



# ZRE: Coronavirus PIT ECL Impact Analysis – Indirect Effects on a US/UK Hypothetical Credit Portfolio As of March 16, 2020

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# ECL Impact Analysis: Trial Portfolio Using ZRE With Updated EDFs to Assess Indirect PIT Coronavirus Loss Effects

- US/UK hypothetical corporate/commercial credit portfolio of about \$1.7 bil in limits was developed – detail below
- Trial portfolio has an LGD x EAD-weighted TTC PD of 0.89% and EAD-weighted, TTC LGD of 32%, the one-year TTC loss is **\$3.3 million**
- ZRE runs in two modes; simulation of our industry/region credit cycles (Uses a Mean Reversion/Momentum Model) utilizing ‘pure’ PIT credit measures - which produces an ‘unconditional’ estimate of ECLs or ZRE runs in scenario mode (‘conditional’) where 3-4 scenarios on various macro and other factors can be provided
- This analysis presented here is from the **‘unconditional’ simulation approach** which is fully automated and can therefore be run with **changes in daily one-year EDFs**
- FYI, the automated E2E simulation approach for ECLs can run a portfolio of 400-500k facilities E2E in about 3-4 hours
- **ECLs for this trial portfolio assessed using Ind/Reg cycle-adjusted PIT measures:**
  - **Pre-Substantial Coronavirus: December 31, 2019**
  - **Post-13% USA Market Sell-Off: Monday, March 16, 2020**

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- Trial run on a portfolio of US & UK corporate and commercial facilities with a wide range of PDs, EADs, & industry segments
- One-year & lifetime ECLs as of 16 Mar 2020 up by about 2x compared to YE2019 PIT on a one-year basis & lifetime, 1.88x relative to PIT values as of 31 Dec 2020
- ECLs still not as extreme as CCAR 2020 stress values; stock prices down about 25% from Dec 19 whereas the severely adverse scenario assumes a fall of over 60%
- Stress results based on the CCAR 2020 Severely Adverse scenario indicates that ECLs could rise by an additional 3x for an over 7x rise since Dec 2019
- PIT ECLs for this trial portfolio would rise from about **\$1.7 mil using PIT credit measures**, to about **\$3.6 mil** as of March 16<sup>th</sup> and about **\$12.5 million** under the CCAR Adverse scenario

FAC #	Basel Parameters					Thousands CU			ZRE Outputs CU (000s)				Stress Charge	Ratio Mar/Dec		Ratio
									31-Dec-19		16-Mar-20		Offs CU: (000s)			Stress/Dec
	TTC PD	TTC LGD	TTC EAD	TTC CCF	TTC FCF	Limit (Millions CU)	One-Year TTC EL	One-Year Static PIT EL	One-Year ECL	Lifetime ECL	One-Year ECL	Lifetime ECL	One Year	One-Year ECL	Lifetime ECL	One Year ECL
All	0.89%	32%	1,178	66%	97%	1725	3,309	1,858	1,742	4,515	3,644	8,489	12,821	2.09	1.88	7.36

Source: ZRE application, Moody's Credit Edge EDFs – 'CU stands for 'Currency Units'

# Trial Portfolio ECL Details – Dec 31, 2019 & March 16<sup>th</sup>, 2020 (1/2)

**Tables Provide Details on TTC PD/LGD/EAD (CCF), Exposures & The Industry/Regions Using Our Credit Cycle Indices for this Hypothetical ‘Trial’ Portfolio of about \$1.7 bil in Limits**

Classification Information			ZRE Inputs										Calculations			ZRE Outputs CU (000s)		ZRE Outputs CU (000s)		Ratio Mar/Dec		
			Basel Parameters					Other Facility & Borrower Attributes					Thousands CU			31-Dec-19		16-Mar-20				
FAC #	Portfolio	Product	TTC PD	TTC LGD	TTC EAD	TTC CCF	TTC CCF	Maturity in Years	Limit (Millions CU)	Expected Usage	Primary Region	Primary Industry	EIR	Basel EL	One-Year TTC EL	One-Year Static PIT EL	One-Year ECL	Lifetime ECL	One-Year ECL	Lifetime ECL	One-Year ECL	Lifetime ECL
26	SME	Term	0.17%	30%	10	100%	100%	3.34	10	100%	North America	Hotels and Leisure	2.35%	5	5	3	3	19	11	56	3.93	2.97
27	LC	Backstop	6.61%	30%	49	70%	100%	1.50	70	0%	UK FI	Banking	6.11%	971	949	352	357	556	615	917	1.72	1.65
28	LC	Term	0.04%	35%	50	100%	100%	0.25	50	100%	UK	Transportation	1.24%	8	8	2	0	0	1	1	5.66	5.66
29	SME	Term	6.61%	25%	10	100%	100%	6.32	10	100%	North America	Medical	3.99%	165	161	124	122	640	284	1,048	2.32	1.64
30	LC	Revolving	0.51%	30%	34	20%	100%	3.89	50	60%	UK	Business and Consumer Service	2.12%	52	51	16	19	156	50	294	2.67	1.89
31	SME	Term	0.06%	30%	5	100%	100%	1.03	5	100%	North America	Machinery and Equipment	2.31%	1	1	1	1	1	2	2	3.28	3.25
32.1	LC	Revolving	0.17%	35%	14	45%	100%	4.25	30	0%	North America	Machinery and Equipment	2.56%	8	8	5	5	47	16	114	3.13	2.39
32.2	LC	Term	0.17%	35%	30	100%	100%	4.25	30	100%	North America	Machinery and Equipment	2.56%	17	17	11	12	106	34	245	2.94	2.31
33.1	LC	Revolving	0.27%	35%	27	35%	100%	1.50	50	30%	North America	Consumer Products	4.30%	25	25	15	15	27	43	70	2.78	2.62
33.2	LC	Term	0.27%	35%	70	100%	100%	1.36	70	100%	North America	Consumer Products	4.30%	65	65	38	40	61	107	157	2.66	2.55
34	LC	Revolving	0.12%	35%	42	20%	100%	0.87	70	50%	North America	Media	2.18%	18	17	8	8	8	24	24	3.18	3.18
35	SME	Contingent	0.12%	30%	1	20%	25%	0.85	5	80%	North America	Retail and Wholesale Trade	2.18%	0	0	0	0	0	1	1	3.12	3.12
36	LC	Revolving	2.42%	30%	24	30%	100%	2.84	80	0%	UK FI	Banking	2.20%	174	169	53	55	223	103	345	1.87	1.55
37	SME	Term	0.05%	30%	10	100%	100%	0.65	10	100%	North America	Business and Consumer Service	2.49%	2	2	1	0	0	2	2	3.43	3.43
38	SME	Revolving	4.04%	25%	9	70%	100%	0.50	12	20%	North America FI	Finance, Insurance, and Real Es	4.19%	92	89	56	28	28	49	49	1.75	1.75
39	SME	Revolving	2.42%	25%	6	20%	100%	0.87	10	50%	North America	Oil and Gas	4.60%	36	35	30	25	25	68	68	2.69	2.69
40	LC	Revolving	0.04%	35%	48	20%	100%	1.50	70	60%	North America FI	Banking	2.03%	7	7	4	4	9	8	14	1.77	1.65
41	SME	Term	0.17%	30%	2	100%	100%	1.01	2	100%	North America	Mining	3.38%	1	1	1	1	1	2	2	3.00	3.00
42	SME	Revolving	0.27%	30%	3	30%	100%	1.62	10	0%	North America	Construction	4.19%	2	2	1	2	3	5	9	3.15	2.85
43	SME	Revolving	0.05%	30%	3	20%	100%	4.00	12	10%	North America	Retail and Wholesale Trade	3.08%	1	1	0	0	4	1	10	3.57	2.52
44	LC	Revolving	0.06%	35%	51	45%	100%	5.90	70	50%	UK	Media	1.53%	11	11	2	3	112	9	190	3.04	1.69
45	LC	Revolving	0.27%	35%	8	20%	100%	0.66	30	10%	North America	Media	2.39%	8	8	4	2	2	8	8	3.18	3.18
46	LC	Revolving	0.27%	35%	29	20%	100%	6.52	80	20%	UK	Medical	1.73%	27	26	8	10	218	29	424	3.00	1.94
All	All	All	0.89%	32%	1,178	66%	97%	2.52	1725					3,384	3,309	1,858	1,742	4,515	3,644	8,489	2.09	1.88

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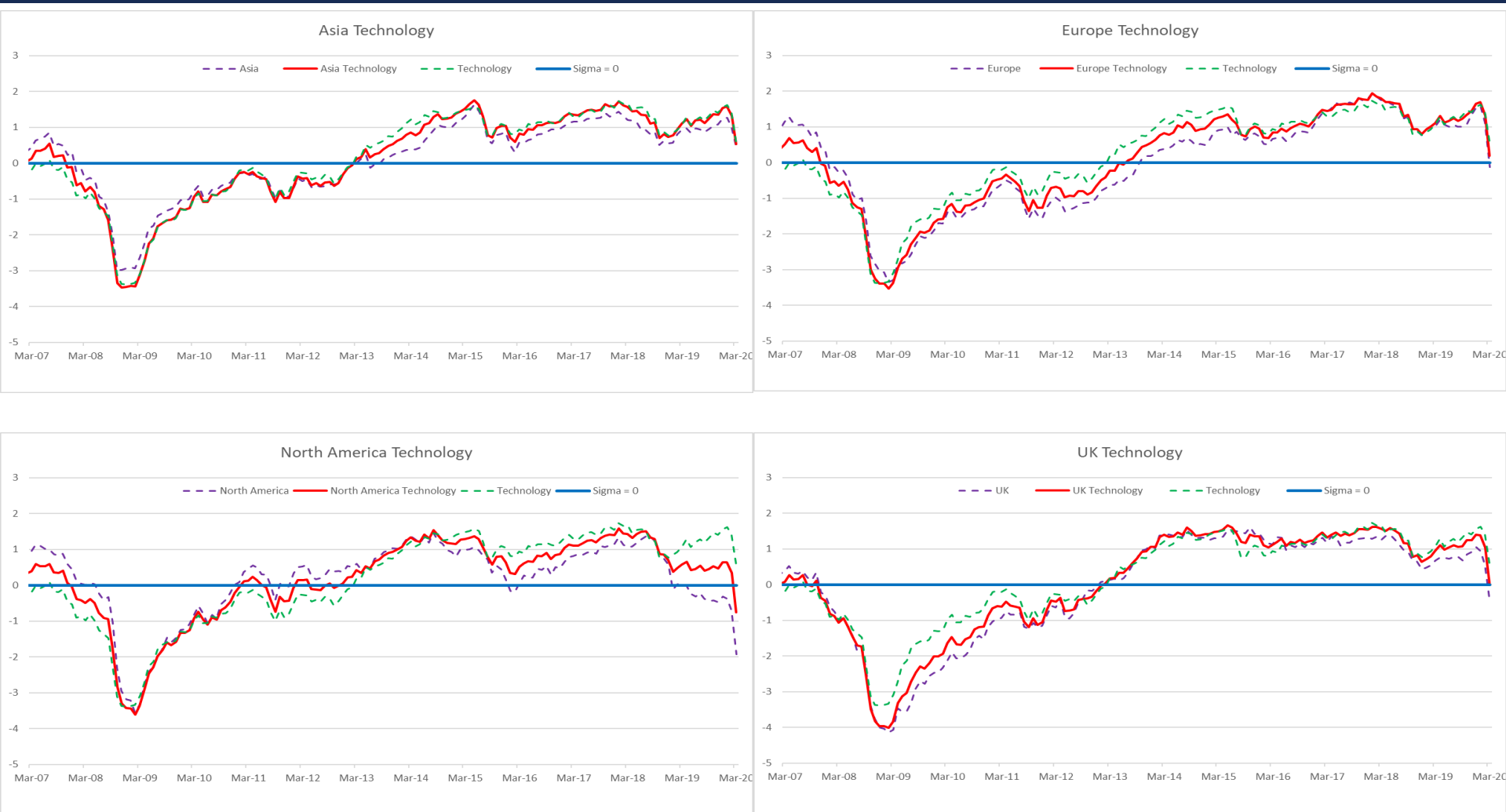
# Trial Portfolio ECL Details – Dec 31, 2019 & March 16<sup>th</sup>, 2020 (2/2)

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# Technology Regional Credit Cycles as of March 16, 2020



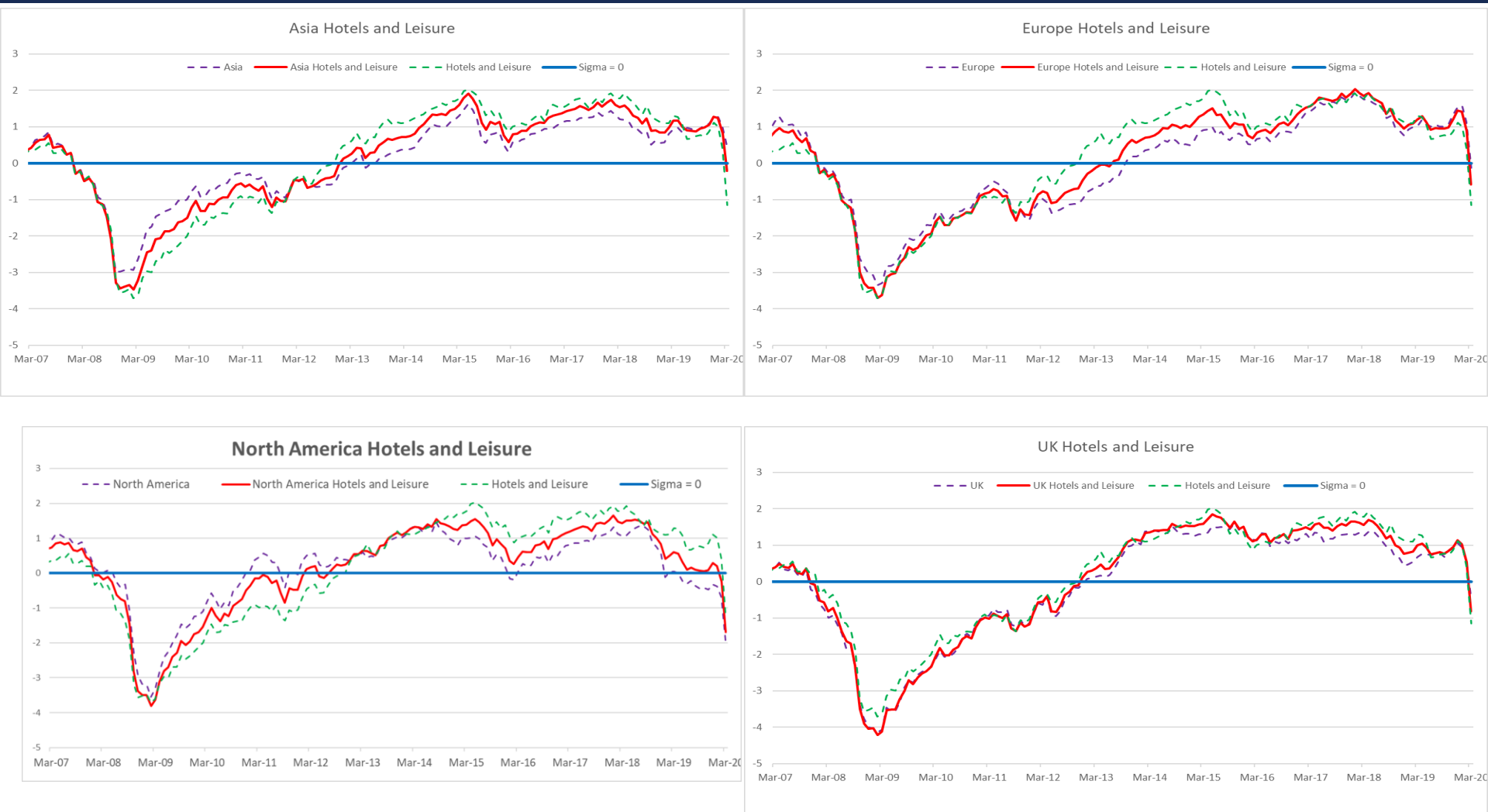
Source: ZRE application, Moody's CreditEdge EDFs - 0 = TTC Credit Conditions – Cycles Shown in Sigma Units – Cycle Below 0 Implies PIT Risk > TTC Risk

# Oil/Gas Regional Credit Cycles as of March 16, 2020



Source: ZRE application, Moody's CreditEdge EDFs - 0 = TTC Credit Conditions – Cycles Shown in Sigma Units – Cycle Below 0 Implies PIT Risk > TTC Risk

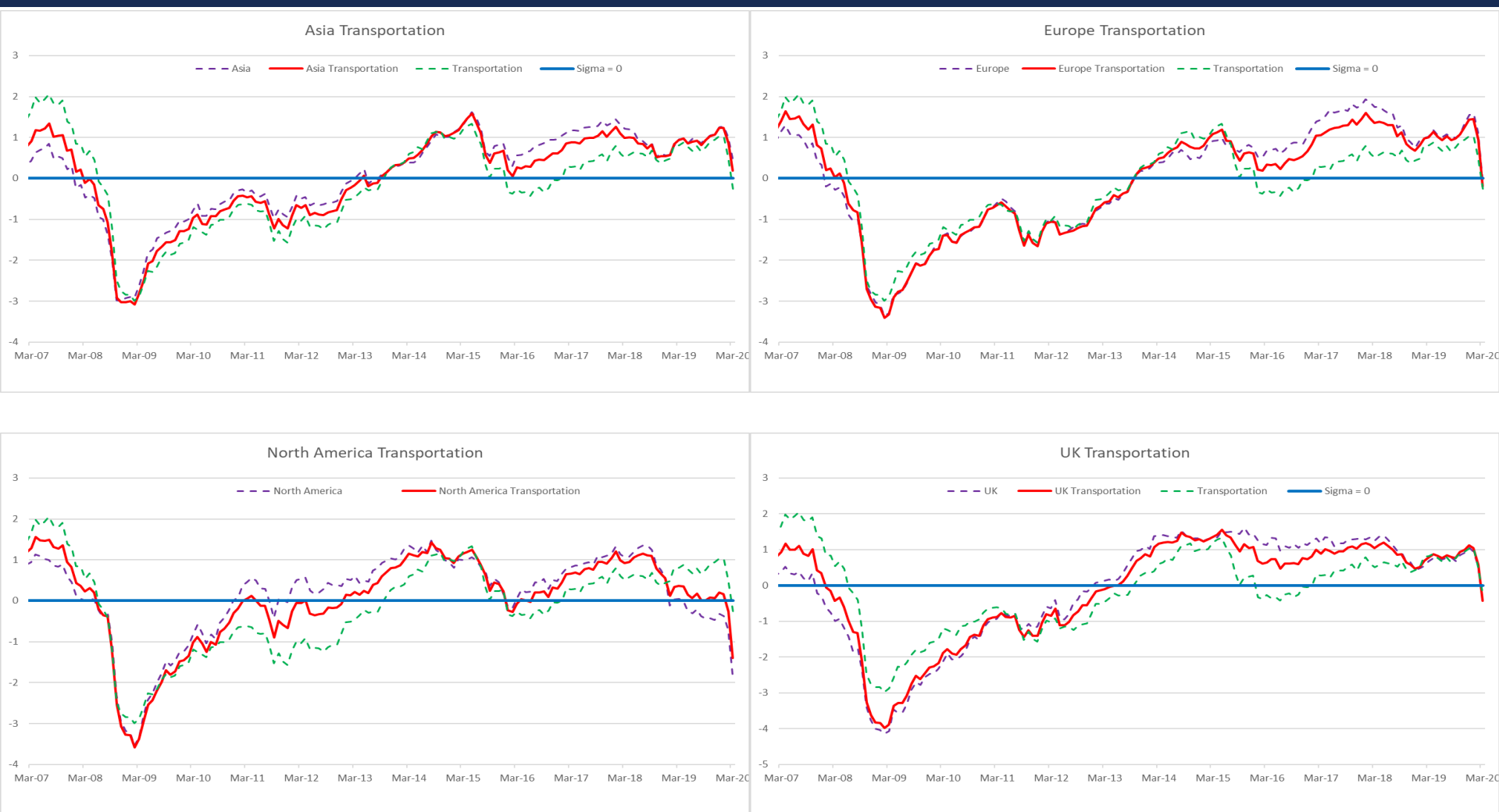
# Hotels/Leisure Regional Credit Cycles as of March 16, 2020



Source: ZRE application, Moody's CreditEdge EDFs - 0 = TTC Credit Conditions – Cycles Shown in Sigma Units – Cycle Below 0 Implies PIT Risk > TTC Risk



# Transportation Regional Credit Cycles as of March 16, 2020



Source: ZRE application, Moody's CreditEdge EDFs - 0 = TTC Credit Conditions – Cycles Shown in Sigma Units – Cycle Below 0 Implies PIT Risk > TTC Risk