The integration between assets management tokens and other financial markets: evidence from the TVP-VAR model

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Abstract: Using the TVP-VAR model, this study investigates the return and volatility connectedness between asset management tokens and the largest asset management stock (BlackRock, Inc. —BLK) as well as other traditional assets (gold, global stocks, bonds, oil, and fiat currency). We find asset management tokens as a huge diversification opportunity in a portfolio comprising traditional assets. Net shock receivers are asset management tokens, while net shock transmitters are BLK and other assets. The dynamic analysis of system-wide spillover reveals periodic waves with varying degrees of connectedness over time (for example, it is highest during the Covid-19 period). Finally, we calculate the optimal weights and hedging ratios for asset management token pairs and other financial markets.

Keywords: asset management tokens, connectedness, cryptocurrency, diversification

JEL Codes: C58, G12, G15

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1 Introduction

For many years, safe-haven assets and portfolio diversification have been crucial components of investing strategy. Historically, traditional assets like gold have served as a hedge and safe haven during times of market turbulence. However, new investment possibilities and a variety of risk-hedging strategies have developed in recent years and the traditional assets' diversification profiles may have altered as a result (Cheema et al., 2022; Mensi et al., 2022). Three of these novel investment options are the focus of this paper. It examines three asset management tokens (SwissBorg—CHSB, Numeraire—NMR, and Uquid Coin—UQC) for the diversification benefits in a portfolio with traditional assets (i.e., gold, global stocks, bonds, oil, and fiat currency) and the largest asset management company (BlackRock, Inc.—BLK).

Similar kinds of studies include Yousaf et al. (2022), Yousaf and Yarovaya (2022), Corbet et al. (2022), and Elsayed et al. (2022). Yousaf et al. (2022) study the diversification benefits offered by three energy cryptocurrencies in a portfolio with other traditional asset classes including oil. They show energy cryptocurrencies as an excellent diversifier in the portfolio, showing connectedness with Bitcoin only. On the other hand, a study of NFTs and Defi assets shows that these assets are also decoupled from traditional assets, and portfolio managers and investors can consider these assets to enjoy the diversification benefits (Yousaf and Yarovaya, 2022). Corbet et al. (2022) explore the factors influencing the DeFi tokens focusing on Bitcoin, Ethereum, and investor attention. They propose that investor attention (measured by Google Trends)—rather than platform valuation (measured by Ethereum)—is the primary factor influencing DeFi pricing. They propose DeFi as a distinct asset class from other cryptocurrencies. Elsayed et al. (2022) claim that bitcoin (the leader in the cryptocurrency asset class) has acted as a net transmitter of shocks to other asset classes whereas gold serves as the system's hub and provides safe haven features.

This paper adds to this stream of literature by studying the return and volatility connectedness between asset management tokens (AMTs) and the largest asset management stock (i.e., BlackRock, Inc.-BLK), as well as the other asset classes. First, it helps us to understand the diversification benefits offered by these new assets when added to a portfolio along with traditional sorted assets. The prior research has demonstrated the benefits of diversification provided by the new digital assets (Corbet et al. 2022; Yousaf and Yarovaya, 2022); however, AMTs are currently understudied in the finance literature. Second, we estimate the optimal weights and hedge ratios

for the pairs of assets management tokens and other financial assets. It offers insights to portfolio managers and investors on effective hedging and efficient asset allocation in the portfolio. By allocating funds among expansive traditional and digital assets, this study assists investors and portfolio managers in making better-educated portfolio management decisions. Third, we use the TVP-VAR model to estimate the connectedness between the system. It is an extension of the Diebold and Yilmaz (2012, 2014) model as proposed by Antonakakis and Gabauer (2017). This model offers added benefits, like the fact that it does not require the selection of a rolling window, is suitable for small samples, is less susceptible to outliers, and allows each parameter's time variation to be carefully evaluated without losing observations.

The results show low but negative connectedness of the three management tokens with other asset classes. The three management tokens have served as the net shock receivers, whereas BLK acts as the net shock transmitter. The system-wide spillover dynamic analysis shows the cyclical nature of connectedness with the highest level during the Covid-19 phase. Finally, we find high optimal weights and low hedge ratios for the management tokens with other asset classes. The findings are particularly helpful for policymakers, hedge funds, and portfolio managers.

The rest of the paper is organized as follows: Section 2 describes the data, section 3 explains the methodology, section 4 provides a discussion about the findings, and section 5 concludes the paper with implications for the readers.

2 Data

We use the data of three asset management tokens (SwissBorg-CHSB, Numeraire-NMR, Uquid Coin-UQC), asset management stock (BlackRock, Inc.-BLK), and other financial markets (gold, global stocks-MSCI World, PIMCO Investment Grade Corporate Bond Index-bond, West Texas Intermediate-WTI, US dollar index-USD.Index) from February 05, 2018, to August 02, 2022. The data on AMTs are collected from the website of coinmarketcap.com, whereas the data of the rest of the markets are gathered from Bloomberg. The prices and returns of the assets are presented in Figure 1 and Figure 2, respectively.

Table 1 presents the summary statistics for all the assets. The mean return on all assets is comparable, with UQC (0.00818) with the highest mean return and WTI (-0.002) with the lowest mean return. Distinctively, the three management tokens stand out because they have the largest

mean returns and standard deviations. Across all asset classes, WTI is the only asset class that has a standard deviation closer to the three management tokens, i.e., 0.1052. Table 1 also presents the Jarque Berra test (JB) for normality and the Augmented Dickey-Fuller test (ADF) for stationarity of the series. Both tests are significant at a 1% level. ADF shows that all series are stationary, and we do not need a transformation of any series.

Further, we present the unconditional correlations between the assets in Table 2. Overall, the correlation between all the assets is quite low (i.e., below 0.30) except between the MSCI_WORLD and BLK (i.e., 0.812). The management tokens are more correlated with MSCI_WORLD, BLK and among themselves, whereas their correlation with other assets is quite low (i.e., even below 0.10). It provides us a piece of preliminary evidence for a possible level of diversification opportunity offered by the management tokens in the financial markets. We analyze this opportunity further as discussed in the next sections.

3 Methodology

We use the TVP-VAR method developed by Antonakakis and Gabauer (2017) to estimate the connectedness between the system as a development of the model proposed by Diebold and Yilmaz (2012, 2014). Here is how the TVP-VAR (1) model is described:

$$Y_t = \phi_t Y_{t-1} + u_t; \qquad u_t \sim N(0, S_t) \tag{1}$$

$$\text{vec}(\phi_t) = \text{vec}(\phi_{t-1}) + v_t; \qquad v_t \sim N(0, R_t) \tag{2}$$

The matrices, ϕ_t, S_t, and R_t are $N \times N$ dimensinal, and Y_t, u_t, and v_t are $N \times 1$ dimensional vectors. According to Diebold and Yilmaz (2012) and Pesaran and Shin (1998), the generalized impulse response function (GIRF), $\phi^g_{ij,t}$, is as follows:

$$\phi^g_{ij,t}(J) = \frac{S^{-1}_{ii,t} \sum_{t=1}^{j-1} (\iota_i' A_t S_t \iota_j)^2}{\sum_{J=1}^{N} \sum_{t=1}^{j-1} (\iota_i A_t S_t A_t' \iota_i)}$$

Also, the generalized forecast variance decompositions (GFEVD), $\tilde{\phi}^g_{ijt}(J)$, is defined as:

$$\tilde{\phi}^g_{ij,t}(J) = \frac{\phi^g_{ij,t}(J)}{\sum_{J=1}^{N} \phi^g_{ij,t}(J)}$$

Where vector ι_i is a zero vector with unity at the location i, $\sum_{j=1}^{N}\tilde{\phi}_{ij,t}^{N}(J) = 1$, and $\sum_{i,j=1}^{N}\tilde{\phi}_{ij,t}^{N}(J) = N$. We estimate the variance shared by i on j by GFEVD and define the total connectedness of the system, $H_t^g(J)$, in this way:

$$H_t^g(J) = \frac{\sum_{i,j=1,i\neq j}^{N}\tilde{\phi}_{ij,t}^{g}(J)}{\sum_{i,j=1,}^{N}\tilde{\phi}_{ij,t}^{g}(J)} \tag{4}$$

Next, we estimate the directional connectedness from i to j by:

$$H_{i\rightarrow j,t}^{g}(J) = \sum_{j=1,i\neq j}^{N}\tilde{\phi}_{ji,t}^{g}(J)$$

and the directional connectedness from j to i by:

$$H_{i\leftarrow j,t}^{g}(J) = \sum_{j=1,i\neq j}^{N}\tilde{\phi}_{ij,t}^{g}(J)$$

The net total directional connectedness is estimated as follows.

$$H_{i,t}^{g} = H_{i\rightarrow j,t}^{g}(J) - H_{i\leftarrow j,t}^{g}(J) \tag{5}$$

The positive value of $H_{i,t}^{g}$ indicates that variable i net transmitter of shocks, whereas the negative value implies that it is a net receiver of shocks.

We also perform portfolio analysis for the AMTs in addition to connectivity analysis. We do so by determining the optimal portfolio weights and hedging ratios for the pairings of AMTs and other financial assets. We compute the optimal weights and hedge ratios following Kroner and Ng (1998) and Kroner and Sultan (1993), respectively, by applying the variance and covariances obtained from the DCC-GARCH model of Engle (2002).

4 Results

Table 3 shows the static spillover between the management tokens and the other asset classes. Panel A of Table 3 shows the return spillovers while Panel B of Table 3 shows the volatility spillover between the assets in the system. The row with the title “TO” presents the

directional connectedness from an asset to the system whereas the column titled "FROM" demonstrates the connectedness of each asset from each asset to the system. The last row in each Panel presents the net directional connectedness of each asset.

From Panel A of Table 3, we see that the three management tokens have a moderate level of connectedness to and from the system. BLK and MSCI World are the top transmitters and receivers of shocks from the system. In 'net' terms, CHSB shows -4.38%, NMR shows -4.45%, and UQC has -0.85% of net directional connectedness. It demonstrates that management tokens are net receivers of the shocks from the system. Whereas BLK, the largest asset management company, is a net transmitter of shocks (with a net directional connectedness of 4.58%). Among other assets, Gold (-0.82%), WTI (-3.08%), and USD.Index (-5.34%) are the net receivers of shocks while MSCI World (8.92%), and Bonds (5.42%) are the net transmitters of the shocks to the system. The total connectedness of the system is 30.57% that is also plausible. Yousaf and Yarovaya (2022) find it 56.86% for NFT and DeFi assets in a portfolio with traditional assets.

We present estimates for volatility spillover in Panel B of Table 3. CHSB, NMR, and UQC again show a moderate level of individual connectedness with other assets. The results are comparable with Yousaf et al. (2022) for the energy cryptocurrencies. However, if we compare the connectedness of assets to and from the system, Bond has been the top transmitter of shocks (59.06%) followed by BLK (58.03%) whereas, MSCI World (53.84%) and BLK (46.99%) are the top receivers of the shocks, respectively. In 'net' terms, CHSB has -2.47%, NMR has -4.55% and UQC has 2.23% of net directional connectedness with the system. Whereas, the BLK has a positive and stronger connectedness with the system (i.e., 11.04%). It shows that CHSB and NMR are the net receivers of shocks whereas UQC and BLK are the net transmitters of shocks. Gold (-14.66%), and USD.Index (-6.86%) remain net receivers, and Bond (21.73%) is the net transmitter as in the case of return spillovers. However, the MSCI World (-17.38%) has turned into a net receiver and WTI into a net transmitter of shocks in volatility spillover.

To explore the network relationship further, we also study the dynamic connectedness of the system and present the results in Figure 3. In Figure 3, the left graph shows the total returns spillover index. Initially, we find that the connectedness of the system is above 40% which soon after encounters a fall and hit the lowest level before the start of 2020 (i.e., before the Covid-19 period). It rises back abruptly and hit its highest point during the Covid-19 period. It crosses the

threshold level of 50%. The connectedness decreases again to the lower levels till 2022 and then increases back gradually. The total connectedness for the volatility is presented in the right-side graph of Figure 3. The pattern of movement of the total connectedness is similar to returns. In both cases, connectedness shows a cyclical motion. It starts at higher levels, and then reduces to lower levels, i.e., before 2020. It then again shows an abrupt increase during Covid-19 and hit the highest level. Followingly, it decreases back to lower levels and again in 2022, it starts increasing back to the initial levels.

Figure 4 presents the results for the estimates of net return spillovers for each asset class over time. It shows that the CHSB and NMR have been net transmitters and UQC has been a net receiver of shocks with few exceptions during the studied time. BLK has initially been a net transmitter of shocks and then shows a fluctuating behavior afterward. During the Covid-19 period, it is among the top shock transmitters of the system. MSCI world, Bond, and WTI also show analogous behavior. However, the Gold and USD.Index are the net receivers of shocks during the Covid-19 period. Figure 5 displays estimates for the net volatility spillovers for each asset over time. Overall, the results are quite comparable with the return spillovers in the markets. Differently, BLK and MSCI World act as net transmitters of shocks during the Covid-19 period for volatility to the system whereas they have been net receivers of shocks for returns.

Finally, we present the estimated optimal weights and the hedge ratios for the pairs of AMTs with the other assets in Table 4 (Yousaf and Hassan, 2019). The optimal weights for CHSB in a portfolio with other assets range from 0.852 to 0.995, i.e., for WTI/CHSB and Bond/CHSB, respectively. It shows that for a WTI-CHSB (Bond-CHSB) portfolio of 1 dollar, we should invest 0.852 (0.995) cents in WTI (Bond) and the remaining 0.148 (0.005) cents in CHSB. Similarly, the optimal weights for NMR range from 0.900 to 0.998 for WTI/NMR and USD.Index/NMR, respectively, and for UQC, they range from 0.886 to 0.998 for WTI/UQC and Bond/UQC, respectively. Table 4 also presents the hedge ratios for different pairs of assets with the management tokens. The hedge ratio for CHSB ranges from 0.00 (i.e., for USD.Index/CHSB) to 0.07 (i.e., for WTI/CHSB), NMR from 0.00 (i.e., for USD.Index/NMR) to 0.01 (i.e., for WTI/NMR), and UQC from 0.00 (i.e., for USD.Index/UQC) to 0.01 (i.e., for BLK/UQC). The hedge ratio of 0.07 for WTI/CHSB indicates that a $1 long position in WTI can be hedged for a 7-

cent short position in CHSB. Overall, the hedge ratios are quite low for this set of portfolios that warrants the effective hedging strategy with the AMTs (Akhtaruzzaman *et al.* 2020).

5 Conclusion

This paper studies the return and volatility transmission of the three well-known management tokens and the largest asset management company, BlackRock, Inc. (BLK), along with other asset classes. Overall, we find that there is low but negative connectedness between the three management tokens and other asset classes. The three management tokens have been the net shock receivers, whereas BLK functions as a net shock transmitter in the system.

The dynamic analysis of the system-wide spillover demonstrates cyclical movements with distinct identification of the lowest and maximum degrees of connectedness (for example, during the Covid-19 phase). The analysis at the individual level reveals that, with few exceptions, CHSB and NMR have been net transmitters and UQC has been a net receiver of shocks. BLK has initially been a net transmitter of shocks. However, during the COVID-19 time, BLK and MSCI World behave as net shock receivers in case of returns while as a net shock transmitter to the system for volatility.

Finally, using AMTs, we calculate the optimal weights and hedging ratios for the pairs of various assets. Overall, for the three AMTs, the optimal weights have been high, and the hedge ratios have been low. It demonstrates the diversification potential of the three AMTs when added to the portfolio of traditional assets. All three AMTs have a negative net directional connectedness with the system. The low levels of net directional connectedness and low hedging ratios confirm the diversification benefits of adding AMTs to the portfolio. The investors, hedge funds, and portfolio managers can use these AMTs to mitigate the portfolio concentration risk and increase diversification.

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Table 1. Summary statistics

	CHSB	NMR	UQC	BLK	GOLD	MSCI_WORLD	BOND	WTI	USD.Index
Mean	0.00388	0.00541	0.00818	0.00041	0.00029	0.00030	-0.00003	-0.00200	0.00016
Maximum	0.4759	1.7282	1.5219	0.1352	0.0450	0.0877	0.0705	0.5308	0.0160
Minimum	-0.3796	-0.4202	-0.5003	-0.1365	-0.0565	-0.0991	-0.0495	-3.0196	-0.0168
Std. Dev.	0.0783	0.1152	0.1208	0.0200	0.0091	0.0114	0.0051	0.1052	0.0038
Skewness	0.9404	6.7218	3.9367	-0.0689	-0.4514	-0.9364	0.3608	-22.1631	0.2110
Kurtosis	7.7220	91.3490	41.6379	10.7718	6.7693	18.1934	55.2070	618.4605	4.3429
J.B	1216.4[a]	376020.4[a]	73208.8[a]	2844.7[a]	706.1[a]	11033.9[a]	128353.6[a]	17927285.0[a]	93.3[a]
ADF	-21.843[a]	-36.604[a]	-18.855[a]	-11.424[a]	-32.568[a]	-9.975[a]	-12.244[a]	-24.838[a]	-32.720[a]

Notes: SwissBorg-CHSB, Numeraire-NMR, Uquid Coin-UQC, BlackRock Inc.-BLK, global stocks-MSCI World, PIMCO Investment Grade Corporate Bond Index-bond, West Texas Intermediate-WTI, US dollar index-USD.Index. Std. Dev-standard deviation, J.B-Jarque Berra test, ADF-Augmented Dicky Fuller test. [a] refers to the level of significance at 1 percent.

Table 2. Unconditional correlations

	CHSB	NMR	UQC	BLK	GOLD	MSCI_WORLD	BOND	WTI	USD.Index
CHSB	1.000								
NMR	0.266	1.000							
UQC	0.133	0.099	1.000						
BLK	0.162	0.133	0.039	1.000					
GOLD	0.060	0.014	0.055	0.003	1.000				
MSCI_WORLD	0.214	0.152	0.046	0.812	0.091	1.000			
BOND	0.082	-0.064	0.016	0.109	0.293	0.245	1.000		
WTI	0.069	0.007	0.004	0.046	0.007	0.120	0.056	1.000	
USD.Index	-0.045	0.024	-0.091	-0.095	-0.407	-0.193	-0.248	-0.020	1.000

Notes: SwissBorg-CHSB, Numeraire-NMR, Uquid Coin-UQC, BlackRock Inc.-BLK, global stocks-MSCI World, PIMCO Investment Grade Corporate Bond Index-bond, West Texas Intermediate-WTI, US dollar index-USD.Index.

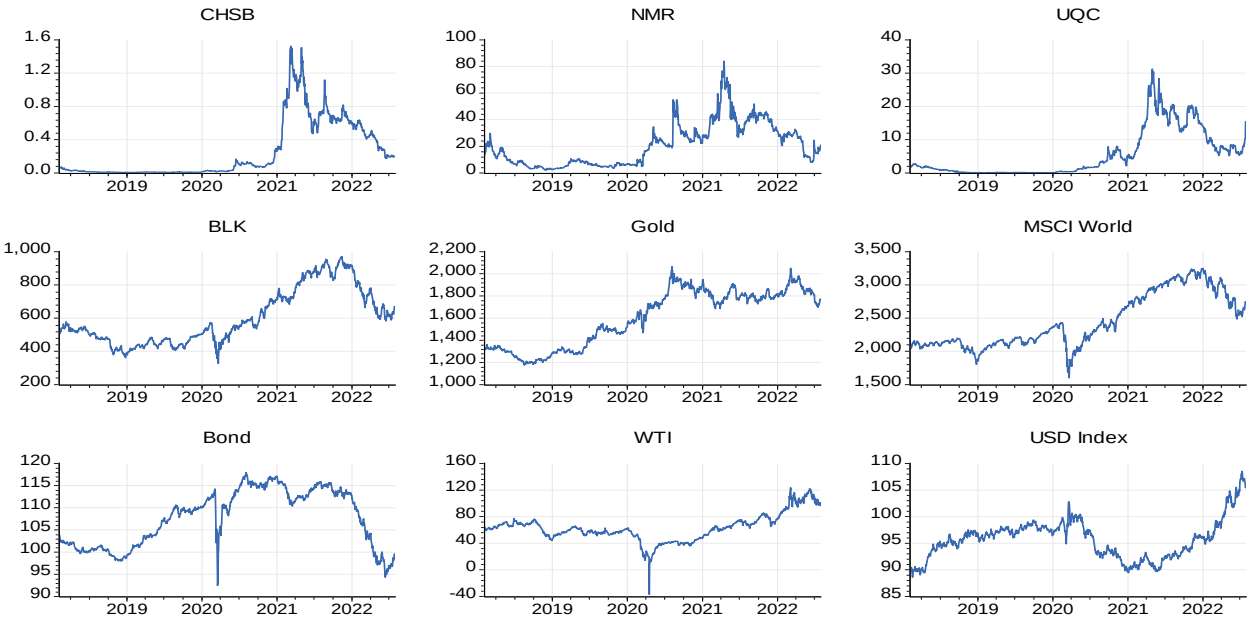

Figure 1. Prices

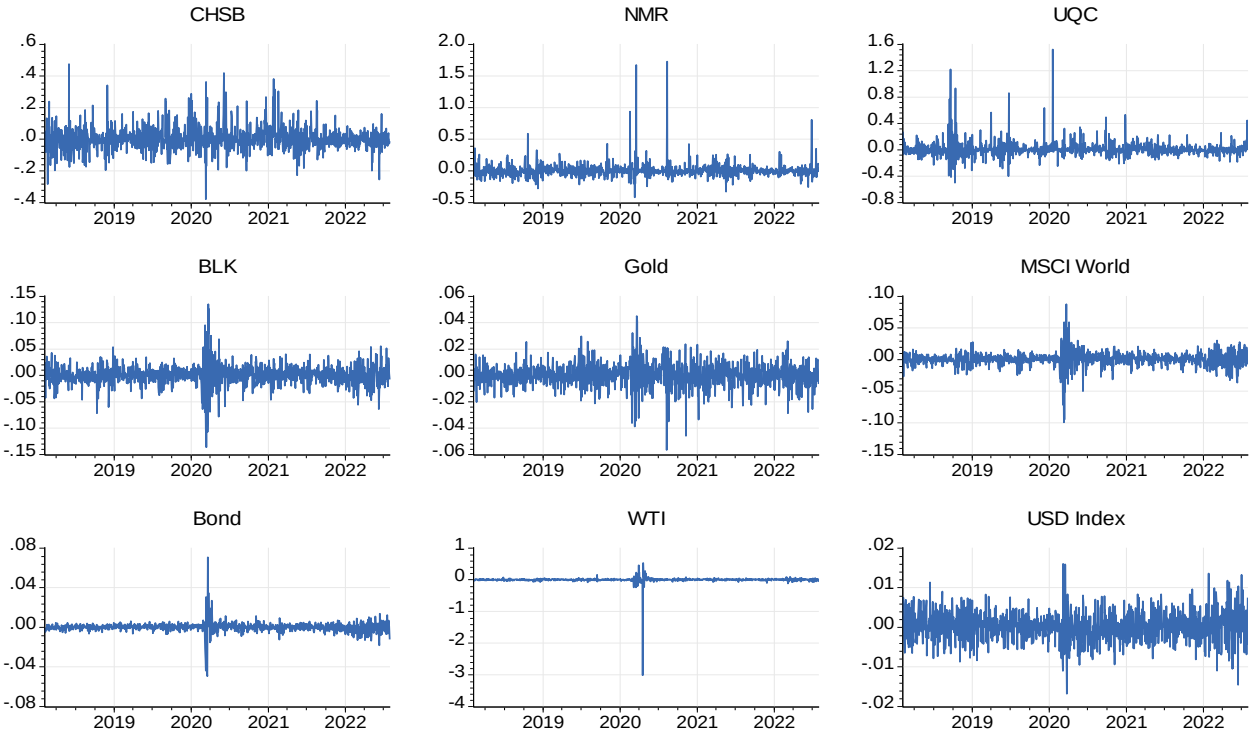

Figure 2. Returns

Table 3. Static spillovers

Panel A. Return Spillovers

	CHSB	NMR	UQC	BLK	Gold	MSCI.World	Bond	WTI	USD.Index	FROM
CHSB	76.54	7.24	3.82	3.10	1.02	4.33	1.46	0.93	1.56	23.46
NMR	7.25	76.27	3.17	3.41	1.74	2.22	2.24	2.44	1.26	23.73
UQC	3.43	2.91	84.68	1.83	0.92	2.13	1.26	0.86	1.99	15.32
BLK	2.16	2.25	1.43	52.34	1.60	32.04	2.69	2.24	3.25	47.66
Gold	0.79	1.44	0.91	2.07	65.81	3.86	9.20	2.83	13.08	34.19
MSCI.World	2.66	1.41	1.66	30.73	3.15	49.10	3.97	2.73	4.59	50.90
Bond	0.83	1.58	0.95	3.21	8.77	4.20	75.21	1.17	4.08	24.79
WTI	0.90	1.44	0.85	3.68	2.89	4.20	1.34	82.41	2.30	17.59
USD.Index	1.05	1.00	1.67	4.21	13.29	6.85	8.04	1.32	62.56	37.44
TO	19.08	19.28	14.48	52.24	33.37	59.82	30.20	14.52	32.10	275.09
Inc.Own	95.62	95.55	99.15	104.58	99.18	108.92	105.42	96.92	94.66	cTCI/TCI
NET	-4.38	-4.45	-0.85	4.58	-0.82	8.92	5.42	-3.08	-5.34	34.39/30.57

Panel B. Volatility Spillovers

	CHSB	NMR	UQC	BLK	Gold	MSCI.World	Bond	WTI	USD.Index	FROM
CHSB	81.05	2.52	4.42	2.71	0.90	1.50	2.91	2.48	1.52	18.95
NMR	2.95	81.86	2.43	2.01	1.52	0.96	4.69	1.52	2.04	18.14
UQC	4.24	1.99	80.89	3.24	1.21	0.98	4.16	1.32	1.97	19.11
BLK	2.19	1.61	2.76	53.01	1.12	18.68	11.91	4.16	4.57	46.99
Gold	1.38	1.50	2.26	5.65	64.09	2.65	9.19	4.66	8.63	35.91
MSCI.World	1.50	1.30	2.54	23.46	1.90	46.16	11.27	6.71	5.16	53.84
Bond	1.72	2.48	3.69	10.01	4.04	3.54	62.67	7.04	4.81	37.33
WTI	1.15	0.73	1.13	3.34	3.31	3.19	5.63	79.10	2.43	20.90
USD.Index	1.35	1.46	2.11	7.61	7.25	4.96	9.32	3.92	62.02	37.98
TO	16.48	13.59	21.34	58.03	21.25	36.46	59.06	31.82	31.12	289.15
Inc.Own	97.53	95.45	102.23	111.04	85.34	82.62	121.73	110.92	93.14	cTCI/TCI
NET	-2.47	-4.55	2.23	11.04	-14.66	-17.38	21.73	10.92	-6.86	36.14/32.13

Notes: SwissBorg-CHSB, Numeraire-NMR, Uquid Coin-UQC, BlackRock Inc.-BLK, global stocks-MSCI World, PIMCO Investment Grade Corporate Bond Index-bond, West Texas Intermediate-WTI, US dollar index-USD.Index. Forecast horizon is 10-days.

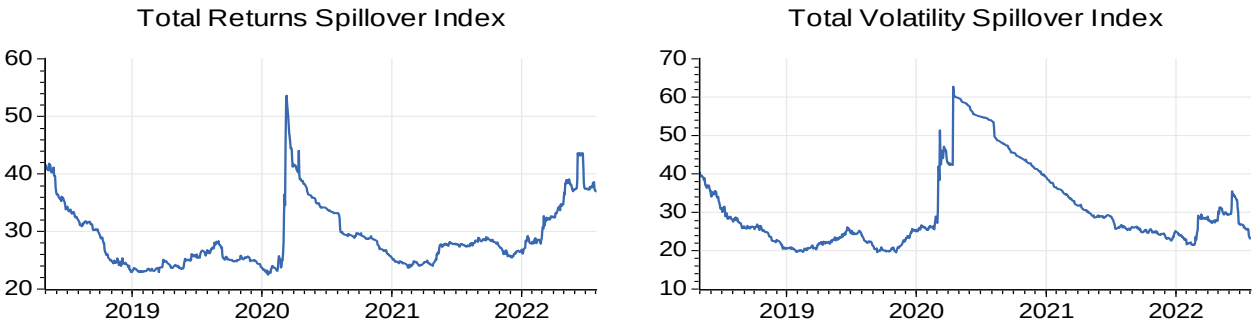

Figure 3. Total spillovers

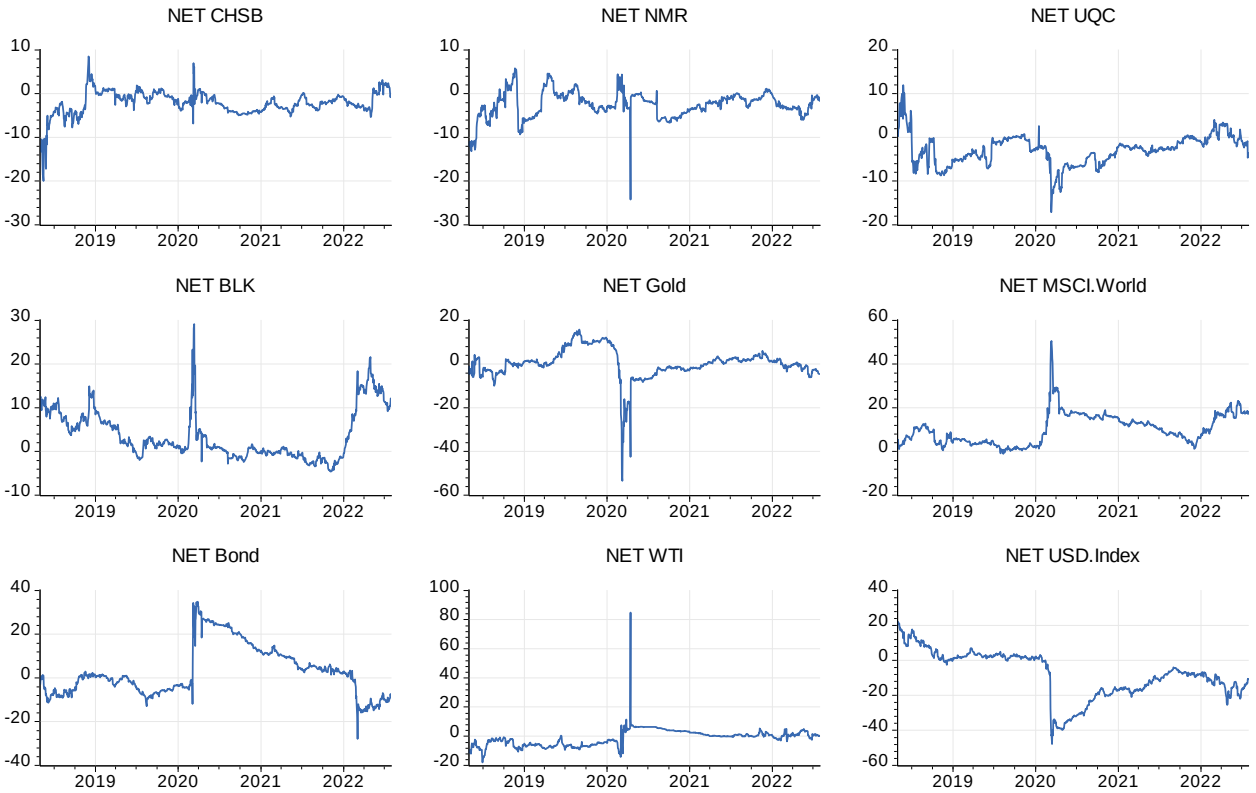

Figure 4. Net returns spillovers

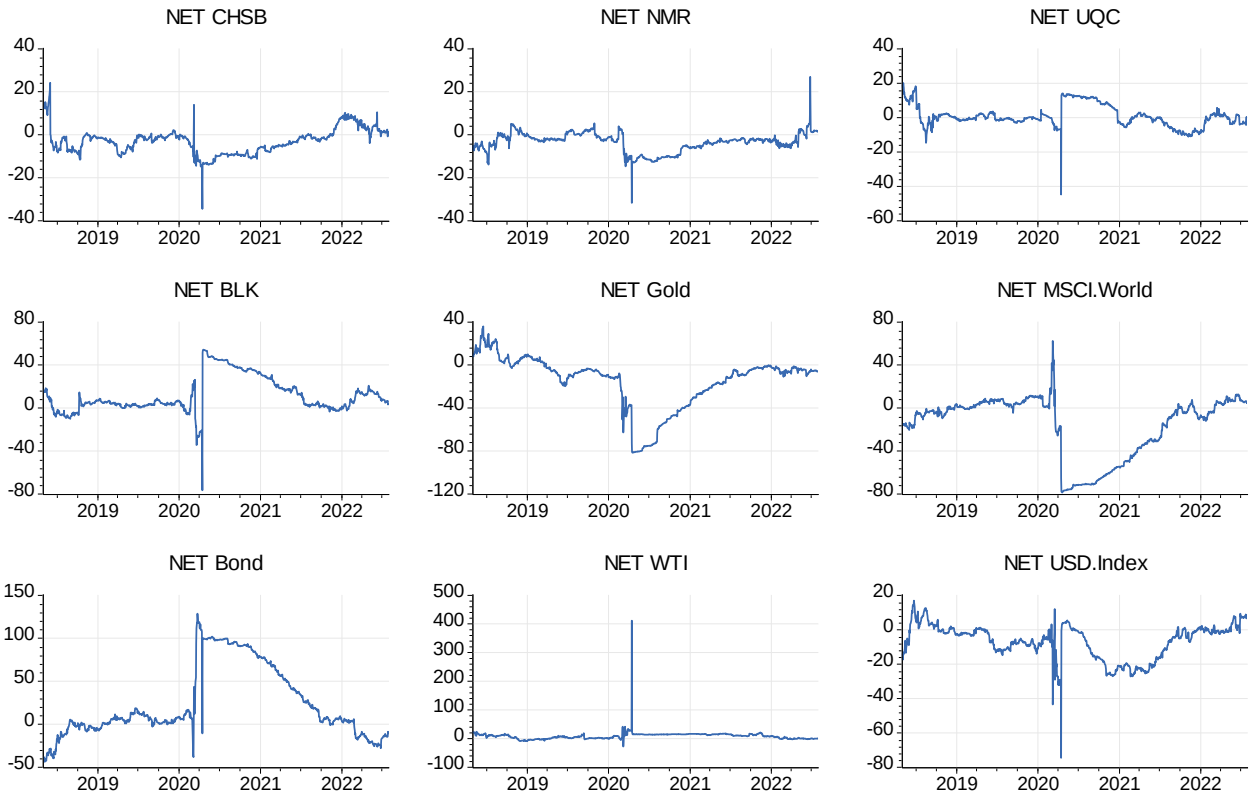

Figure 5. Net volatility spillovers

Table 4. Optimal weights and hedge ratios for the pairs of Asset management token and other markets

Pairs	Optimal Weight	Pairs	Hedge Ratio
BLK/CHSB	0.961	BLK/CHSB	0.03
Gold/CHSB	0.990	Gold/CHSB	0.01
MSCI World/CHSB	0.984	MSCI.World/CHSB	0.02
Bond/CHSB	0.995	Bond/CHSB	0.01
WTI/CHSB	0.852	WTI/CHSB	0.07
USD Index/CHSB	0.993	USD.Index/CHSB	0.00
BLK/NMR	0.982	BLK/NMR	0.01
Gold/NMR	0.994	Gold/NMR	0.00
MSCI World/NMR	0.994	MSCI.World/NMR	0.01
Bond/NMR	0.999	Bond/NMR	0.00
WTI/NMR	0.900	WTI/NMR	0.01
USD Index/NMR	0.998	USD.Index/NMR	0.00
BLK/UQC	0.979	BLK/UQC	0.01
Gold/UQC	0.994	Gold/UQC	0.00
MSCI World/UQC	0.990	MSCI.World/UQC	0.01
Bond/UQC	0.998	Bond/UQC	0.00
WTI/UQC	0.886	WTI/UQC	0.00
USD Index/UQC	0.995	USD.Index/UQC	0.00

Notes: SwissBorg-CHSB, Numeraire-NMR, Uquid Coin-UQC, BlackRock Inc.-BLK, global stocks-MSCI World, PIMCO Investment Grade Corporate Bond Index-bond, West Texas Intermediate-WTI, US dollar index-USD.Index.

Appendix:

Table 1A. Static spillovers using the forecast horizon of 20-days

Panel A. Return Spillover

	CHSB	NMR	UQC	BLK	Gold	MSCI.World	Bond	WTI	USD.Index	FROM
CHSB	76.53	7.24	3.83	3.10	1.03	4.33	1.46	0.92	1.56	23.47
NMR	7.24	76.25	3.17	3.41	1.74	2.22	2.26	2.44	1.26	23.75
UQC	3.44	2.91	84.63	1.83	0.92	2.13	1.27	0.86	2.00	15.37
BLK	2.16	2.25	1.43	52.33	1.61	32.03	2.70	2.24	3.25	47.67
Gold	0.79	1.44	0.91	2.07	65.81	3.86	9.20	2.83	13.08	34.19
MSCI.World	2.66	1.41	1.66	30.73	3.16	49.09	3.97	2.73	4.59	50.91
Bond	0.83	1.57	0.97	3.21	8.77	4.20	75.19	1.17	4.09	24.81
WTI	0.90	1.44	0.86	3.68	2.89	4.19	1.34	82.40	2.30	17.60
USD.Index	1.06	1.00	1.67	4.21	13.29	6.85	8.05	1.32	62.55	37.45
TO	19.08	19.28	14.50	52.24	33.41	59.81	30.25	14.52	32.14	275.22
Inc.Own	95.61	95.53	99.13	104.57	99.21	108.90	105.44	96.91	94.69	TCI
NET	-4.39	-4.47	-0.87	4.57	-0.79	8.90	5.44	-3.09	-5.31	30.58

Panel B. Volatility Spillover

	CHSB	NMR	UQC	BLK	Gold	MSCI.World	Bond	WTI	USD.Index	FROM
CHSB	80.95	2.52	4.44	2.72	0.90	1.50	2.92	2.51	1.54	19.05
NMR	2.95	81.82	2.44	2.00	1.52	0.95	4.68	1.56	2.06	18.18
UQC	4.25	2.00	80.81	3.24	1.20	0.97	4.17	1.37	1.99	19.19
BLK	2.17	1.61	2.76	52.95	1.11	18.66	11.93	4.24	4.57	47.05
Gold	1.38	1.51	2.26	5.66	64.01	2.64	9.20	4.71	8.63	35.99
MSCI.World	1.51	1.31	2.54	23.44	1.91	46.09	11.27	6.77	5.16	53.91
Bond	1.72	2.48	3.69	10.00	4.03	3.54	62.60	7.12	4.83	37.40
WTI	1.15	0.74	1.14	3.34	3.31	3.19	5.65	79.03	2.45	20.97
USD.Index	1.35	1.46	2.12	7.62	7.25	4.95	9.34	3.98	61.93	38.07
TO	16.48	13.61	21.41	58.02	21.23	36.41	59.18	32.25	31.23	289.82
Inc.Own	97.43	95.44	102.21	110.97	85.24	82.50	121.77	111.28	93.16	TCI
NET	-2.57	-4.56	2.21	10.97	-14.76	-17.50	21.77	11.28	-6.84	32.20

Notes: SwissBorg-CHSB, Numeraire-NMR, Uquid Coin-UQC, BlackRock Inc.-BLK, global stocks-MSCI World, PIMCO Investment Grade Corporate Bond Index-bond, West Texas Intermediate-WTI, US dollar index-USD.Index.