Characteristics of Fixed Income Holdings of U.S. and Canadian Institutions in Low Interest Rate Periods

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MACROECONOMIC RISK

The Global Risk Institute funded this research along with the preparation of this paper.

The persistence of prolonged periods of low interest rates in developed economies such as Canada, the UK and the US has generated a lot of interest in its impact on asset allocation decisions of institutional investors. The issue has experienced intense coverage in business publications and popular press. In a series of studies, we examine this issue empirically. In the first paper, we examined the asset allocation between equity and fixed income of pension funds and insurance companies based in US, UK and Canada[1]. Our results show that in the three countries studied, institutions do not alter their asset allocations in a dramatic manner. There is weak evidence showing that there is a shift towards more equity and less fixed income securities in protracted low interest rate periods. In the second paper, we investigate the impact of changes in the interest rate environment on the holdings of insurance companies in the United States[2]. Overall, our empirical results suggest that US based insurance companies do indeed alter their portfolio holdings of publicly traded equity during protracted periods of low interest rates. Being sensitive to the drop in yields of their fixed income holdings, they prefer higher income yielding assets. Further, from a risk management perspective they prefer higher diversification but increase the systematic risk of their portfolios in order to earn higher returns. In the current paper, we examine the shifts in fixed income allocations during low periods based on three fundamental bond characteristics – risk, maturity and liquidity.

We collect data on corporate bond holdings from Thomson Reuters Lipper eMAXX. This database provides us a comprehensive coverage of quarterly fixed-income holdings of North American insurance companies, mutual funds, and pension funds. The holdings information is collected from the regulatory disclosure to the National Association of Insurance Commissioners (NAIC) for insurance companies and to the Securities and Exchange Commission (SEC) for mutual funds, asset managers, and public pension funds. The eMAXX database also reports voluntary disclosures by the major private pension funds. Our study focuses on the portfolio holdings of insurance companies and pension funds. Although eMAXX database does not contain the entire universe of corporate bond investors' holdings (i.e., large non-US institutions, hedge funds, and non-institutional investors), the database does cover 95% of all the bond issues by face value from the Mergent Fixed Income Securities Database (FISD), the commonly used database for U.S. corporate bonds.

We further collect bond characteristics information (FISD) and bond pricing from the Trade Reporting and Compliance Engine (TRACE). TRACE is the FINRA's over-the-counter corporate bond market real-time price dissemination service. We match bond holdings data with bond characteristics and bond prices to calculate the bond values as well as classifying bonds into short-term vs. long term bonds; investment grade vs. non-investment grade bonds; and liquid vs. illiquid bonds.

1 *Duong, H., Krishnamurti, C., Parwada, J., and Papagiorgiou, N., 2015, "Actual Asset Allocations of Institutional Investors During Recent Low Interest Periods: Evidence from UK, US and Canada" Working paper.*

2 *Krishnamurti, C., Papagiorgiou, N., and Radmehr, F., 2016, "Institutional Investor Preferences of Equity Holdings in Low Interest Rate Periods". Working paper.*

Short-term bonds are those with less than 5 years to maturity. Investment grade bonds are those with S&P credit rating of BBB- and above. We define a bond as liquid if it trades for at least half of all the trading days within a quarter. Since TRACE was introduced in July 2002, our sample starts with the third quarter of 2002 and ends with the final quarter of 2013.

For each quarter, we calculate the total value of all bonds held by insurance companies and pension funds. We then calculate the percentage of holdings in short-term vs. long term bonds; investment grade vs. non-investment grade bonds; and liquid vs. illiquid bonds. We perform this analysis for (1) all US-based insurance companies and pension funds; (2) US insurance companies and pension funds, separately; (3) Canadian insurance companies and pension funds and (4) Canadian insurance companies and pension funds, separately.

Table 1 shows the pattern in holdings of US-based pension funds and insurance companies during the study period (2002 to 2013). The mean (median) value of fixed income holdings of all pension funds and insurance companies during this period was $68.82 billion ($58.46 billion). Pension funds held on average (median) $5.47 billion ($5.55 billion) of fixed income securities while insurance companies held on average $63.35 Billion ($53.19 billion). The holdings in short-term to long-term securities was 36% to 64%. Insurance companies held a similar proportion of short-term to long-term securities. The pension funds held short-term to long-term securities in the proportion of 43 to 57. The break-up between investment grade and speculative grade was 94 to 6 for the combined sample of pension funds and insurance companies. Pension funds tend to hold investment grade to speculatives0 in the ratio of 87 to 13. Insurance companies hold investment to speculative in the ratio of 95 to 5. The holdings of liquid to illiquid bonds is 40 to 60 for the overall sample and somewhat similar for insurance companies. Pension funds deviate somewhat from this with a 54 to 46 split.

Table 1: Total values and holdings of fixed income securities by US-based pension funds and insurance

		ALL	Pension Funds	Insurance companies
Panel A: Total values and holdings in various categories (in Billions USD)				
total_value	*Mean*	*68.82*	*5.47*	*63.35*
	Median	*58.46*	*5.55*	*53.19*
total_value_inv	*Mean*	*65.31*	*4.78*	*60.53*
	Median	*54.23*	*4.71*	*50.11*
total_value_inv_no	*Mean*	*3.52*	*0.70*	*2.82*
	Median	*3.65*	*0.71*	*2.90*
total_value_st	*Mean*	*24.31*	*2.35*	*21.96*
	Median	*21.95*	*2.45*	*19.96*
total_value_lt	*Mean*	*44.51*	*3.12*	*41.39*
	Median	*36.66*	*3.05*	*33.79*
total_value_liq	*Mean*	*27.31*	*3.00*	*24.31*
	Median	*19.34*	*2.57*	*16.96*
total_value_illiq	*Mean*	*41.51*	*2.48*	*39.04*
	Median	*39.54*	*2.55*	*36.86*
Panel B: Percentage Holdings of pension funds and insurance companies				
holding_short_term	*Mean%*	*36.12*	*42.82*	*35.53*
	Median%	*36.74*	*42.37*	*35.99*
holding_long_term	*Mean%*	*63.88*	*57.18*	*64.47*
	Median%	*63.26*	*57.63*	*64.01*
holding_inv_grade	*Mean%*	*94.36*	*87.35*	*94.91*
	Median%	*95.38*	*86.68*	*95.86*
holding_spec_grade	*Mean%*	*5.64*	*12.65*	*5.09*
	Median%	*4.62*	*13.32*	*4.14*
holding_liq	*Mean%*	*40.50*	*54.12*	*39.31*
	Median%	*40.93*	*53.14*	*39.34*
holding_illiq	*Mean%*	*59.50*	*45.88*	*60.69*
	Median%	*59.07*	*46.86*	*60.66*

We conduct regressions using US-based financial institutions' holdings of short-term/investment grade / liquid bonds on interest rates, using contemporaneous, lag and lead 3-month T-Bill rates. We also use change in interest rates to explain holdings. We find that the contemporaneous 3-month T-Bill rate has a strong positive influence on short-term holdings. This finding implies that institutions shift to long-term bonds when interest rates are low, such as in the current period. They could be motivated by the higher yields offered by long-term securities in their bid to achieve targeted yields. We find qualitatively similar results when we use lagged 3-month T-Bill rates or leading T-Bill rates. The change in T-bill rate variable displays no significant effect on holdings. These results suggest that current, immediate past and expected future rates drive holdings in short-term securities but changes in interest rates don't drive these changes.

Interest rates (contemporaneous, lagged and leading) have a negative impact on holdings of investment grade bonds. This finding implies that institutions prefer to hold more investment grade bonds during low interest periods. Change in interest rates do not impact holdings in investment grade bonds. Interest rates have a negative relationship with institutional holdings of liquid bonds. During periods with high interest rates, institutions hold lower proportion of liquid bonds compared to low interest rates. Although reaching for yield is a documented strategy of institutional investors, they appear to be not shifting investments to illiquid securities to reach their goal during low interest rate periods.

When we repeat our analysis using the holdings of US-based pension funds, we find that pension funds shift their preference to investment grade bonds during low interest periods. Further, they prefer to increase their holdings of liquid bonds during low interest rate periods. However, there is no relationship between pension fund holdings in short-term securities and interest rates.

When we separately examine the holdings of US-based insurance companies, we find that insurance companies shift their preference to investment grade bonds during low interest periods. Also, they prefer to increase their holdings of liquid bonds during low interest rate periods. In line with our combined sample results, we find that insurance companies hold more long-term bonds in low interest periods. Reaching for yield appears to be the primary motive for this shift. Consistent with prior results, we find that interest rate changes do not appear to drive the shift in holdings of insurance companies. The summary of these results are contained in Table 2.

Table 2: Shifts in Fixed Income Asset Characteristics during Low Interest Periods – US Institutions

	Bond Characteristics		
Institution Type	*Horizon*	*Risk*	*Liquidity*
Insurance Companies	*Long-term*	*Low*	*Liquid*
Pension Funds	-	*Low*	*Liquid*

We conduct regressions of Canadian financial institutions' holdings of short-term/investment grade/ liquid bonds on interest rates. These are summarized in Table 3. We use contemporaneous, lag and lead 3-month T-Bill rates and change in interest rates to explain holdings. When we regress short-term holdings of pension funds and insurance companies on interest rates, we find that the contemporaneous 3-month T-Bill rate has a strong positive influence on short-term holdings. This finding implies that institutions shift to long-term bonds when interest rates are low, such as in the current period. They could be motivated by the higher yields offered by long-term securities in their bid to achieve targeted yields. We find qualitatively similar results when we use lagged 3-month T-Bill rates or leading T-Bill rates. The change in T-bill rate variable displays no significant effect on holdings. These results suggest that current, immediate past and expected future rates drive holdings in short-term securities but changes in interest rates don't drive these changes. These results are similar to that of US based financial institutions.

When we use holdings in investment grade bonds of pension funds and insurance companies as the dependent variable, we find that interest rates (contemporaneous, lagged and leading) have no significant impact on holdings of investment grade bonds. However, change in interest rates have a negative impact on holdings in investment grade bonds. This finding implies that institutions prefer to hold more investment grade bonds when interest rates reduce. When we regress holdings of liquid bonds on interest rates, we find that interest rates have a positive relationship with institutional holdings of liquid bonds. During periods with high interest rates, institutions hold higher proportion of liquid bonds compared to low interest rates. This result is consistent with the reaching for yield strategy of institutional investors documented in earlier work, but somewhat different from US institutions which seem to doing exactly the opposite. While US institutions exhibit flight to liquidity, Canadian institutions prefer higher returns achievable through shifting to illiquid securities.

We repeat our analysis using the holdings of Canada-based pension funds. First, we find that the contemporaneous / lagging / leading 3-month T-Bill rate has a strong positive influence on short-term holdings. This finding implies that institutions shift to long-term bonds when interest rates are low, motivated by the higher yields offered by long-term securities in their bid to achieve targeted yields. This result is similar to the one obtained for the combined Canadian sample. Second, we find significant positive effects of current, lagged and leading T-Bill rates on investment grade holdings. This finding implies that Canadian pension funds shift to non-investment grade bonds during low interest periods. This is consistent with a reaching for yield strategy. Finally, they exhibit no change in preference regarding their holdings of liquid bonds during low interest rate periods. This is in sharp contrast to US-based pension funds which shift to more liquid bonds during periods of low interest rates.

Table 3: Shifts in Fixed Income Asset Characteristics during Low Interest Periods of Canadian Institutions

	Bond Characteristics		
Institution Type	*Horizon*	*Risk*	*Liquidity*
Insurance Companies	*Long-term*	*Low*	*Illiquid*
Pension Funds	*Long-term*	*High*	-

When we separately examine the holdings of Canada-based insurance companies, like the US companies, we find that insurance companies shift their preference to investment grade bonds during low interest periods. Like US-based insurance companies, we find that insurance companies hold more long-term bonds in low interest periods. Reaching for yield appears to be the primary motive for this shift. In contrast to US-based insurance companies, they prefer to increase their holdings of illiquid bonds during low interest rate periods. Here too, we find that interest rate changes do not appear to drive the shift in holdings of insurance companies. Overall, Canadian insurance companies exhibit preferences towards long-term, investment grade, and illiquid bonds.

Summarizing the key results, we find that both US and Canadian institutions reach for yield during low interest rate periods, but in different ways. While US institutions, increase their holdings of long-term bonds, they tend not to prefer speculative grade bonds or illiquid bonds during low interest rate periods. Canadian institutions, prefer long-term bonds, investment grade bonds and illiquid bonds during low interest rate periods. The main difference is that Canadian institutions shift towards illiquid bonds, apparently to increase their yields but US institutions do exactly the opposite. These results suggest that US institutions face more redemption risk than Canadian institutions.