What drives short duration premium

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ABSTRACT

Like bond duration, equity duration by definition is the weighted cash flow maturity and measures the sensitivity of the price to the change of interest rate. Using a present value decomposition approach, I calculate the contribution of cash flow news and discount rate news to the unexpected returns for portfolios formed based on equity duration. Surprisingly, the cash flow news is the main driver across portfolios that are composed of stocks with long duration or short duration. Stocks characterized by a shorter duration earns return premium over stocks with a longer duration. This short duration premium is robust, and subsumes value premium even when intangible capital is considered. Portfolio analyses indicate that the premium is concentrated within small stocks and stocks that are possibly short-sell constrained.

Keywords: Equity duration, Anomalies, Value premium, Short-sell constraints, Present value decomposition.

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1 Introduction

2 Literature review

3 Data and methodology

4 Variance decomposition

In this section, I leverage Campbell and Shiller variance decomposition to check if the contribution of discount rate news to unexpected returns is higher within stocks with larger duration, and if the contribution of cash flow news is higher within stocks with lower duration.

Table 2 presents the results using returns contemporary with duration while table 3 displays the results using next period's returns.

Table 4 records the market-level decomposition results using different sample periods.

We can conclude two arguments. First, there is no trend of increasing (decreasing) contribution of discount rate (cash flow) news to unexpected returns, which is quite surprising, as we expect stocks with long duration to be sensitive to discount rate changes. Second, in most cases, the cash flow news is the main driver of returns across different portfolios, though discount rate news remains most important at the aggregate market level.

5 Superiority over value strategy

5.1 The duration premium

The returns of the portfolios sorted by duration are shown in Table 5. The short-long duration premium, though its magnitude is smaller in the later sample period, is significantly different from zero using different sample periods. This phenomenon diverges from the recent underperformance of value stocks recorded in Chapter 1, suggesting that the duration premium is more robust than the value premium.

5.2 Duration and book-to-market ratio

We regress the excess return on duration, combining with different book-to-market ratios separately, while controlling for size and short-sell proxy. Table 6 exhibits the Fama-macBeth regression results. Only the traditional book-to-market is subsumed by duration as its associated coefficient is no longer significant.

However, as noted by Cochrane (2011) that running multiple panel-data forecasting regressions is full of pitfalls of course, I follow the approach in Andrei (2021) to report the panel regressions of portfolio returns on portfolio deciles in Table 7. Regardless of the value weighting method of portfolio returns, the forecasting ability of different intangible adjusted book-to-market ratio deciles is all subsumed by duration deciles.

5.3 Spanning test

To control for the possible size effects entangled, we form HML factors using equity duration, different versions of book-to-market ratios. Then the spanning test is conducted. The columns in table 8 indicate the dependent variables, and each column represents a regression of dependent HML factor on Fama-French three factors except that we replace FF HML factor with corresponding factors shown in the first column.

It is easy to see from the table that when we use the HML factor constructed by duration (EquityDurationhml) as the independent variable, the R^2 is higher than when we use HML factors constructed by the intangible adjusted book-to-market ratio as explanatory variables. The intercepts are all significant, meaning that HML factors can expand the mean-variance frontier formed by the other three factors.

6 Duration and short-sell constraints

6.1 Proxy for short-sell constraints

The short interest is a proxy for short-sell demand. But a higher short interest ratio defined as short interest over shares outstanding does not necessarily implies a more constrained situation. The stocks is short-sell constrained only if the relative higher demand to supply (proxied by institutional holdings) is higher that the excess demand is likely. Table 9 presents the univariate portfolio sort when short interest ratio is larger (HighSIR) or smaller (LowSIR) than its cross-sectional mean in each period. Several patterns are observed. First, the long-short portfolio premium are all significant. Second, there is no much difference between equal weighted premium within high short interest ratio stocks and within low short interest ratio stocks. Third, the value-weighted return under high short interest ratio even changes its sign. Table 10, in contrast, presents the portfolio sort when the short interest rate over the institutional ownership ratio is higher than its cross-sectional mean in each period (HighSIIO) and lower (LowSIIO). We see that the absolute magnitude of the weighted premium is larger under HighSIIO than its correspondence under LowSIIO, which indicates that the duration premium is larger when stocks are more short-sell constrained.

6.2 Independent portfolio sorts

The double independent portfolio sort using duration and SIIO is shown in Table 11. The duration premium are not significant under each SIIO portfolio when value-weighted approach is applied when forming the portfolio returns. In contrast, the absolute magnitude of the equal weighted duration premium increases when portfolios are more short-sell constrained (SIIO port increases), and the duration premium is significant only when SIIO is large.

The construction of Table 12 is the same as that of Table 11, except that we use the residual institutional ownership ratio (RIOR) in place of SIIO. Remember that higher RIOR indicates less constrained stocks, while higher SIIO indicates more constrained stocks. Therefore, it delivers the same argument as table 11 does.

6.3 Size effects

Given that the value-weighted duration premium and equal-weighted duration premium in Table 11, 12 diverge notably, it is natural to do the independent sorts conditional on stock size. Table 13 reports 3*3 independent sort using duration and SIIO, conditional on large stocks (its size is in the highest third size portfolio) and small stocks (its size is in the lowest third size portfolio).

The duration premium are all not significant if the analysis is based on the sub-sample of small stocks. For the sub-sample composed of small stocks, we see that again the absolute magnitude of duration premium increases as stocks are more short-sell constrained, and that the premium becomes significant only under highest SIIO port, regardless of which weighting method is applied. Therefore, we can conclude that, the duration premium is mainly concentrated in small and short-sell constrained stocks.

7 Conclusion

Table 1

	mean	sd	min	p25	p50	p75	max
mktcap	1481616	1899236	5932	145034	526355	2434220	10257225
logret	0.1217	0.1987	-0.5796	0.0113	0.1549	0.2396	0.7367
logdvc	0.1030	0.4070	-1.9135	-0.0983	0.1047	0.3109	1.6965
logdiv	0.1123	0.4041	-1.4095	-0.0830	0.1045	0.3128	1.6619
logdp	-3.6819	0.5486	-5.4748	-4.0201	-3.6837	-3.2364	-2.4458
logdp_t	-2.6684	0.4678	-4.0914	-2.9575	-2.6365	-2.3280	-1.6561
eqis	0.1663	0.0850	0.0491	0.1063	0.1424	0.2130	0.4300
ty	0.0190	0.0142	-0.0169	0.0059	0.0193	0.0306	0.0411
dfy	0.0104	0.0040	0.0039	0.0077	0.0093	0.0121	0.0213
valuesprd	1.5916	0.1520	1.3106	1.4922	1.5788	1.6795	2.0677

Table 2

	Full sample		$ssc = 1$		$ssc = 0$		$sir >= med(sir)$		$sir < med(sir)$		$ior >= med(ior)$		$ior < med(ior)$	
port	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF
1	0.21	0.66	0.43	0.39	0.43	0.47	0.39	0.64	0.52	0.57	0.55	0.56	0.36	0.60
2	0.24	0.53	2.76	4.89	0.47	0.54	0.52	0.62	0.48	0.48	0.36	0.65	0.50	0.60
3	0.37	0.47	0.54	0.61	0.51	0.65	0.31	0.45	0.45	0.67	0.60	0.47	0.53	0.66
4	0.28	0.55	0.23	0.88	0.64	0.39	0.56	0.47	0.57	0.44	0.47	0.35	0.45	0.53
5	0.28	0.43	0.28	0.49	0.44	0.54	0.32	0.46	0.64	0.36	0.29	0.64	0.37	0.55

Table 3

	Full sample		$ssc = 1$		$ssc = 0$		$sir >= med(sir)$		$sir < med(sir)$		$ior >= med(ior)$		$ior < med(ior)$	
port	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF	varDR	varCF
1	0.28	0.72	0.62	0.90	0.26	1.12	0.21	0.74	0.25	0.75	0.70	1.15	0.44	0.47
2	0.43	1.17	0.79	0.87	0.43	0.91	0.26	0.70	0.42	1.05	0.60	0.91	0.41	0.76
3	0.40	0.77	0.68	0.62	0.92	0.71	0.74	0.82	0.88	0.86	0.59	0.61	0.31	0.61
4	0.38	0.97	0.41	2.27	1.21	0.47	0.38	1.09	0.30	0.82	6.66	4.79	0.75	1.29
5	0.29	1.31	0.65	1.22	0.87	0.84	0.19	1.29	1.13	1.13	0.45	0.72	0.13	0.72

Table 4

	1965-2020		1965-1990		1991-2020	
	varDR	varCF	varDR	varCF	varDR	varCF
contr	1.41	0.41	3.12	1.00	0.69	0.49

Table 5

	1965-2020		1965-1998		1999-2020	
port	ret_{vw}	ret_{ew}	ret_{vw}	ret_{ew}	ret_{vw}	ret_{ew}
1	0.1629	0.2173	0.1821	0.2297	0.1332	0.1980
2	0.1423	0.1874	0.1654	0.1997	0.1065	0.1683
3	0.1341	0.1730	0.1557	0.1790	0.1008	0.1635
4	0.1136	0.1631	0.1303	0.1722	0.0876	0.1491
5	0.1254	0.1550	0.1400	0.1568	0.1028	0.1521
6	0.1202	0.1541	0.1304	0.1519	0.1044	0.1575
7	0.1220	0.1517	0.1389	0.1537	0.0959	0.1486
8	0.1254	0.1424	0.1321	0.1359	0.1150	0.1525
9	0.1084	0.1404	0.1238	0.1299	0.0846	0.1565
10	0.1196	0.1327	0.1168	0.1163	0.1239	0.1581
10-1	-0.0433	-0.0846	-0.0652	-0.1134	-0.0093	-0.0399
$10-1$ (t)	5.9428	7.9689	5.5201	6.9306	2.7957	4.2239

Table 6

	(1)	(2)	(3)	(4)
	ret	ret	ret	ret
EquityDuration	-0.00720***	-0.00576***	-0.00464**	-0.00490**
	(-3.72)	(-2.73)	(-2.27)	(-2.41)
bm_v1	0.0221			
	(0.28)			
bm_v2		0.0486***		
		(2.69)		
bm_v3			0.121***	
			(2.79)	
bm_v4				0.131***
				(2.79)
loglmktcap	-0.0697**	-0.0496	-0.0480	-0.0490
	(-1.98)	(-1.44)	(-1.42)	(-1.43)
siior	-0.000432**	-0.000448**	-0.000445**	-0.000447**
	(-2.58)	(-2.58)	(-2.56)	(-2.57)
_cons	1.365***	1.165***	1.095***	1.101***
	(3.45)	(3.10)	(2.97)	(2.96)
R^2	0.02	0.02	0.02	0.02

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ret_p	ret_p	ret_p	ret_p	ret_ew	ret_ew	ret_ew	ret_ew
EquityDuration_vw	-0.00318***	-0.00206***	-0.00230***	-0.00250***	-0.00362***	-0.00287***	-0.00286***	-0.00289***
	(-5.07)	(-3.36)	(-3.72)	(-4.04)	(-5.39)	(-4.46)	(-4.39)	(-4.43)
bm_v1_vw	0.00155**				0.00140*			
	(2.01)				(1.70)			
bm_v2_vw		0.000521				-0.000811		
		(0.54)				(-0.80)		
bm_v3_vw			0.000584				-0.000296	
			(0.76)				(-0.37)	
bm_v4_vw				0.000635				-0.000206
				(0.84)				(-0.26)

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8

	(1) EquityDurationhml	(2) EquityDurationhml	(3) EquityDurationhml	(4) EquityDurationhml	(5) bm_v1hml	(6) bm_v2hml	(7) bm_v3hml	(8) bm_v4hml
bm_v1hml	-0.531***							
	(-16.14)							
bm_v2hml		-0.412***						
		(-11.72)						
bm_v3hml			-0.361***					
			(-10.27)					
bm_v4hml				-0.358***				
				(-10.23)				
EquityDurationhml					-0.626***	-0.504***	-0.464***	-0.466***
					(-16.14)	(-11.72)	(-10.27)	(-10.23)
_cons	-1.351***	-1.202**	-1.451***	-1.423***	1.652***	3.497***	3.670***	3.797***
	(-2.90)	(-2.30)	(-2.72)	(-2.65)	(3.27)	(6.24)	(6.24)	(6.40)
R^2	0.47	0.37	0.34	0.34	0.40	0.53	0.42	0.43
adj. R^2	0.47	0.37	0.33	0.33	0.39	0.52	0.42	0.42

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9

	HighSIR		LowSIR	
port	ret_{vw}	ret_{ew}	ret_{vw}	ret_{ew}
1	0.1467	0.1710	0.1715	0.2147
2	0.1454	0.1581	0.1624	0.1878
3	0.1247	0.1447	0.1308	0.1703
4	0.1329	0.1475	0.1306	0.1701
5	0.1363	0.1491	0.1311	0.1663
6	0.1197	0.1307	0.1197	0.1609
7	0.1398	0.1519	0.1332	0.1573
8	0.1374	0.1299	0.1451	0.1527
9	0.1368	0.1188	0.1234	0.1575
10	0.1507	0.1061	0.1289	0.1490
$10-1$	0.0040	-0.0649	-0.0426	-0.0657
$10-1$ (t)	4.1880	4.2262	5.1546	7.1614

Table 10

	HighSIIO		LowSIIO	
port	$ret_v w$	$ret_e w$	$ret_v w$	$ret_e w$
1	0.1414	0.1423	0.1621	0.2112
2	0.0894	0.1258	0.1571	0.1793
3	0.1687	0.1527	0.1375	0.1735
4	0.1212	0.1375	0.1172	0.1624
5	0.1019	0.0852	0.1346	0.1658
6	0.1338	0.0995	0.1225	0.1583
7	0.1545	0.1471	0.1345	0.1556
8	0.0658	0.0500	0.1491	0.1501
9	0.0866	0.0473	0.1225	0.1478
10	0.0256	0.0426	0.1334	0.1572
$10-1$	-0.1066	-0.0906	-0.0288	-0.0540
$10-1$ (t)	2.9224	2.8204	5.0247	7.0665

Table 11

	Panel A: value-weighted return					
	Dur1	Dur2	Dur3	Dur4	Dur5	$\mathrm{Dur}5-1$
SIIO1	0.1832	0.1370	0.1297	0.1635	0.1593	-0.0238
	6.2763	5.4687	4.9380	6.4137	5.6881	-0.8638
SIIO2	0.1406	0.1253	0.1261	0.1334	0.1170	-0.0236
	4.6022	4.9197	5.0434	5.4173	4.5790	-0.9883
SIIO3	0.1814	0.1236	0.1401	0.1366	0.1331	-0.0483
	6.0609	4.6275	4.9532	5.1346	4.7703	-2.0644
SIIO4	0.1588	0.1375	0.1400	0.1157	0.1271	-0.0318
	5.0749	5.0514	4.9691	3.9381	4.3569	-1.3020
SIIO5	0.1310	0.1499	0.1283	0.1518	0.1392	0.0082
	3.7509	4.8889	4.2386	4.7439	3.6729	0.2820
$\mathrm{SIIO}5-1$	-0.0521	0.0130	-0.0014	-0.0117	-0.0201	
	-2.0228	0.5775	-0.0598	-0.4613	-0.6190	
	Panel B: equal-weighted return					
	Dur1	Dur2	Dur3	Dur4	Dur5	$\mathrm{Dur}5-1$
SIIO1	0.2034	0.1823	0.1783	0.1785	0.1848	-0.0186
	7.8940	7.6885	7.1863	6.8809	6.2203	-0.9935
SIIO2	0.1851	0.1602	0.1632	0.1598	0.1486	-0.0365
	6.5608	6.1776	6.0689	5.8597	5.3676	-2.2280
SIIO3	0.1921	0.1682	0.1616	0.1457	0.1648	-0.0273
	6.0906	6.0250	5.7928	5.2367	5.4677	-1.5160
SIIO4	0.2100	0.1615	0.1562	0.1402	0.1548	-0.0552
	6.3840	5.7069	5.3909	4.6380	4.7870	-2.7851
SIIO5	0.1662	0.1546	0.1364	0.1371	0.1010	-0.0652
	4.1816	4.7867	4.2572	4.1194	2.6723	-2.8485
$\mathrm{SIIO}5-1$	-0.0372	-0.0277	-0.0419	-0.0414	-0.0838	
	-1.4971	-1.4145	-2.2530	-2.1055	-3.6537	

Table 12

	Panel A: value-weighted return					
	Dur1	Dur2	Dur3	Dur4	Dur5	$\text{Dur}5-1$
RIOR1	0.1460	0.1009	0.1215	0.1409	0.1348	-0.0112
	4.9205	4.2090	4.9384	5.9057	5.1373	-0.4361
RIOR2	0.1508	0.1418	0.1467	0.1433	0.1361	-0.0146
	5.0315	5.6945	5.7702	5.4807	4.5311	-0.6161
RIOR3	0.1741	0.1564	0.1570	0.1537	0.1488	-0.0253
	5.6422	5.4166	5.6417	5.3406	4.3753	-1.1992
RIOR4	0.1651	0.1819	0.1714	0.1521	0.1632	-0.0019
	4.8899	6.0127	5.5566	4.7368	4.3178	-0.0876
RIOR5	0.2134	0.1800	0.1846	0.1772	0.1781	-0.0354
	5.8605	5.3431	5.3938	5.0520	4.3464	-1.4372
$\text{RIOR}5-1$	0.0674	0.0791	0.0631	0.0363	0.0433	
	2.2994	3.1297	2.5590	1.4050	1.4280	
	Panel B: equal-weighted return					
	Dur1	Dur2	Dur3	Dur4	Dur5	$\text{Dur}5-1$
RIOR1	0.1982	0.1647	0.1573	0.1473	0.1012	-0.0970
	7.3580	7.5978	7.1535	5.9784	2.9013	-4.8615
RIOR2	0.1822	0.1704	0.1585	0.1547	0.1507	-0.0314
	6.9988	7.7316	6.7436	5.8787	4.4668	-1.4869
RIOR3	0.1903	0.1733	0.1670	0.1606	0.1530	-0.0373
	6.9231	6.5643	6.2120	5.4979	4.3311	-1.8892
RIOR4	0.1972	0.1957	0.1791	0.1670	0.1745	-0.0227
	6.3895	6.7872	5.9237	5.2783	4.5654	-1.0441
RIOR5	0.2350	0.1930	0.2034	0.1989	0.2167	-0.0183
	6.9196	5.9140	5.8612	5.4597	5.1073	-0.8079
$\text{RIOR}5-1$	0.0368	0.0282	0.0461	0.0515	0.1155	
	1.8745	1.5166	2.2430	2.4698	4.8552	

Table 13

Panel A: value-weighted return								
	Small stocks				Large stocks			
	Dur1	Dur2	Dur3	Dur3 − 1	Dur1	Dur2	Dur3	Dur3 − 1
SIIO1	0.2023	0.1928	0.1727	-0.0296	0.1297	0.1462	0.1359	0.0061
	6.4873	6.2948	4.7690	-1.0868	5.1635	6.4519	5.8512	0.3959
SIIO2	0.1926	0.1506	0.1601	-0.0325	0.1475	0.1220	0.1221	-0.0253
	5.4567	4.6437	3.9388	-0.9583	5.7422	4.6603	4.7796	-1.5204
SIIO3	0.2072	0.1717	0.1124	-0.0948	0.1246	0.1225	0.1367	0.0121
	4.3481	4.2260	2.6143	-2.5435	4.6639	4.4573	4.3384	0.5939
SIIO3 − 1	0.0049	-0.0211	-0.0603		-0.0052	-0.0236	0.0008	
	0.1291	-0.6451	-1.8076		-0.3680	-1.5606	0.0436	

Panel B: equal-weighted return								
	Small stocks				Large stocks			
	Dur1	Dur2	Dur3	Dur3 − 1	Dur1	Dur2	Dur3	Dur3 − 1
SIIO1	0.2043	0.2080	0.2068	0.0024	0.1561	0.1618	0.1444	-0.0118
	6.3417	6.4043	5.3609	0.0765	6.4020	6.6223	5.9303	-1.0530
SIIO2	0.2160	0.1692	0.1824	-0.0337	0.1583	0.1421	0.1417	-0.0166
	5.7453	4.9092	4.2458	-0.9346	5.8670	5.4056	5.2604	-1.2581
SIIO3	0.2237	0.1826	0.1441	-0.0796	0.1455	0.1300	0.1268	-0.0187
	4.6976	4.3361	3.0248	-2.1358	5.2924	4.6816	4.0133	-1.1313
SIIO3 − 1	0.0194	-0.0254	-0.0627		-0.0106	-0.0318	-0.0176	
	0.5189	-0.7725	-1.7386		-0.9485	-3.0306	-1.2454	

References