

# Defined Contribution Pension Plans: Mutual Fund Asset Allocation Changes

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Defined contribution (DC) retirement plan assets are not only a major factor in retirement assets, constituting 27.4 percent of the total retirement asset market in the third quarter of 2014, these assets are also an important source of mutual fund assets and flows.<sup>1</sup> While such assets are a source of potential growth for mutual funds, they are also a potential source of variability in assets and flows, representing both opportunities and uncertainties for mutual fund managers and shareholders. As pointed out by Sialm, Starks and Zhang (2014), the impact of DC plans on fund flows is important because these flows can affect capital market resource allocations and fund manager incentives as well as exert externalities on other fund investors. We

expect such effects to be particularly heightened during periods in which reallocations across mutual funds in different asset classes occur due to macroeconomic conditions.

These reallocations across asset classes are a result of the defining characteristic of DC plans – investment option choice. DC plan sponsors (through their control over the plan menu) and DC plan participants (through their individual choices) can change the allocation of DC assets across different asset classes, either through changing their existing balances or through changing their future contributions. This choice characteristic gives DC plans the ability to move their retirement savings across different mutual fund asset classes, thus, creating systematic differences in the flows into these funds.<sup>2</sup> It is thus important to understand these reallocations of flows to asset classes across time and how they are affected by macroeconomic conditions.

<sup>1</sup>Investment Company Institute U.S. Retirement Market statistics 3<sup>rd</sup> Quarter 2014 <http://www.ici.org/research/stats/retirement>.

<sup>2</sup> For further discussions and insights on plan menus and participant and sponsor behaviors, see for example, Benartzi and Thaler (2001), Madrian and Shea (2001), Agnew, Balduzzi, and Sunden (2003), Choi, Laibson, Madrian, and Metrick (2002), Huberman and Jiang (2006), Brown, Liang, and Weisbenner (2007), Sialm and Starks (2012), Tang, Mitchell, Mottola, and Utkus (2012), Christoffersen and Simutin (2014), Pool, Sialm, and Stefanescu (2014), and Sialm, Starks, and Zhang (2014).

To examine the reactions of DC plan sponsors and participants associated with macroeconomic conditions, we compare the sensitivity of flows of DC and non-DC investors into equity and fixed income funds with respect to economic growth, uncertainty, and consumer sentiment. Specifically, we analyze the differences between equity and fixed income mutual fund flows of DC shareholders versus those flows from non-DC shareholders around macroeconomic shocks.

### **I. Investor Flows into Mutual Funds**

We obtain our primary data from surveys of mutual fund management companies conducted each year from 1997 to 2012 by *Pensions & Investments*.<sup>3</sup> In these surveys the mutual fund management companies report the dollar amount that DC retirement accounts have invested in their mutual funds as of December 31<sup>st</sup> of the year prior to the survey date. The survey requests the DC plan assets for the funds with the largest DC assets in each of several broad investment categories (Domestic Equity Funds, Domestic Fixed Income Funds, International Equity Funds, Balanced Funds, Money Market Funds). These surveys cover the large majority of mutual funds as

discussed in more detail in Sialm, Starks and Zhang (2014). Non-DC assets are obtained by merging the DC asset data from *Pensions & Investments* with the overall Total Net Assets (TNA) from the CRSP Survivor-Bias Free Mutual Fund Database. We also gather data on general macroeconomic conditions: the dates of NBER business cycle expansions and contractions, the Chicago Fed National Activity Index, the University of Michigan Consumer Sentiment Index, and the CBOE VIX Index.

Figure 1 illustrates the dollar amounts of assets under management in equity, balanced and fixed income mutual funds, divided between defined contribution plans (DC assets) and other investors (Non-DC assets), for each year in our sample period.<sup>4</sup> The figure indicates that investment in equity mutual funds has been the dominant form of investment for DC investors in mutual funds.

Overall, our data indicates that there has been large growth in both DC and non-DC assets in mutual funds. Specifically, between 1997 and 2012, DC assets in the equity, balanced, and fixed income mutual funds have grown by over 500 percent and non-DC assets have grown by over 400 percent.

<sup>3</sup> Additional information about the *Pensions & Investments* survey can be obtained from the website at <http://www.pionline.com>.

<sup>4</sup>The equity funds include both domestic and international equity. The fixed income funds include both bond funds and money market funds.

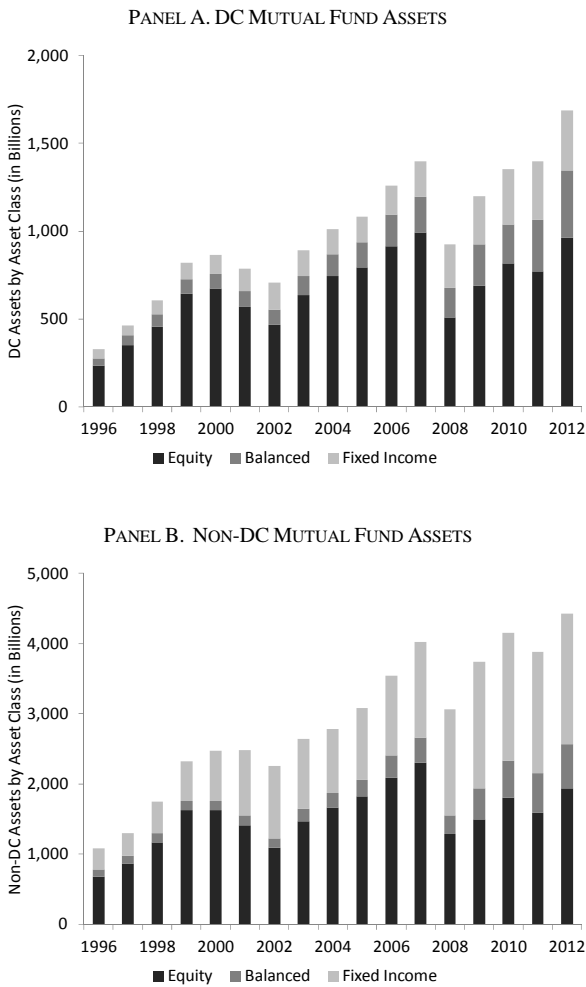


FIGURE 1. DC AND NON-DC MUTUAL FUND ASSETS BY ASSET CLASS

Figure 2 shows the annual percentage flows from DC and non-DC shareholders to equity and fixed income funds.<sup>5</sup> In general, the average annual growth rate of DC assets amounts to 2.4 percent for equity funds and 6.9 percent for bond funds. The average

<sup>5</sup>Percentage flows of DC and non-DC assets in different asset classes are computed by value-weighting the flows into individual mutual funds by the lagged DC and Non-DC asset sizes. Percentage flows of DC and non-DC assets in fund  $f$  at time  $t$  are computed based on the DC and non-DC assets ( $DCTNA$  and  $NDCTNA$ ) and based on the annual fund returns ( $R$ ) as:  $[DCTNA_{f,t} - DCTNA_{f,t-1}(1+R_{f,t})] / [DCTNA_{f,t-1}(1+R_{f,t})]$  and  $[NDCTNA_{f,t} - NDCTNA_{f,t-1}(1+R_{f,t})] / [NDCTNA_{f,t-1}(1+R_{f,t})]$ , respectively.

growth rate of non-DC assets is on average lower and amounts to 0.5 percent for equity funds and to 4.5 percent for bond funds.

Figure 2 indicates that the flows into the different types of mutual funds have been quite variable. Several periods have striking changes in fund flows. During 2000, DC flows into equity mutual funds are large at 9.7 percent, but the DC flows into fixed income mutual funds are a negative 0.9 percent. In contrast, after a downturn in financial markets the following year, DC flows into equity mutual funds turn negative (-0.3 percent), and DC flows into fixed income mutual funds become quite large at 15.0 percent. Similarly, during the Great Recession of 2008, DC flows to equity mutual funds experience the largest outflow over the entire period (-15.1 percent), while flows into the fixed income mutual funds are the greatest over the entire period at 20.4 percent.<sup>6</sup> In fact, these 2008 flows in percentage terms are the most extreme annual equity and fixed income fund flows and are statistically significantly different from the mean flows at a 5 percent confidence level. These results are consistent with survey evidence from Hurd and Rohwedder (2010) in which the respondents report changes in the

<sup>6</sup> Breaking out the fixed income funds into money market funds and bond funds shows a general flight to safety during 2008, with money market funds growing by 24.7% that year and the bond funds growing by 17.3% as compared to outflows of 13.7% in domestic equity funds and outflows of 19.1% in international equity funds.

asset allocations of their contributions during the financial crisis.<sup>7</sup>

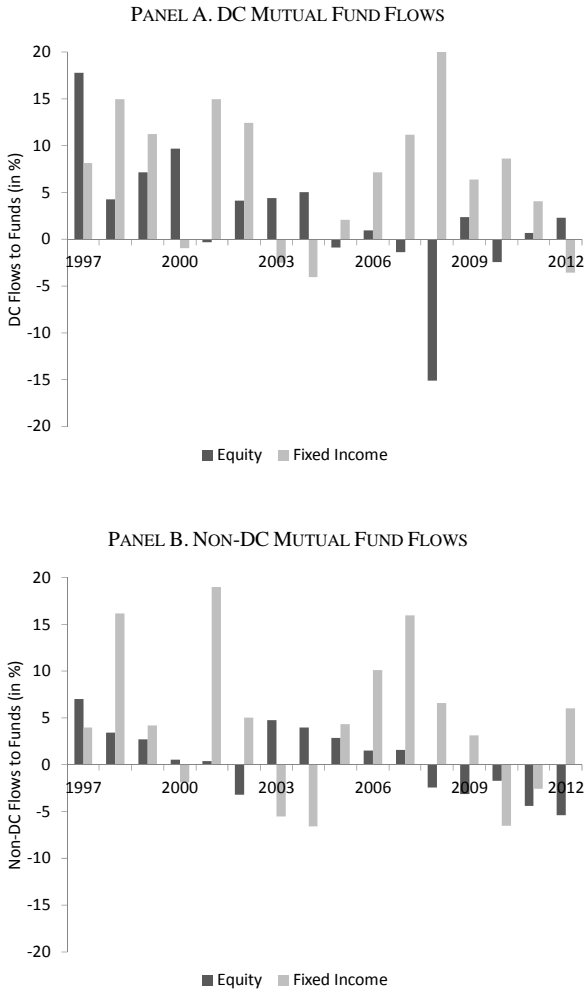


FIGURE 2. DC AND NON-DC MUTUAL FUND FLOWS INTO EQUITY AND BOND FUNDS

## II. Changes in Macroeconomic Conditions

To examine the relation of DC investor flows to macroeconomic conditions, we conduct univariate regressions of the DC and non-DC flows and their differences to independent variables that capture

macroeconomic conditions. Because of the limited time period in our sample, we consider each of the macroeconomic conditions separately.

We first consider NBER recessionary periods. The first column of Panels A and B of Table 1 indicates the investment behavior of DC and non-DC shareholders in equity and fixed income mutual funds during these periods. As can be seen from the regression coefficients, during such periods DC plans pull money out of equity funds. While non-DC shareholders also tend to pull money out of equity funds during recessionary periods, they do not do so to nearly the extent of the DC shareholders. The DC shareholders invest significantly more in fixed income funds during recessionary periods.

In Panel C of Table 1 we report the results for a differences-in-differences-in-differences analysis by examining the divergence in flows to equity versus fixed income funds for DC shareholders as compared to non-DC shareholders. While we find significant differences in flows between equity and fixed income funds for both the DC and non-DC shareholders during recessionary periods, these differences are even larger for DC shareholders, which supports the hypothesis that macroeconomic conditions

<sup>7</sup> For an analysis of Vanguard DC participant trading during the 2008-2009 crisis period, see Tang, Mitchell and Utkus (2012).

have significant effects on the allocation of DC plan assets.

TABLE 1—COEFFICIENTS FROM UNIVARIATE REGRESSIONS OF MUTUAL FUND FLOWS AGAINST MACROECONOMIC VARIABLES

	NBER	CFNAI	VIX	UMCSI
Recession				
<b>Panel A: Equity Funds</b>				
DC Flows	-0.138*** (0.035)	0.062*** (0.019)	-0.180 (0.296)	0.338*** (0.090)
Non-DC Flows	-0.035* (0.019)	0.025*** (0.008)	-0.207* (0.103)	0.178*** (0.045)
Difference	-0.103*** (0.029)	0.036* (0.018)	0.027 (0.273)	0.160 (0.103)
<b>Panel B: Fixed Income Funds</b>				
DC Flows	0.133*** (0.026)	-0.047** (0.020)	0.703*** (0.231)	-0.050 (0.138)
Non-DC Flows	0.080 (0.071)	-0.027 (0.024)	0.077 (0.294)	0.081 (0.101)
Difference	0.053 (0.066)	-0.019 (0.021)	0.625*** (0.177)	-0.131 (0.106)
<b>Panel C: Difference Between Equity and Fixed Income Funds</b>				
DC Flows	-0.271*** (0.038)	0.108*** (0.027)	-0.883** (0.393)	0.388* (0.197)
Non-DC Flows	-0.114* (0.064)	0.053** (0.025)	-0.284 (0.315)	0.097 (0.085)
Difference	-0.157* (0.085)	0.056 (0.033)	-0.599 (0.418)	0.291* (0.161)

*Notes:* The table reports the univariate regression coefficients and the corresponding Newey-West standard errors with a lag length of two for each regression. DC and Non-DC Flows to Equity and Fixed Income Funds are regressed on an indicator variable for NBER Recessions, on the Chicago Federal Reserve National Activity Index (CFNAI), the CBOE Implied Volatility Index (VIX), or on the University of Michigan Consumer Sentiment Index (UMSI). \* indicates significance at the 10 percent level; \*\* indicates significance at the 5 percent level; \*\*\* indicates significance at the 1 percent level.

We also consider a different measure of economic activity by employing the Chicago Fed National Activity Index (CFNAI), which is a continuous measure of

economic growth. The results are consistent with those using the NBER measure. When economic activity is strong, there exist higher flows to equity funds by both DC and non-DC fund shareholders, but the DC shareholders exhibit a larger change during these periods. Similarly, DC shareholders have significantly lower flows to fixed income funds during these periods. Finally, Panel C shows that both DC and non-DC shareholders have significant differences between their flows to equity versus fixed income funds during these periods.

As pointed out by Bloom (2014) uncertainty in the economy affects behavior such as the willingness of firms to invest and consumers to spend. Such uncertainty would also be expected to affect the risk-taking decisions of investors, both DC participants and other mutual fund investors, which would be revealed in their equity versus fixed income choices. For example, during recessionary periods DC participants and their plan sponsors may view bad news as particularly problematic for the long-term future of their retirement income. Consequently, they may react to such news by changing their asset allocations, as suggested by the DC plan flow behavior during the Great Recession. To explore the issue of investor uncertainty further, we examine the relation between DC

and non-DC flows using an uncertainty measure employed by Bloom (2014), the CBOE Volatility Index (VIX).<sup>8</sup> From the results in Panel C of Table 1, it appears that the level of VIX has little effect on the equity flow decisions of DC investors. However, a strong positive relation exists between flows into fixed income funds by DC investors and economic uncertainty, suggesting a flight to safety effect. This effect is not apparent in the flow decisions of non-DC mutual fund investors.

We also examine the relation between consumer sentiment and flows from DC and non-DC shareholders using the University of Michigan Consumer Sentiment Index. This index is based on a survey of households regarding their perspectives on economic conditions, both current and future. The results are reported in the last column of Table 1. We find that flows to equity funds from DC and non-DC shareholders are sensitive to consumer sentiment. Panel C indicates that DC shareholders are more sensitive to consumer sentiment than non-DC shareholders in terms of asset reallocation decisions.

Overall, we find a strong relation between macroeconomic conditions and the

investment behavior of DC investors relative to non-DC investors in mutual funds. In general, in terms of asset reallocations across equity and fixed income funds, DC investors react more strongly than do other mutual fund investors. This time-series evidence is consistent with the cross-sectional evidence of Sialm, Starks, and Zhang (2014), who document that DC investors react more sensitively to individual fund performance than non-DC investors.

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<sup>8</sup> Ederington and Golubeva (2011) and Ben-Rephael, Kandel and Wohl (2012) also investigate the impact of VIX on fund flows. However, they do not compare DC and non-DC flows.

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