield of US treasuries with a maturity of 2 years ($\Delta y(2)$, the change of the yield of US treasuries with a maturity of 10 years ($\Delta y(10\perp)$) orthogonalized with respect to $\Delta y(2)$, the change of the default spread (Δdef; ML US corporates BBB-A rated), the change of the CBOE Volatility Index (Δvix), and the change of the Aruoba-Diebold-Scotti Business Conditions Index (Δads; Aruoba et al 2009, updated 2014). Ψ is a dummy variable which is one if reallocations and portfolio weights move in the same direction in a given period. All explanatory variables are interacted with Ψ, i.e. we measure the effect of the explanatory variables when no rebalancing takes place. All explanatory variables are scaled such that they have a standard deviation of 1%; regression coefficients measure reallocations in basis points given a one standard deviation shock of a right-hand side variable. Newey-West t-stats are in parentheses. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	$X_t^A = a + d\,\Psi_t + \mathbf{b}'\,\mathbf{Z}_t \times \boldsymbol{\Psi}_t + e_t$											
	US bonds		DM bonds		Global HY		US HY		EM Hard		EM Blend	
	Retail	Insti.	Retail	Insti.	Retail	Insti.	Retail	Insti.	Retail	Insti.	Retail	Insti.
const.	0.08	0.05	-0.05	0.09	0.16	0.05	-0.01	0.13	0.29	0.06	0.00	0.05
	(6.35)	(1.43)	(-0.97)	(1.62)	(2.90)	(0.95)	(-0.42)	(3.35)	(5.96)	(1.51)	(0.06)	(0.92)
Ψ_t	-0.06	-0.07	0.06	0.06	0.11	0.20	-0.00	0.08	-0.01	-0.11	0.08	0.58
	(-3.65)	(-1.53)	(1.07)	(0.78)	(1.39)	(1.76)	(-0.05)	(1.23)	(-0.22)	(-1.34)	(1.27)	(3.48)
$\Delta y(2)_t$	-3.99	-9.50	-15.92	-27.55	-4.24	-25.78	-7.23	-23.49	-8.86	-30.70	-0.54	-46.42
	(-2.79)	(-2.11)	(-3.31)	(-2.82)	(-0.77)	(-2.33)	(-2.06)	(-4.82)	(-2.20)	(-4.33)	(-0.13)	(-3.07)
$\Delta y(10\perp)_t$	-0.91	-7.94	3.69	-3.61	5.63	-6.61	-9.18	-11.90	-17.73	-29.81	-1.31	-35.61
	(-0.74)	(-2.00)	(0.75)	(-0.58)	(1.14)	(-0.70)	(-2.37)	(-2.19)	(-4.34)	(-4.25)	(-0.49)	(-2.02)
$\triangle def_t$	-0.75	-8.06	-13.33	-31.58	-25.94	-62.77	-28.21	-40.80	-21.88	-43.28	-0.29	-26.69
	(-0.56)	(-1.30)	(-2.04)	(-3.85)	(-5.01)	(-5.86)	(-5.58)	(-3.69)	(-3.74)	(-3.87)	(-0.09)	(-1.16)
$\triangle vix_t$	7.76	18.15	20.60	23.30	-3.50	6.33	-9.56	-12.73	0.90	-7.09	10.21	4.73
	(5.68)	(3.60)	(4.16)	(2.42)	(-0.64)	(0.58)	(-2.11)	(-1.60)	(0.20)	(-0.92)	(2.51)	(0.28)
$\triangle ads_t$	0.92	5.71	-15.64	-12.01	-5.41	-7.39	4.14	10.35	8.57	1.45	-6.75	-5.27
	(0.88)	(1.56)	(-3.40)	(-1.37)	(-1.00)	(-0.87)	(0.99)	(1.76)	(1.78)	(0.20)	(-2.36)	(-0.37)
$\bar{R}^2$	0.15	0.12	0.09	0.10	0.05	0.07	0.15	0.18	0.06	0.09	0.02	0.04

Table VIII: Reallocation Factors and Past Return Differentials

The table reports results from long horizon predictive regressions of rotation and diversification reallocation shifts over a k-period horizon on lagged return differentials corresponding to the factors. bs are multiplied by 100 and measure predicted reallocations in basis points given a one standard deviation shock of the predictor. Newey-West t-stats are in parentheses (2×(k-1) lags). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail			Institutional		
k	W1	W4	W12	W1	W4	W12
			$ROT_{t:t+k} = a + b \times ret_t + e_{t:t+k}$			
b	0.99	1.27	0.15	-1.00	-2.48	-11.58
t	(1.94)	(0.76)	(0.03)	(-0.59)	(-0.66)	(-1.17)
$\bar{R}^2$	0.01	-0.00	-0.00	-0.00	-0.00	0.00
			$DIV_{t:t+k} = a + b \times ret_t + e_{t:t+k}$			
b	2.13	5.61	11.01	4.28	9.40	10.69
t	(4.51)	(4.65)	(2.80)	(3.33)	(2.54)	(2.00)
$\bar{R}^2$	0.09	0.07	0.04	0.03	0.03	0.01

Table IX: Reallocation Factors and Past Yield Differentials

The table reports results from long horizon predictive regressions of rotation and diversification reallocation shifts over a k-period horizon on lagged yield differentials corresponding to the factors. bs are multiplied by 100 and measure predicted reallocations in basis points given a one standard deviation shock of the predictor. Newey-West t-stats are in parentheses (2×(k-1) lags). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail			Institutional		
k	W1	W4	W12	W1	W4	W12
			$ROT_{t:t+k} = a + b \times y_t + e_{t:t+k}$			
b	-2.72	-10.41	-28.02	-4.61	-18.35	-51.74
t	(-6.12)	(-3.91)	(-2.01)	(-3.35)	(-3.47)	(-2.43)
$\bar{R}^2$	0.08	0.11	0.11	0.02	0.07	0.13
			$DIV_{t:t+k} = a + b \times y_t + e_{t:t+k}$			
b	-2.73	-9.37	-21.21	0.23	3.51	17.80
t	(-7.32)	(-5.25)	(-4.15)	(0.18)	(0.80)	(1.33)
$\bar{R}^2$	0.16	0.20	0.17	-0.00	0.00	0.04

Table X: Return Chasing and Search for Yield

The table shows LZ statistics computed as $LZ = \frac{1}{T}\sum_{t=1}^{T}\sum_{i=1}^{N} X_{i;t}^{W} \times Z_{i;t:t-l}$, the time-series average of the sum of wealth weighted portfolio reallocations ($X_{i;t}^{W}$) scaled by an asset specific lagged instrument ($Z_{i;t:t-l}$). The instruments are the assets own lagged return (1 week, 1-4 weeks, or 1-12 weeks) or the assets own lagged yield. The LZ statistic is annualized and reported in percentage points. A LZ statistic of 1 (for example) implies that investors shift towards an asset allocation with an "ex post" 1% p.a. higher return/yield. GMM t-stats in parentheses. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail				Institutional			
	returns			yields	returns			yields
$Z_{t:t-l}$	ret_{t-1}	$ret_{t:t-4}$	$ret_{t:t-12}$	y_{t-1}	ret_{t-1}	$ret_{t:t-4}$	$ret_{t:t-12}$	y_{t-1}
				Equities **and** Bonds (N=15)				
LZ, %	1.27	0.58	0.29	0.02	1.91	0.86	-0.08	0.01
(t-stat)	(2.94)	(1.94)	(1.32)	(1.18)	(1.73)	(1.45)	(-0.17)	(0.49)
				Equities Only (N=9)				
LZ, %	0.55	0.45	0.34	0.00	1.55	1.23	0.70	0.00
(t-stat)	(3.58)	(4.01)	(3.52)	(0.71)	(2.47)	(3.31)	(3.32)	(0.83)
				Bonds Only (N=8)				
LZ, %	1.14	0.50	0.16	-0.02	1.25	0.56	0.04	0.06
(t-stat)	(7.05)	(5.53)	(1.91)	(-0.83)	(4.65)	(2.72)	(0.19)	(2.12)

Figure VII: Long Horizon LZ-Statistic: Lagged Returns

The figure shows LZ statistics computed over k-weeks using the one period lagged return as instrument:

$$LZ_k = \frac{1}{T}\sum_{t=1}^{T}\sum_{i=1}^{N} X^{W}_{i;t:t+k} \times ret_{i;t:t-1}.$$

Shaded areas indicate GMM-based 90% confidence bands. The corresponding numbers for k=1 and k=12 are provided in Table X and Table A.8. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

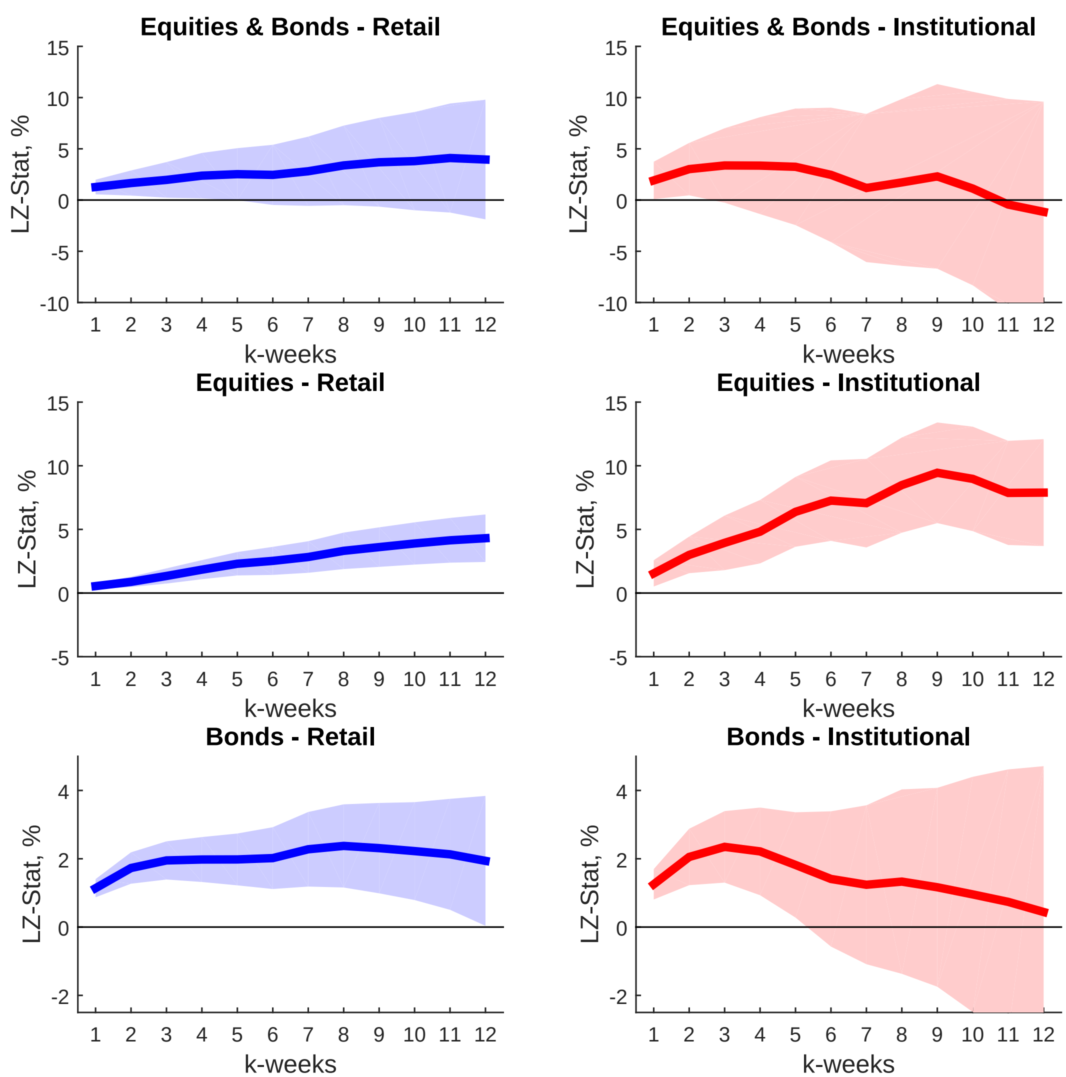
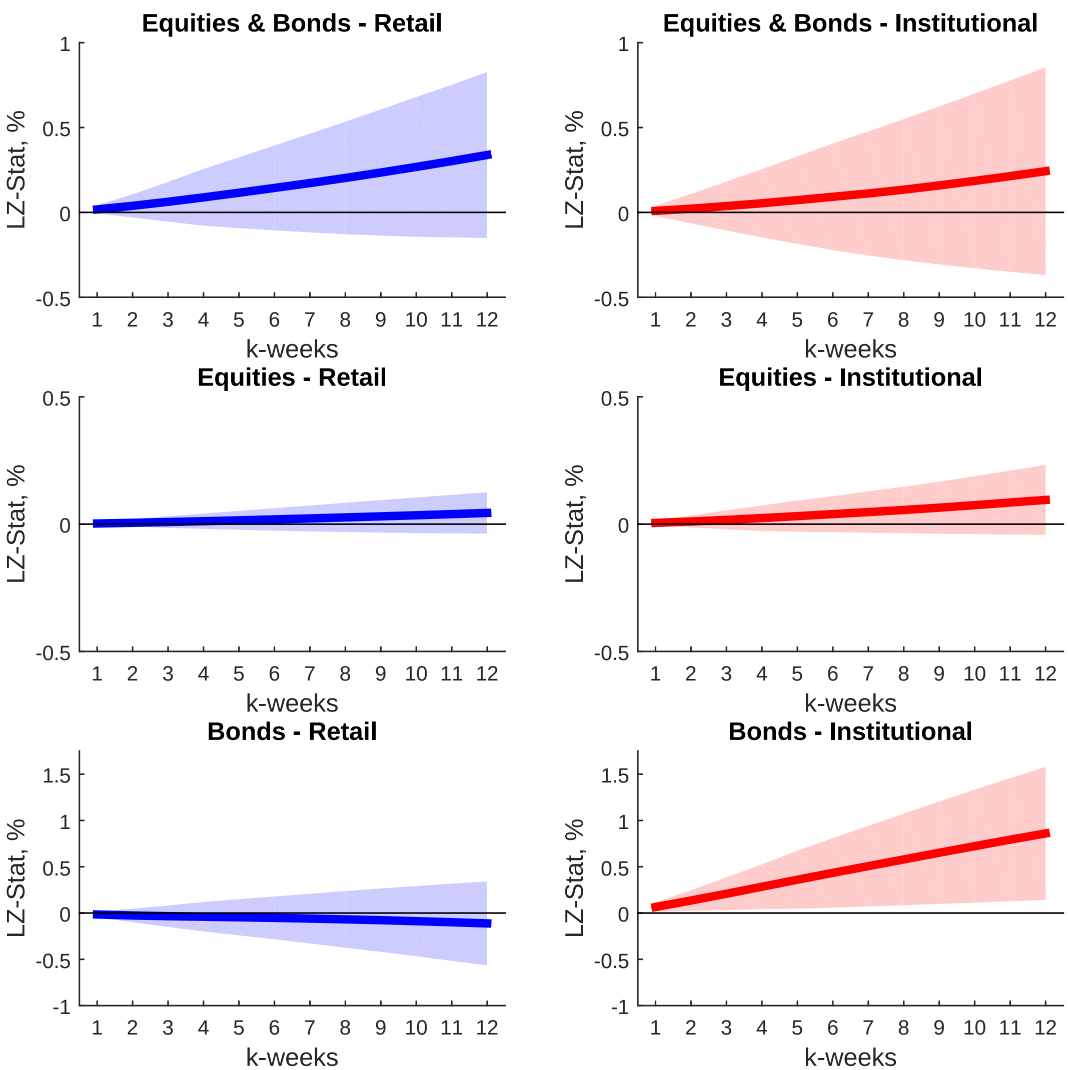


Figure VIII: Long Horizon LZ-Statistic: Lagged Yields

The figure shows LZ statistics computed over k-weeks using the one period lagged yield as instrument:

$$LZ_k = \frac{1}{T}\sum_{t=1}^{T}\sum_{i=1}^{N} X^W_{i;t:t+k} \times y_{i;t:t-1}.$$

Shaded areas indicate GMM-based 90% confidence bands. The corresponding numbers for k=1 and k=12 are provided in Table X and Table A.8. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.



Supplementary Material

– not for publication –

Data & Factor Structure

Figure A.1: Database Coverage - Assets Under Management by Asset Class and Investor Type

The figure provides total assets under management (billions dollar) covered as of the end of 2014 - the end of our sample period. The data come from the EPFR mutual funds database.

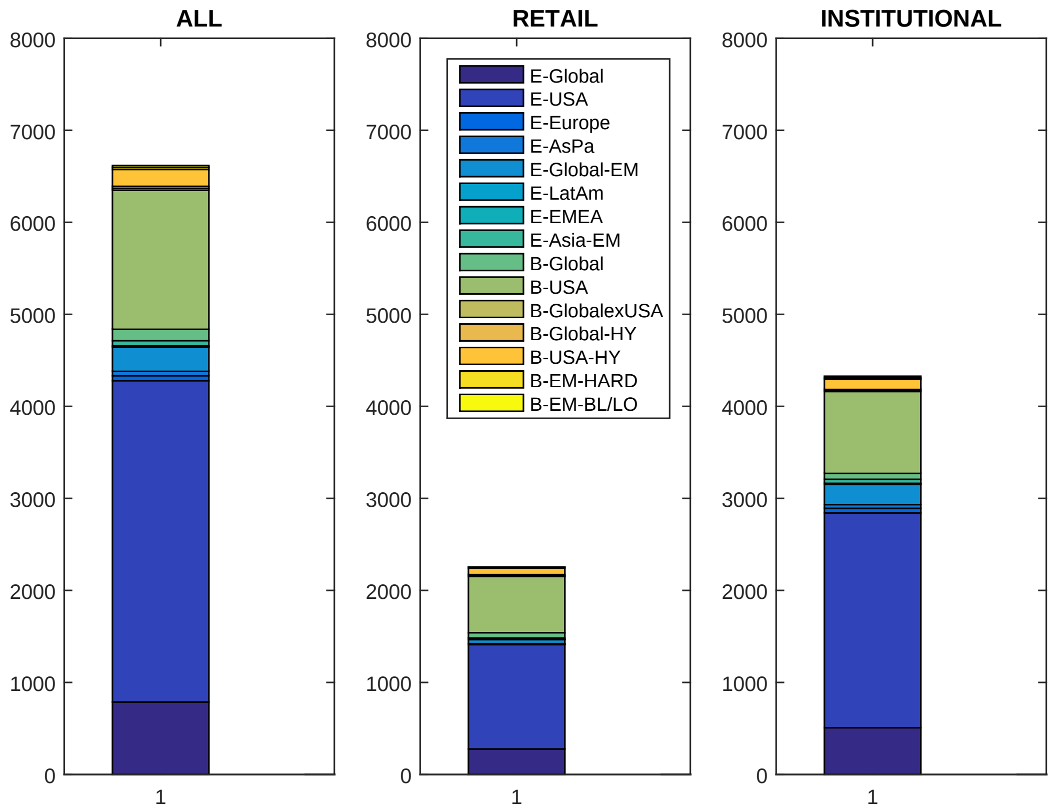


Table A.1: Global Portfolio Reallocations and Performance - Retail and Institutional Investors

Supplementary results Table I: characteristics for retail and institutional investors. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Quantities - Portfolio Reallocations							Prices			
	wealth weighted, X_t^W (weekly basis points)					asset w., X_t^A (weekly bp)		return, ret_t (% p.a.)		yield, y_t (% p.a.)	
	mu	std	ac1	$\rho_{r_{t-1}}$	$\rho_{y_{t-1}}$	mu	std	mu	std	mu	std
	Retail Investors										
Equities											
Global	0.01	2.15	0.64	0.12	-0.61	-0.14	15.53	5.75	19.05	2.60	0.48
US	-2.45	4.75	0.58	-0.07	-0.04	-5.24	9.88	8.11	18.08	2.01	0.29
Europe	0.00	0.14	0.65	0.16	-0.27	0.37	59.52	7.46	19.21	3.36	0.73
AsiaPac.	-0.05	0.61	0.12	-0.01	-0.02	-11.88	103.07	3.70	18.56	2.54	0.51
EM	0.16	0.75	0.45	0.22	-0.19	8.42	45.87	8.78	24.09	2.69	0.61
LatAm.	-0.02	0.20	0.09	0.20	-0.05	-14.94	159.52	10.99	31.14	3.19	0.69
EMEA	-0.01	0.09	0.60	0.29	-0.23	-17.56	79.61	4.26	29.45	2.60	1.07
EM-Asia	-0.02	0.52	0.40	0.33	-0.06	-1.29	53.89	10.73	22.45	2.53	0.52
Bonds											
Global	0.45	0.91	0.39	0.12	0.02	24.65	38.37	4.61	4.94	2.98	1.05
US	1.77	5.27	0.66	0.17	-0.25	5.75	19.56	2.59	3.99	3.43	1.42
DM	-0.02	0.38	0.70	0.18	0.36	-1.15	66.36	3.99	7.13	2.72	0.63
Global-HY	0.09	0.41	0.24	0.26	-0.01	23.42	89.77	4.48	8.41	9.05	3.34
US-HY	0.00	1.74	0.35	0.32	0.13	0.02	53.58	4.78	7.69	7.77	1.91
EM-Hard	0.07	0.20	0.39	0.14	-0.13	29.20	70.45	4.99	8.66	6.42	1.12
EM-Blend	0.01	0.12	0.18	-0.04	-0.14	4.67	60.64	4.47	10.67	6.36	1.09
	Institutional Investors										
Equities											
Global	-0.28	7.50	-0.05	0.04	-0.11	-2.12	45.10	4.89	19.82	2.60	0.48
US	-1.58	20.08	0.03	-0.11	-0.01	-3.15	39.34	8.55	18.42	2.01	0.29
Europe	0.20	1.20	0.54	0.19	-0.19	28.70	156.31	6.13	23.58	3.36	0.73
AsiaPac.	-0.01	1.18	0.36	0.20	-0.07	-0.75	130.51	4.47	19.28	2.54	0.51
EM	0.22	4.52	0.20	0.23	0.09	3.22	78.06	7.53	23.22	2.69	0.61
LatAm.	-0.00	0.84	0.24	0.26	-0.02	2.15	182.36	10.36	32.10	3.19	0.69
EMEA	0.04	0.26	0.41	0.17	-0.15	49.58	297.61	2.93	32.67	2.60	1.07
EM-Asia	0.09	1.55	0.40	0.28	0.07	11.40	134.71	9.87	24.79	2.53	0.52
Bonds											
Global	0.30	1.13	0.31	0.05	0.01	32.20	115.72	3.37	3.83	2.98	1.05
US	0.48	11.00	0.27	0.12	-0.21	1.55	53.99	3.43	3.25	3.43	1.42
DM	0.04	0.36	0.28	0.04	0.11	14.48	96.71	3.47	6.19	2.72	0.63
Global-HY	0.02	0.21	0.28	0.23	0.18	24.55	174.33	5.60	7.24	9.05	3.34
US-HY	0.36	1.82	0.45	0.30	0.19	20.48	80.77	4.98	7.55	7.77	1.91
EM-Hard	0.01	0.37	0.28	0.20	-0.12	1.35	115.41	6.75	8.78	6.42	1.12
EM-Blend	0.11	0.41	0.45	0.07	-0.26	53.13	237.95	4.49	7.97	6.36	1.09

Table A.2: Principal Components of Portfolio Reallocations - Retail and Institutional

Supplementary results Table II: principal components for samples restricted to retail or institutional investors. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail				Institutional			
	PC1	PC2	PC3	PC4	PC1	PC2	PC3	PC4
Equities								
Global	0.15	0.49	-0.58	-0.46	-0.27	0.38	0.72	-0.36
US	0.64	-0.67	-0.06	-0.14	0.87	-0.23	0.15	-0.25
Europe	0.00	0.02	-0.01	-0.03	-0.01	0.06	0.05	0.07
AsiaPac.	-0.00	0.04	-0.00	0.11	-0.01	0.04	0.01	0.15
EM	0.00	0.15	-0.00	0.30	-0.08	0.35	-0.66	-0.55
LatAm.	-0.00	0.02	-0.00	0.02	-0.01	0.03	-0.04	0.07
EMEA	0.00	0.01	-0.01	0.01	-0.00	0.01	-0.01	0.02
EM-Asia	0.01	0.07	-0.01	0.07	-0.02	-.09	-0.09	0.23
Bonds								
Global	-0.03	-0.06	0.02	0.65	-0.01	-0.00	-0.01	0.17
US	-0.75	-0.48	-0.18	-0.23	-0.41	-0.81	-0.01	-0.23
DM	-0.00	0.05	-0.04	0.08	-0.01	0.00	-0.00	0.02
Global-HY	-0.00	0.04	0.08	-0.01	-0.00	0.00	-0.01	0.03
US-HY	-0.01	0.20	0.79	-0.41	-0.02	0.08	-0.09	0.58
EM-Hard	-0.01	0.01	0.01	0.02	-0.00	0.01	-0.01	0.04
EM-Blend	-0.00	0.00	-0.00	0.02	-0.00	0.00	-0.01	0.00
% Var expl.	75.61	13.28	6.61	1.93	86.96	7.62	3.53	0.74

Table A.3: Characteristics of Rotation and Diversification Factors

This table provides summary statistics for the rotation and diversification reallocation shift factors. The rotation factor measures portfolio reallocations from US bonds to US equities (corresponding to the first principal component of global portfolio reallocations, see Table II). The diversification factor measures shifts from US assets to foreign assets (corresponding to the second principal component). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Quantities						Prices			
	reallocation (X_t^W) weekly bps			change of weight ($\triangle w_t$) weekly bps			return (ret_t) % p.w.		yield (y_t) % p.a.	
	mu	std	ac1	mu	std	ac1	mu	std	mu	std
Retail										
ROT	-4.21	9.44	0.64	-1.32	90.26	-0.09	5.52	18.51	-1.42	1.51
DIV	1.37	6.84	0.53	0.82	34.68	0.10	0.72	7.91	1.50	0.73
Institutional										
ROT	-2.07	29.76	0.10	0.41	85.01	-0.11	5.13	18.60	-1.42	1.51
DIV	2.20	25.55	0.02	0.42	62.38	0.09	-0.23	8.29	1.50	0.73

Figure A.2: Cumulative Reallocations in FOMC Week Time: Term Spread

The figure shows cumulated weekly abnormal portfolio reallocations (measured in basis points) in FOMC week time. Abnormal reallocations are estimated from dummy variable regressions of the respective wealth weighted reallocation factor on a constant and weeks prior, with, and after scheduled FOMC announcements and then additively accumulated. Shaded areas indicate 90% confidence intervals as of $t-1$. Green/red dotted lines provide results for when the component of 10 year treasury yields orthogonal to two year treasuries increases/decreases the two days around the FOMC announcement. Dummy regression details are reported in Table III/A.4. The sample period is from 01/2006 - 12/2014, covering 470 weekly observations, and 72 FOMC announcement weeks.

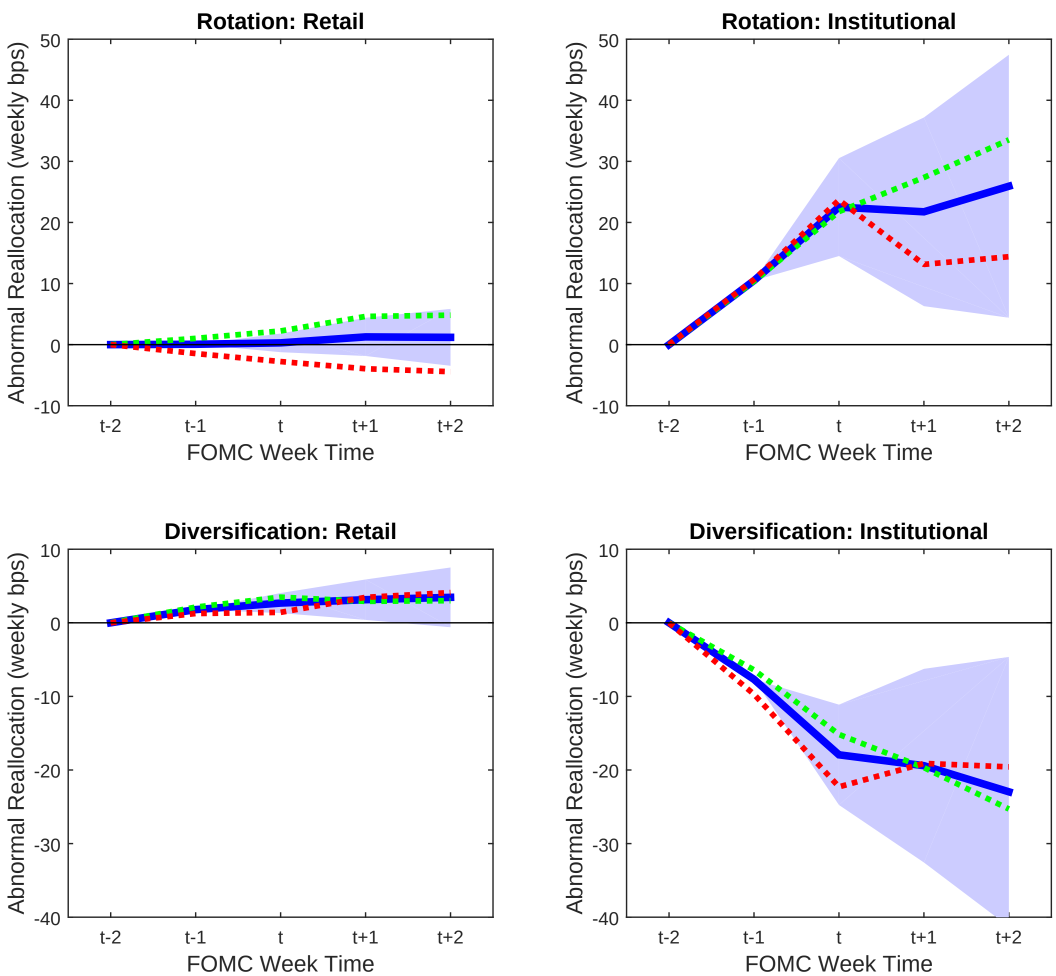


Table A.4: Institutional Reallocation Shifts by FOMC Type: Term Spread

This table provides weekly *abnormal* rotation and diversification reallocations in basis points in weeks before, with, and after an FOMC announcement by FOMC type. Results are based on the FOMC week dummy regression:

$$X_{i;t}^{W} \times 100 = a + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}^{y>0}(FOMC - Week) + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}^{y<0}(FOMC - Week) + e_t.$$

The FOMC week dummy captures 72 weeks with a scheduled FOMC announcement in the sample period from 01/2006 - 12/2014 (470 weekly observations) and is split into weeks in which the yield curve moves up or down around the FOMC announcement. The split is according to when the orthogonal component of ten year treasuries $\Delta y(10 \perp)_t$ to two year treasuries increases (44) or decreases (28) the *two days* around the FOMC announcement day. The two weeks before (or after) FOMC announcements are excluded from the event window when there are not at least two non-event weeks weeks between two FOMC cycles. From $t-2$ to $t+2$, there are 34, 72, 72, 71, and 67 event weeks and 154 non-event weeks. Newey-West t-stats are in parentheses (automatic lag length according to Andrews (1991)).

	Institutional Reallocations in FOMC Week Time			
	Rotation		Diversification	
	tightening	easing	tightening	easing
	$\Delta y(10 \perp)_t > 0$	$\Delta y(10 \perp)_t < 0$	$\Delta y(10 \perp)_t > 0$	$\Delta y(10 \perp)_t < 0$
$FOMC_{t-2}$	8.65	-3.02	-8.25	-0.69
	(1.69)	(-0.40)	(-2.02)	(-0.11)
$FOMC_{t-1}$	10.38	10.65	-6.40	-9.71
	(2.00)	(2.03)	(-1.33)	(-2.20)
$FOMC_{t}$	11.39	13.02	-8.77	-12.58
	(2.00)	(1.72)	(-1.87)	(-1.79)
$FOMC_{t+1}$	5.59	-10.54	-4.51	3.19
	(1.08)	(-1.60)	(-0.91)	(0.62)
$FOMC_{t+2}$	6.16	1.26	-5.62	-0.47
	(1.31)	(0.28)	(-1.32)	(-0.14)
constant	-6.25		6.03	
	(-2.61)		(3.55)	

Table A.5: Institutional Reallocation Shifts by FOMC Type: QE Announcements

This table provides weekly *abnormal* rotation and diversification reallocations in basis points in weeks before, with, and after an FOMC announcement by FOMC type. Results are based on the FOMC week dummy regression:

$$X_{i;t}^{W} \times 100 = a + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}^{non-QE}(FOMC - Week) + \sum_{k} b_i^k \times \mathbf{1}_{t-2+k}^{QE}(FOMC - Week) + e_t.$$

The FOMC week dummy captures 72 weeks with a scheduled FOMC announcement in the sample period from 01/2006 - 12/2014 (470 weekly observations) and is split into weeks with and without quantitative easing (QE) announcements. The 11 QE announcement dates are reported in Table A.6. The two weeks before (or after) FOMC announcements are excluded from the event window when there are not at least two non-event weeks weeks between two FOMC cycles. According to this convention, from $t-2$ to $t+2$, there are 34, 72, 72, 71, and 67 event weeks and 154 non-event weeks. Newey-West t-stats are in parentheses (automatic lag length according to Andrews (1991)).

	Institutional Reallocations in FOMC Week Time			
	Rotation		Diversification	
	other weeks	QE-weeks	other weeks	QE-weeks
$FOMC_{t-2}$	1.82	9.96	-3.44	-10.58
	(0.36)	(0.95)	(-0.78)	(-1.67)
$FOMC_{t-1}$	9.54	15.74	-7.13	-10.75
	(2.17)	(1.90)	(-1.78)	(-2.09)
$FOMC_{t}$	12.14	11.36	-11.00	-6.07
	(2.27)	(1.37)	(-2.42)	(-0.76)
$FOMC_{t+1}$	0.99	-10.34	-2.69	5.17
	(0.21)	(-0.93)	(-0.64)	(0.76)
$FOMC_{t+2}$	5.90	-5.59	-4.89	4.10
	(1.54)	(-0.64)	(-1.47)	(0.64)
constant	-6.25		6.03	
	(-2.61)		(3.55)	

Table A.6: Quantitative Easing Announcement Dates

This table provides the 11 FOMC announcements with important statements on quantitative easing. These events are considered as quantitative easing FOMC weeks in the dummy regression of Table A.5.

	Date		FOMC statement
1	16.12.2008	QE1	first mention of possible purchases of long-term Treasuries
2	28.01.2009	QE1	ready to expand agency debt and MBS purchases, purchase of long-term Treasuries
3	18.03.2009	QE1	additional purchases are announced
4	10.08.2010	QE2	announcement that LSAP-II starts
5	21.09.2010	QE2	maintain existing policy of reinvesting principal payments
6	03.11.2010	QE2	maintain existing policy of reinvesting principal payments; add. purchases
7	09.08.2011	QE2	maintain existing policy of reinvesting principal payments
8	21.09.2011	MEP	announcement of maturity extension programme
9	20.06.2012	MEP	decided to continue through the end of the year its program
10	13.09.2012	QE3	agreed to increase policy accommodation by purchasing additional purchases
11	12.12.2012	QE3	additional purchases are announced

Table A.7: Institutional Reallocation Shifts: Controlling for Macroeconomic News

This table provides weekly *abnormal* rotation and diversification reallocations in basis points in weeks before, with, and after an FOMC announcement. Results are based on the FOMC week dummy regression as shown in Table III, except that a vector $\boldsymbol{X}_t$ of control variables is added. The controls are the surprise component of 15 macroeconomic news announcements. Below (3), only macroeconomic news in the two weeks around FOMC weeks are taken into account (i.e., within the FOMC event window, t-2 to t+2). Below (4) and (5), all available macroeconomic news surprises are taken into account. Newey-West t-stats are in parentheses (automatic lag length according to Andrews (1991)). All controls have a standard deviation of 1%.

	Institutional Reallocations in FOMC Week Time									
	Rotation					Diversification				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$FOMC_{t-2}$	3.50	3.50	3.68	2.47		-4.91	-4.91	-3.85	-3.65	
	(0.72)	(0.76)	(0.74)	(0.51)		(-1.26)	(-1.26)	(-1.01)	(-0.94)	
$FOMC_{t-1}$	10.49	10.49	10.07	9.74		-7.68	-7.68	-7.90	-7.29	
	(2.55)	(2.59)	(2.41)	(2.35)		(-2.13)	(-2.13)	(-2.14)	(-1.98)	
$FOMC_{t}$	12.02	13.29	14.78	13.03		-10.25	-11.38	-11.75	-10.83	
	(2.48)	(2.78)	(3.10)	(2.70)		(-2.48)	(-2.70)	(-2.59)	(-2.44)	
$FOMC_{t+1}$	-0.77	-0.77	0.41	-0.48		-1.48	-1.48	-2.77	-1.76	
	(-0.17)	(-0.17)	(0.09)	(-0.11)		(-0.38)	(-0.38)	(-0.75)	(-0.47)	
$FOMC_{t+2}$	4.18	4.18	4.40	3.87		-3.55	-3.55	-4.27	-3.80	
	(1.14)	(1.12)	(1.20)	(1.05)		(-1.13)	(-1.13)	(-1.37)	(-1.22)	
nonfarm pay.			0.34	0.21	0.11			-1.08	-0.85	-0.80
			(0.22)	(0.17)	(0.08)			(-0.92)	(-0.89)	(-0.81)
gdp			-1.43	-1.15	-1.44			0.54	0.26	0.52
			(-1.32)	(-1.09)	(-1.29)			(0.52)	(0.29)	(0.66)
ism manuf.			-0.45	-0.78	-0.98			-0.04	0.14	0.22
			(-0.19)	(-0.40)	(-0.52)			(-0.04)	(0.13)	(0.20)
cons. conf.			2.22	0.61	1.22			-3.35	-1.37	-1.84
			(1.57)	(0.58)	(1.16)			(-2.73)	(-1.47)	(-2.10)
michigan sent.			0.59	2.00	2.13			-2.31	-2.86	-2.94
			(0.39)	(1.75)	(1.90)			(-1.43)	(-2.51)	(-2.67)
new homes			0.56	-0.38	-0.55			0.31	0.33	0.49
			(0.33)	(-0.32)	(-0.49)			(0.22)	(0.32)	(0.51)
unempl. rate			1.12	0.43	0.50			-2.30	-1.20	-1.33
			(0.88)	(0.38)	(0.42)			(-2.04)	(-1.26)	(-1.36)
housing starts			1.13	0.12	-0.20			0.21	0.03	0.29
			(0.44)	(0.07)	(-0.12)			(0.08)	(0.02)	(0.23)
industr. prod.			-3.11	-0.14	0.02			1.72	-0.15	-0.37
			(-1.52)	(-0.09)	(0.01)			(0.91)	(-0.11)	(-0.29)
factory orders			0.25	-0.12	0.20			-0.54	-0.70	-0.86
			(0.18)	(-0.10)	(0.17)			(-0.50)	(-0.79)	(-0.95)
personal spending			-0.27	0.12	0.15			-0.55	-0.36	-0.41
			(-0.18)	(0.08)	(0.10)			(-0.49)	(-0.36)	(-0.42)
leading index			-4.22	-0.94	-0.35			0.16	-1.00	-1.47
			(-2.22)	(-0.60)	(-0.24)			(0.10)	(-0.90)	(-1.41)
durables orders			1.43	-0.75	-0.88			1.43	1.36	1.47
			(0.59)	(-0.59)	(-0.72)			(0.90)	(1.67)	(1.83)
cpi core			0.80	-0.79	-1.78			-2.89	-1.31	-0.46
			(0.31)	(-0.50)	(-0.90)			(-1.13)	(-0.90)	(-0.25)
retail ex auto			-1.01	-1.15	-0.80			0.92	0.46	0.14
			(-0.37)	(-0.49)	(-0.35)			(0.34)	(0.24)	(0.07)
constant	-6.25	-6.25	-6.25	-5.93	-2.06	6.03	6.03	6.03	5.68	2.07
	(-2.61)	(-2.78)	(-2.78)	(-2.63)	(-1.47)	(3.55)	(3.55)	(3.55)	(3.25)	(1.77)

Return Chasing and Search for Yield

Table A.8: Return Chasing and Search for Yield: 12-Weeks Horizon

The table shows LZ statistics computed as $LZ = \frac{1}{T}\sum_{t=1}^{T}\sum_{i=1}^{N} X^W_{i;t:t+12} \times Z_{i;t:t-l}$, the time-series average of the sum of wealth weighted portfolio reallocations over the following 12 weeks ($X^W_{i;t:t+12}$) scaled by an asset specific lagged instrument ($Z_{i;t:t-l}$). The instruments are the assets own lagged return (1 week, 1-4 weeks, or 1-12 weeks) or the assets own lagged yield. The LZ statistic is annualized and reported in percentage points. A LZ statistic of 1 (for example) implies that investors shift towards an asset allocation with an "ex post" 1% p.a. higher return/yield. GMM t-stats in parentheses. The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail				Institutional			
	returns			yields	returns			yields
$Z_{t:t-l}$	ret_{t-1}	$ret_{t:t-4}$	$ret_{t:t-12}$	y_{t-1}	ret_{t-1}	$ret_{t:t-4}$	$ret_{t:t-12}$	y_{t-1}
				Equities **and** Bonds				
LZ, %	3.95	2.88	2.71	0.34	-1.15	-2.78	-1.29	0.24
(t-stat)	(1.12)	(0.95)	(0.86)	(1.14)	(-0.18)	(-0.44)	(-0.36)	(0.65)
				Equities Only				
LZ, %	4.31	3.94	3.16	0.04	7.89	7.11	4.90	0.10
(t-stat)	(3.81)	(2.95)	(2.24)	(0.89)	(3.10)	(2.78)	(2.69)	(1.15)
				Bonds Only				
LZ, %	1.94	0.72	0.33	-0.11	0.44	-0.83	-0.76	0.86
(t-stat)	(1.68)	(0.58)	(0.26)	(-0.41)	(0.17)	(-0.29)	(-0.37)	(1.97)

Further Results

Table A.9: Rotation: Future Returns and Future Economic Conditions

The table reports results from predictive regressions of various k-periods compounded variables on lagged rotation shifts. The dependent variables are future rotation factor returns and future changes of the Aruoba-Diebold-Scotti Business Conditions Index (Aruoba et al 2009, updated 2014). Newey-West t-stats are in parentheses (2×(k-1) lags). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail			Institutional		
k	W1	W4	W12	W1	W4	W12
	Future Returns, $ret_{t:t+k} = a + b \times ROT_t + e_{t:t+k}$					
b	-0.17	-0.65	-1.42	-0.32	-0.83	-1.67
t	(-1.24)	(-2.15)	(-1.78)	(-1.97)	(-2.12)	(-2.08)
R^2	0.00	0.02	0.03	0.01	0.03	0.04
	Future Economy, $\triangle ads_{t:t+k} = a + b \times ROT_t + e_{t:t+k}$					
b	-0.10	-0.40	-0.75	-0.07	-0.37	-0.94
t	(-2.56)	(-1.68)	(-1.25)	(-1.21)	(-1.37)	(-2.07)
R^2	0.01	0.01	0.01	0.00	0.01	0.02

Table A.10: Diversification: Future Returns and Future Economic Conditions

The table reports results from predictive regressions of various k-periods compounded variables on lagged diversification shifts. The dependent variables are future diversification factor returns and future changes of the Aruoba-Diebold-Scotti Business Conditions Index (Aruoba et al 2009, updated 2014). Newey-West t-stats are in parentheses (2×(k-1) lags). The sample period is from 01/2006 - 12/2014 and spans 470 weekly observations.

	Retail			Institutional		
k	W1	W4	W12	W1	W4	W12
	Future Returns, $ret_{t:t+k} = a + b \times DIV_t + e_{t:t+k}$					
b	-0.00	0.00	0.09	0.06	0.19	0.32
t	(-0.00)	(0.01)	(0.15)	(1.05)	(1.21)	(0.86)
R^2	-0.00	-0.00	-0.00	0.00	0.00	0.00
	Future Economy, $\triangle ads_{i;t:t+k} = a + b \times DIV_t + e_{t:t+k}$					
b	0.02	0.03	-0.01	0.01	0.01	0.63
t	(0.36)	(0.10)	(-0.02)	(0.19)	(0.04)	(1.74)
R^2	-0.00	-0.00	-0.00	-0.00	-0.00	0.01