INTERNET APPENDIX

Corporate Bond Portfolios and Macroeconomic Conditions

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In this internet appendix we include additional specifications of our corporate bond parametric portfolios (CBPP) that are not included in the paper. In Table 1 we present specifications where we allow transaction costs to vary over time and cross-sectionally, depending either on bond issue amount or on bond-specific illiquidity. Specifically, we sort the bonds by offering amount (illiquidity) each month and divide the sorted sample in terciles. Bonds with the smallest issue amount (highest illiquidity) are assigned the highest level of transaction costs, according to the values shown in Appendix A in the paper. In Table 2 we show parametric portfolios that are based on subsets of bond-specific characteristics. In Table 3 we show parametric portfolios for different levels of risk aversion coefficient γ during recessionary periods. In Table 4 we show parametric portfolios after independently excluding each of the top three issuers in our sample (General Motors, General Electric, and Bank of America).

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Table 1: **Optimal Corporate Bonds Portfolios - Cross-Sectionally Varying T-Costs**
This table displays estimates of the optimal portfolio policy for the following bond-specific characteristics: time to maturity (TTM), credit rating (RAT), coupon (COUP), illiquidity (ILLIQ), momentum (MOM), and size (SIZE). The parameters are estimated for a power utility with $\gamma = 7$. Our dataset includes 116,932 bond-month observations between September 2005 and September 2015. All columns refer to portfolios with transaction costs that vary both over time and cross-sectionally (see Appendix A in the paper). In the first (last) two columns, transaction costs vary cross-sectionally depending on the bond issue amount (illiquidity). The columns *VW* refer to the respective value-weighted bond portfolio benchmarks. The first set of rows presents the marginal impact of the characteristics and bootstrapped p-values. The second set of rows shows the average absolute portfolio weight, average minimum and maximum weights, average sum of negative weights, and average annual turnover of the portfolio. The last set of rows reports (annualized) performance measures, displaying certainty equivalent and bootstrapped p-value, certainty equivalent delta with respect to the corresponding benchmark in percent, mean, standard deviation, and skewness of portfolio returns, and the Sharpe ratio.

	Sort by SIZE		**Sort by ILLIQ**	
	VW	**CS-TS**	**VW**	**CS-TS**
TTM	-	-10.234	-	-10.763
	-	(0.001)	-	(0.001)
RAT	-	3.707	-	3.143
	-	(0.001)	-	(0.001)
COUP	-	11.148	-	11.921
	-	(0.001)	-	(0.001)
ILLIQ	-	-0.024	-	-0.042
	-	(0.930)	-	(0.885)
MOM	-	11.150	-	10.800
	-	(0.001)	-	(0.001)
SIZE	-	-5.490	-	-5.804
	-	(0.001)	-	(0.001)
$\lvert w_i \rvert \times 100$	0.106	0.174	0.106	0.175
$\max\ w_i \times 100$	1.090	1.316	1.090	1.301
$\min\ w_i \times 100$	0.002	-0.628	0.002	-0.638
$\sum w_i I(w_i < 0)$	(0.001)	-0.326	(0.001)	-0.330
$\sum \lvert (w_{i,t} - w_{i,t-1}) \rvert$	0.551	5.875	0.551	5.728
CE	0.032	0.046	0.031	0.046
	-	(0.001)	-	(0.001)
%ΔCE	-	0.438	-	0.484
$\bar{r}$	0.058	0.071	0.058	0.070
$\sigma(r)$	0.082	0.088	0.082	0.088
Skew	-0.081	3.163	-0.085	3.271
SR	0.559	0.659	0.554	0.654

Table 2: **Optimal Corporate Bonds Portfolios - Variables Selection**

This table displays estimates of the optimal portfolio policy for the following bond-specific characteristics: time to maturity (TTM), credit rating (RAT), coupon (COUP), illiquidity (ILLIQ), momentum (MOM), and size (SIZE). The parameters are estimated for a power utility with $\gamma = 7$ and taking into account fixed transaction cost of $75bp$. Our dataset includes 116,932 bond-month observations between September 2005 and September 2015. For each of the specifications, we present results with and without smoothing parameter α, which is estimated following the procedure described in Section 2.3 of the paper. The column *VW* refers to the value-weighted benchmark without characteristics. The first set of rows presents the marginal impact of the characteristics and bootstrapped p-values. The second set of rows shows the optimal α and bootstrapped p-values, whenever applicable. The third set of rows shows the average absolute portfolio weight, average minimum and maximum weights, average sum of negative weights, and average annual turnover of the portfolio. The last set of rows reports (annualized) performance measures, displaying certainty equivalent and bootstrapped p-value, certainty equivalent delta with respect to the corresponding benchmark in percent, mean, standard deviation, and skewness of portfolio returns, and the Sharpe ratio.

	VW	**CBPP (75bp)**					
		(1)	(2)	(3)	(4)	(5)	(6)
TTM	-	-3.423		-7.512		-10.074	
	-	(0.001)		(0.001)		(0.001)	
RAT	-	-		-2.019		2.953	
	-	-		(0.001)		(0.001)	
COUP	-	-		10.059		10.988	
	-	-		(0.001)		(0.001)	
ILLIQ	-	-		-		-0.115	
	-	-		-		(0.675)	
MOM	-	-		-		9.983	
	-	-		-		(0.001)	
SIZE	-	-		-		-5.461	
	-	-		-		(0.001)	
α	-	-	0.023	-	0.028	-	0.557
	-	-	(0.232)	-	(0.293)	-	(0.001)
$\lvert w_i \rvert \times 100$	0.106	0.116	0.116	0.137	0.137	0.166	0.158
max $w_i \times 100$	1.090	1.086	1.086	1.177	1.177	1.261	1.175
min $w_i \times 100$	0.002	-0.051	-0.051	-0.374	-0.374	-0.586	-0.511
$\sum w_i I(w_i < 0)$	0.000	-0.047	-0.047	-0.151	-0.150	-0.291	-0.251
$\sum \lvert (w_{i,t} - w_{i,t-1}) \rvert$	0.551	0.644	0.635	0.942	0.926	5.400	2.633
CE	0.031	0.032	0.032	0.034	0.034	0.044	0.057
	-	(0.393)	(0.391)	(0.179)	(0.177)	(0.001)	(0.001)
%ΔCE	-	0.032	0.032	0.097	0.097	0.419	0.839
$\bar{r}$	0.058	0.054	0.054	0.057	0.057	0.068	0.079
$\sigma(r)$	0.082	0.075	0.075	0.080	0.080	0.086	0.076
Skew	-0.068	0.044	0.027	1.800	1.752	3.304	2.003
SR	0.551	0.556	0.556	0.553	0.554	0.640	0.859

Table 3: **Optimal Corporate Bonds Portfolios - Time-Varying Risk Aversion**

This table displays estimates of the optimal portfolio policy with time varying risk aversion. The optimal portfolio policy is a function of macroeconomic regimes interacted with bond-specific characteristics (TTM, RAT, COUP, ILLIQ, MOM, SIZE). Regimes are defined based on the NBER recession period, see Section 3.3 in the paper for details. The regime-specific parameters are estimated for a power utility with $\gamma = 7$ ($\gamma = 7$, 10, 20, 50) in expansion (recessions) periods and fixed transaction costs of 75*bp*. Our dataset includes 116,932 bond-month observations between September 2005 and September 2015. The column VW refers to the value-weighted portfolio benchmark. The header of the remaining columns display the level of risk aversion applied in the no crisis and crisis period, respectively. The first two sets of rows present the marginal impact of the characteristics in both regimes and bootstrapped p-values. The third set of rows shows the average sum of negative weights and average annual turnover of the portfolio. The last set of rows reports (annualized) performance measures, displaying certainty equivalent and bootstrapped p-value in both regimes, certainty equivalent delta with respect to the corresponding benchmark in percent, mean, standard deviation, and skewness of portfolio returns, and the Sharpe ratio.

	γ= **(7/7)**	γ=**(7/10)**	γ=**(7/20)**	γ=**(7/50)**
$\text{TTM}_{no\ crisis}$	4.761	4.875	4.981	3.245
	(0.001)	(0.001)	(0.001)	(0.001)
$\text{RAT}_{no\ crisis}$	21.104	21.051	20.826	21.076
	(0.001)	(0.001)	(0.001)	(0.001)
$\text{COUP}_{no\ crisis}$	2.058	1.918	1.787	2.403
	(0.001)	(0.001)	(0.001)	(0.001)
$\text{ILLIQ}_{no\ crisis}$	0.108	0.107	0.107	0.123
	(0.221)	(0.195)	(0.226)	(0.229)
$\text{MOM}_{no\ crisis}$	3.352	3.289	3.261	3.226
	(0.001)	(0.001)	(0.001)	(0.001)
$\text{SIZE}_{no\ crisis}$	-11.523	-11.266	-11.202	-10.640
	(0.001)	(0.001)	(0.001)	(0.001)
TTM_{crisis}	-49.988	-43.938	-36.542	-32.365
	(0.001)	(0.001)	(0.001)	(0.001)
RAT_{crisis}	-11.227	-11.401	-11.600	-11.853
	(0.001)	(0.001)	(0.001)	(0.001)
COUP_{crisis}	43.446	38.602	33.156	33.726
	(0.001)	(0.001)	(0.001)	(0.001)
ILLIQ_{crisis}	-1.658	-1.240	-0.767	-0.724
	(0.646)	(0.757)	(0.825)	(0.847)
MOM_{crisis}	10.223	8.724	7.115	5.686
	(0.001)	(0.001)	(0.002)	(0.024)
SIZE_{crisis}	-11.571	-9.066	-6.360	-2.406
	(0.001)	(0.002)	(0.020)	(0.467)
$\sum w_i I(w_i < 0)$	-0.632	-0.600	-0.562	-0.545
$\sum \lvert(w_{i,t} - w_{i,t-1})\rvert$	4.160	3.946	3.719	3.577
$\text{CE}_{no\ crisis}$	0.079	0.079	0.079	0.079
	(0.001)	(0.001)	(0.001)	(0.001)
$\%\Delta\text{CE}_{no\ crisis}$	0.612	0.612	0.612	0.612
CE_{crisis}	0.111	0.093	0.063	0.019
	(0.001)	(0.001)	(0.001)	(0.001)
$\%\Delta\text{CE}_{crisis}$	2.820	1.744	1.165	1.019
$\bar{r}$	0.135	0.130	0.125	0.121
$\sigma(r)$	0.114	0.109	0.104	0.101
Skew	0.640	0.532	0.464	0.472
SR	1.062	1.072	1.067	1.057

Table 4: **Optimal Corporate Bonds Portfolios - Exclusion of Most Frequent Issuers**
This table displays estimates of the optimal portfolio policy conditioning on two macroeconomic regimes (no crisis and crisis) and bond-specific characteristics (TTM, RAT, COUP, ILLIQ, MOM, SIZE). The macroeconomic regimes are defined based on the NBER recession period, see Section 3.3 in the paper for details. They are introduced through an interaction of bond-specific characteristics, with a dummy variable that equals one in economic downturns. The regime-specific parameters are estimated for a power utility with risk aversion $\gamma = 7$. Our general dataset includes 116,932 bond-month observations between September 2005 and September 2015. In each of the specifications we exclude one of the top three issuers in our sample: General Motors (NO GM), General Electric (NO GE), and Bank of America (NO BofA). The columns display optimal parametric portfolio policies with fixed transaction costs of 50*bp* and 75*bp*. The first two sets of rows present the marginal impact of the characteristics in both regimes and bootstrapped p-values. The third set of rows shows the average sum of negative weights and average annual turnover of the portfolio. The last set of rows reports (annualized) performance measures, displaying certainty equivalent and bootstrapped p-value, certainty equivalent delta with respect to the corresponding benchmark in percent, mean, standard deviation, and skewness of portfolio returns, and the Sharpe ratio.

	NO GM		**NO GE**		**NO BoA**	
	50bp	**75bp**	**50bp**	**75bp**	**50bp**	**75bp**
$\text{TTM}_{no\ crisis}$	21.062	17.626	6.500	3.931	9.392	5.642
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\text{RAT}_{no\ crisis}$	51.469	46.494	35.919	29.649	24.290	21.781
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\text{COUP}_{no\ crisis}$	9.819	4.664	-4.599	-2.729	2.497	2.262
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\text{ILLIQ}_{no\ crisis}$	0.303	0.217	0.256	0.089	0.611	0.142
	(0.040)	(0.012)	(0.190)	(0.365)	(0.001)	(0.137)
$\text{MOM}_{no\ crisis}$	2.385	1.039	18.830	4.614	19.005	4.061
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\text{SIZE}_{no\ crisis}$	-43.743	-32.057	-12.036	-8.260	-19.872	-12.947
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TTM_{crisis}	-63.632	-49.185	-62.697	-56.598	-60.317	-54.908
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
RAT_{crisis}	-42.441	-26.466	-13.866	-12.657	-9.289	-9.302
	(0.001)	(0.001)	(0.008)	(0.001)	(0.080)	(0.002)
COUP_{crisis}	123.881	87.745	53.851	46.947	45.304	40.333
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ILLIQ_{crisis}	-0.717	-1.029	-1.580	-1.866	-2.052	-2.157
	(0.917)	(0.736)	(0.850)	(0.685)	(0.812)	(0.642)
MOM_{crisis}	-11.269	-2.809	14.403	11.670	16.834	13.344
	(0.019)	(0.241)	(0.007)	(0.001)	(0.004)	(0.001)
SIZE_{crisis}	28.285	14.980	-17.025	-14.564	-15.394	-13.320
	(0.001)	(0.001)	(0.007)	(0.001)	(0.008)	(0.001)
$\sum w_i I(w_i < 0)$	-2.083	-1.517	-1.125	-0.695	-1.104	-0.636
$\sum \lvert(w_{i,t} - w_{i,t-1})\rvert$	7.877	5.773	10.016	4.602	10.459	4.427
CE	0.099	0.082	0.105	0.088	0.105	0.089
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\%\Delta\text{CE}$	1.829	1.485	2.500	2.034	2.281	1.871
$\bar{r}$	0.173	0.135	0.185	0.146	0.184	0.144
$\sigma(r)$	0.138	0.117	0.145	0.122	0.141	0.118
Skew	0.732	0.719	0.857	0.805	0.620	0.549
SR	1.151	1.034	1.184	1.079	1.203	1.100