Screening for GEMs: February 2023

Executive Summary

An overview (and output) of our machine learning-driven GEM screening model, which seeks to find the best medium-term long ideas within the top 100 stocks in the MSCI GEM Index.

The model is based on 1) a quantitative multifactor screening model, enhanced by two AI Technology-based approaches; 2) a Deep Neural Network model, and 3) a Recurrent Neural Network model.

Developed over roughly 4 years and implemented in its current state for nearly 3 years, the model has a solid real-world alpha-generating performance track record, discussed in detail below.

By-line

This insight provides an overview of our, machine learning-driven, proprietary GEM screening model, based on a Multifactor model, a Deep Neural Network model, and a Recurrent Neural Network model.

Detail

The top decile this month includes a high concentration of consumer stocks across various geographies. Notable new entrants include Bajaj Finance, Ambev, and Naspers.

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rank	Name	Sector	Location	prev.
1	JD.com, Inc. Class A	Consumer Discretionary	China	11
2	Tata Consultancy Services Limited	Information Technology	India	48
3	Kweichow Moutai Co., Ltd. Class A	Consumer Staples	China	30
4	Li Ning Company Limited	Consumer Discretionary	China	33
5	Maruti Suzuki India Limited	Consumer Discretionary	India	49
6	Naspers Limited Class N	Consumer Discretionary	South Africa	53
7	Ambev SA	Consumer Staples	Brazil	66
8	Saudi Telecom Co.	Communication	Saudi Arabia	42
9	Bajaj Finance Limited	Financials	India	100
10	Wal-Mart de Mexico SAB de CV	Consumer Staples	Mexico	46

Source: FactSet financial data and analytics, my estimates and calculations, Tensorflow, Keras, Google Colaboratory, pandas

The top quintile from the screening model is attached below as an easily downloadable and printable pdf. As usual, please feel free to reach out for the full output table, and any questions, clarifications needed, or suggestions. Please also refer to the following fundamental insights recently published on stocks featured in the top quintile:

- 2023 High Conviction: JD.com to Benefit from Discretionary Spend Recovery, Margin Progress on Track
- Indian IT Services: Weakening revenue dynamics, and above-fair valuation levels, keep us side-lined

Methodology

This proprietary screening model takes a three-pronged approach to find the best medium-term long ideas within the top 100 largest stocks in the MSCI GEM Index. It is based on 1) a typical quantitative multifactor screening model and two Artificial Intelligence Technology-based approaches using 2) a Deep Neural Network model, and 3) a Recurrent Neural Network model.

1) *Multifactor screening model:* This more closely resembles the traditional quantitative analysis multifactor screening models used by the buy-side. It encompasses 17 factors, grouped within traditional Quality,

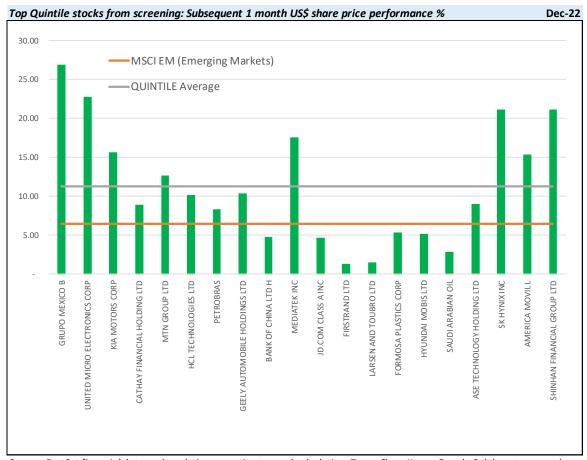
Valuation and Momentum buckets, and derives its outputs based on simple linear regression mathematics. The main benefit of this model is that it is very intuitive since the linear correlations between the factors and the output are easy to understand and track.

- 2) Deep Neural Network model: Using Artificial Intelligence technology, this model is based on a Deep Neural Network architecture where hidden data layers allow for sophisticated non-linear correlations between key input variables, segmented between Macro, Technical, Fundamental and Value inputs. This is similar architecture to that used in Image recognition (amongst many others). The value-add from this model is that it can derive meaningful conclusions from the non-linear inter-correlation of thousands of inputs per stock. This model is trained on over 300,000 data points (and growing) for each stock analysed.
- 3) Recurrent Neural Network model: Also using Artificial Intelligence technology, this model is based on a Recurrent Neural Network architecture. This is similar architecture to that used in most Natural Language Processing applications. This model also allows for sophisticated non-linear inter-correlations between key input variables, segmented between Macro, Technical, Fundamental and Value inputs. However, the main benefit of this model is that it also incorporates a "time"-dimension, very suitable for analysing time-series data, which allows the model to "look back" and contextualise inputs over time. This model is trained on up to 60,000 data points (and growing) for each stock analysed.

At its core, the model attempts to predict which stocks have a better probability of positive US\$ share price performance over the following 3-month investment horizon.

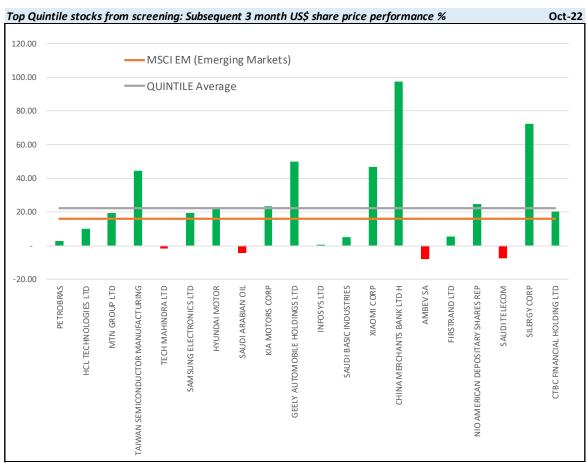
Previous screening performance

Although the model is trained to predict performance as measured over 3 months, it is useful to have a quick look at how last month's picks have performed, so far (Screening for GEMs: January 2023). Driven by the reopening of the Chinese economy, January 2023 was a very strong month for the Global Emerging Markets with its key equity index increasing by +6.5%. The top quintile from our model significantly outperformed its benchmark, delivering an average return of +11.3%. Overall, 13 of the top 20 stock picks managed to beat the benchmark, all delivering a positive return for the month.



Source: FactSet financial data and analytics, my estimates and calculation, Tensorflow, Keras, Google Colaboratory, pandas

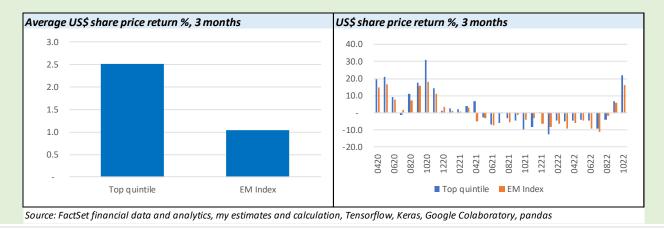
Looking back 3 months, to the end of October 2022's picks (Screening for GEMs: November 2022), we see a similar story. Due to the sharp rallies seen during November 2022 and January 2023, the key Global Emerging Markets equity index increased by +16.1% for the 3 months. The top quintile from our model managed to significantly outperform its benchmark, delivering an average return of +22.1%. Overall, 11 of the top 20 stock picks outperformed the benchmark, with 16 delivering positive returns.



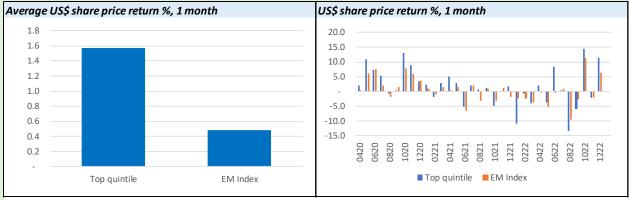
Source: FactSet financial data and analytics, my estimates and calculation, Tensorflow, Keras, Google Colaboratory, pandas

Model track record

It certainly needs to be conceded that statistical/quantitative models could be very susceptible to outliers and anomalies, but should over time, deliver mean or median performances which add value. When looking at the mean US\$ share price returns of the model over the targeted 3-month return period, historically, the top quintile stocks have managed to outperform the benchmark during 23 of the past 31 monthly runs (74%), generating an average monthly alpha of +1.5% in US\$.

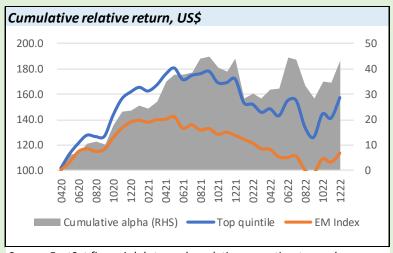


Shorter-term, we have also witnessed outperformance, albeit to a slightly lesser extent. When measured over a 1-month return period, the top quintile stocks have outperformed the benchmark during 21 of the past 33 monthly runs (64%), generating an average monthly alpha of +1.1% in US\$.



Source: FactSet financial data and analytics, my estimates and calculation, Tensorflow, Keras, Google Colaboratory, pandas

This level of outperformance has been significant. For illustrative purposes, had we run a model portfolio based on equal-weighted holdings in these top-quintile stocks, with monthly rebalancing, it would have outperformed the index by 43.4% over the past 33 months, in US\$, excluding friction costs.



Source: FactSet financial data and analytics, my estimates and calculation, Tensorflow, Keras, Google Colaboratory, pandas

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					Screening ranking		Screening ranking		Screening ranking		Screening ranking		ening ranking		ity of US\$	Quant Quality	Quant Value	Mementum	Al Macro	Al Technicals	Al Fundamentals	Al Value
ran	Sedol _		Sector	Location	Qua	DI	RI 🐣	DI Y	RI *	ra	ra_*	ra ▼	ra_▼	ra_*	ra ▼	ra						
1	BKPQZT6				7	8	8	80%	79%	18	39	19	75	14	11	51						
3	B01NPJ1 BP3R2F1	an age of the first of the control o	Information Technology Consumer Staples	India China	3 4	26 9	3 29	80% 80%	80% 74%	3 1	80 86	26 36	40 18	58 92	35 54	84 96						
4	ВО1ЈСК9		Consumer Discretionary		24	14	5	80%	79%	5	92	91	75	78	60	94						
5	6633712		Consumer Discretionary		23	16	4	80%	79%	29	55	21	40	94	32	73						
7	6622691 BG7ZWY7		Consumer Discretionary Consumer Staples	South Africa Brazil	27 11	10 23	15 24	80% 80%	77% 76%	27 19	57 43	74 22	97 6	7 40	56 29	77 39						
8	B12M7Q5			Saudi Arabia	14	12	33	80%	72%	24	45	24	61	35	64	35						
9	BD2N0P2		Financials	India	32	11	18	80%	77%	43	65	8	40	73	54	97						
10	BW1YVH8		Consumer Staples	Mexico	21	4	40	80%	68%	11	72	61	13	60	51	62						
11	6333937 B1YVKN8	0,	Utilities Consumer Discretionary	China China	25 26	40 17	1 32	79% 80%	80% 73%	34 10	33 74	58 96	75 75	43 54	13 96	33 91						
13	BYVW0F7	•			34	31	12	80%	78%	25	81	45	67	10	13	92						
14	2945422		Industrials	Brazil	16	1	62	80%	46%	8	93	16	6	6	50	90						
15 16	6205122 B0C5YV1		Information Technology Health Care	India Korea (South)	1 31	44 30	39 31	79% 80%	69% 73%	7 20	66 89	14 34	40 19	78 45	37 40	79 93						
17	6294896				5	55	35	78%	71%	12	47	23	40	47	33	57						
18	6563206		Communication	South Africa	17	80	7	53%	79%	33	22	59	97	90	76	30						
19	BD4T6W7	PT Telkom Indonesia (Persero) Tbk Class E		Indonesia	2	50	53	78%	52%	16	24	42	2	82	74	43						
20	B01B1L9 BYW4289		Consumer Staples Consumer Discretionary	China China	47	18 52	43 14	80% 78%	64% 78%	26 21	73 79	80 82	75 67	27 24	19 78	47 76						
22	6260734			Taiwan	8	32	69	80%	38%	13	56	29	31	32	69	54						
23	6261674		Consumer Staples	India	9	58	44	78%	59%	6	94	11	40	35	33	98						
24	6889106	Taiwan Semiconductor Manufacturing Co.			15	67	34	72%	72%	4	70	99	31	91	69	64 27						
25 26	6450267 BJTM270		Information Technology Energy	Korea (South) Saudi Arabia	33 13	65 79	19 26	74% 60%	77% 75%	48 14	8 52	100 62	19 61	86 98	94 80	46						
27	2242059	Fomento Economico Mexicano SAB de CV		Mexico	46	34	41	79%	67%	49	38	50	13	29	82	36						
28	6287841		Communication	Taiwan	95	5	22	80%	76%	68	99	27	31	56	45	48						
29	B1324D0	The state of the s	Materials	Saudi Arabia	77 57	38	9	79%	79%	64	41	72 70	61	67	77 66	19						
30	B0166K8 2667470		Industrials Communication	India Mexico	57 40	7 64	66 27	80% 74%	42% 74%	45 38	46 42	78 65	40 13	21 58	66 53	61 40						
32	BG0ZMJ9	Xiaomi Corp. Class B	Information Technology	China	52	57	23	78%	76%	30	59	97	75	64	40	62						
33	BSHYYN1		Financials	Saudi Arabia	30	53	51	78%	52%	69	16	12	61	71	51	34						
34 35	B012W42 6171900	Public Bank Bhd Housing Development Finance Corporation	Financials	Malaysia India	58 100	24	55 36	80% 80%	51% 71%	79 85	23 98	18 41	17 40	26 25	45 72	45 89						
36	6972459	China Resources Beer (Holdings) Co. Ltd.		China	35	13	90	80%	22%	15	85	75	75	49	9	88						
37	6194037	Kakao Corp.	Communication	Korea (South)	87	37	16	79%	77%	53	84	88	19	76	90	66						
38	6135661			India	94	27	20	80%	77%	91	87	2	40	27	15	94						
39 40	B08YDG0 2196286		Consumer Staples Materials	Thailand Brazil	49 6	43 91	49 45	79% 34%	55% 59%	39 22	78 19	15 67	1	12	48 69	70 18						
41	6527666		Financials	Taiwan	44	75	30	64%	73%	75	3	70	31	87	95	25						
42	6442327		Communication	India	53	51	46	78%	57%	47	67	31	40	13	73	87						
43	BG36ZK1 BMMV2K8		Financials	Brazil China	28 45	45 20	77 86	79% 80%	31% 25%	36	48 83	28 57	6	40 33	68 7	55 85						
44	6916628		Communication Information Technology	Taiwan	50	92	10	33%	78%	31 40	29	95	75 31	69	99	20						
46	B0JGGP5		Consumer Staples	India	10	61	81	76%	30%	9	60	47	40	85	49	75						
47	BM93SF4		Communication	China	29	60	64	77%	44%	23	71	73	75	94	31	68						
48 49	6536651 6503138		Consumer Discretionary Financials	China Kuwait	60 92	19 6	74 58	80% 80%	36% 49%	46 78	53 82	71 37	75 59	98 80	5 56	83 80						
50	6771720				72	3	82	80%	30%	51	49	93	19	33	99	31						
51	BLC90T0		Communication	China	56	81	21	53%	77%	62	51	6	75	11	8	60						
52	BCRWL65			India	12	47	99	79%	20%	2	90	49	40	38 52	96	99 37						
53 54	6651048 6322173	Emirates Telecommunications Group Com		Indonesia United Arab Er	42 38	69 46	47 75	71% 79%	56% 35%	74 32	17 62	64	2 73	52 89	28 63	65						
55	BL6B9P1	The state of the s	Health Care	China	76	29	57	80%	49%	35	88	79	75	47	26	100						
56	6193766		Real Estate	China	54	70	38	69%	70%	54	31	77	75	9	44	13						
57 58	BK6YZP5 6709099	Alibaba Group Holding Ltd. PT Bank Rakyat Indonesia (Persero) Tbk Cl		China Indonesia	18 61	56 62	91 42	78% 75%	22% 65%	28 72	28 36	68	75 2	39 63	25 38	48 42						
59	6411673		Financials	Taiwan	51	87	28	39%	74%	60	15	76	31	69	88	21						
60	B12LZH9	Al Rajhi Bank	Financials	Saudi Arabia	88	68	13	72%	78%	71	75	54	61	98	66	77						
61	BPFJHC7			India	78	21	70	80%	38%	98	37	1	40	1	17	58						
62 63	BGJW2K2 B01FLR7	Adani Total Gas Ltd. Ping An Insurance (Group) Company of Ch		India China	84 36	74 82	11 52	64% 51%	78% 52%	55 63	100	9 83	40 75	23	56 6	17 14						
64	B037HR3		Financials	Brazil	82	63	25	75%	75%	88	30	53	6	45	80	23						
65	6372480	MediaTek Inc	Information Technology	Taiwan	19	88	67	38%	42%	17	35	86	31	50	75	21						
66	B0FXT17		Communication	China	64	41	72	79%	36%	50	32	98	67	66	36	48						
67 68	6560393 6624471	•	Communication Financials	Korea (South) United Arab Er	70 89	15 36	93 54	80% 79%	22% 52%	37 90	69 64	90	19 73	88 40	83 27	67 32						
69	BGJW376	Meituan Class B	Consumer Discretionary	China	90	84	6	42%	79%	73	95	20	75	31	12	68						
70	B8F8822	Mahindra & Mahindra Financial Services L			85	35	60	79%	49%	93	44	17	40	18	38	53						
71 72	6148197 BSQCB2		Financials Financials	Qatar India	73 63	59 39	50 80	78% 79%	54% 31%	82 92	26 18	38 5	67 40	56 5	4	41 38						
73	6693233		Materials	Korea (South)	93	89	2	36%	80%	81	58	85	19	20	93	7						
74	B01VRK0	Adani Enterprises Limited	Industrials	India	98	71	17	67%	77%	89	96	10	40	2	56	72						
75	6771645				80	48	61	79%	46%	58	76	66	19	75	42	71						
76	B1DYPZ5 6346913		Financials Materials	China Korea (South)	69 74	85 33	37 87	42% 80%	70% 25%	87 42	11 68	44 92	75 19	50 72	21 98	26 44						
78	6099626		Energy	India	62	49	84	79%	27%	52	63	56	40	15	91	52						
79	BSZ2BY7	ICICI Bank Limited	Financials	India	81	22	94	80%	21%	96	54	3	40	22	30	74						
80	6606996		Financials	South Africa	41	73	83	64%	29%	65	9	43	97	76	64	28						
81 82	6291819 6718976	China Petroleum & Chemical Corporation China Life Insurance Co. Ltd. Class H	Energy Financials	China China	22 37	98 78	78 88	29% 61%	31% 24%	59 76	1 2	48 60	75 75	84 19	22 24	1 16						
83	6190950			Taiwan	79	28	96	80%	21%	66	40	69	31	81	61	29						
84	6438564			Taiwan	68	72	65	66%	43%	70	27	55	31	64	62	9						
85	B01C1P6 BK1K3N2		Financials Consumer Discretionary	Indonesia	65 67	42 76	98 63	79% 63%	21% 45%	56 44	77 61	13 81	2 67	67 3	2 47	80 86						
86 87	B1G1QD8	Industrial and Commercial Bank of China L		China China	66	94	48	31%	45% 56%	84	14	39	67 75	60	22	6						
88	B00FM53		Financials	Brazil	91	66	56	73%	50%	97	50	35	6	54	84	8						
89	6490928		Consumer Discretionary		39	95	79	30%	31%	57	20	46	19	96	3	5						
90 91	BOLMTQ3 B030GJ7	China Construction Bank Corporation Class Standard Bank Group Limited	Financials Financials	China South Africa	59 55	96 83	59 76	30% 50%	49% 34%	83 86	13 5	32 33	75 97	62 35	19 92	3 15						
91	2682365		Energy	South Africa Brazil	20	100	76 95	20%	21%	41	10	63	6	97	92 87	2						
93	2421041	Grupo Financiero Banorte SAB de CV Class		Mexico	48	77	92	62%	22%	80	7	52	13	15	1	24						
94	B3C8VY3		Materials	Saudi Arabia	97	25	100	80%	20%	61	91	84	61	43	89	80						
95 96			Financials	Kuwait Korea (South)	99 86	54 86	71 73	78% 40%	37% 36%	94 100	97 6	25 89	59 19	52 17	85 79	59 11						
	6889526 B3DEOV6	KB Einancial Group Inc							2070	100	O	03	13			11						
97	B3DF0Y6		Financials Financials	China				29%		95	12	40										
97 98		Bank of China Limited Class H	Financials Financials Financials		71 96	97 93	85 68		25% 39%	95 99	12 21	40 87	75 19	73 29	10 86	3 12						
	B3DF0Y6 B154564	Bank of China Limited Class H Shinhan Financial Group Co., Ltd. Hyundai Motor Company	Financials	China Korea (South) Korea (South)	71	97	85	29%	25%				75	73	10	3						

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I/We disclose that as of 2 February 2023:

- I/We have position(s) in any of the securities referenced in this Report.
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