



CFA Institute Research Challenge
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Collapse of the Asian Gateway: We initiate coverage with a Sell recommendation on Singapore Exchange Limited (SGX), with a target price of S\$7.78, representing a downside of 10.5%.

Our take on SGX:

Equities to continue languishing with net delisting and low turnover velocity: SGX's equity revenue has been decreasing over the past few years due to a persistent net delisting, which lead to an overall lower securities market capitalisation. On top of that, SGX's turnover velocity has also been decreasing which leads to a lower SDAV. We are pessimistic that the equities segment will improve in the near foreseeable future.

Impending competition from HKEX for SGX's most popular derivative contract: China A50 Shares represents approximately 51% of the total derivatives volume traded in FY2019. It has been the most popular derivative contract in SGX as it's the only China's A shares offshore products. On 11 March 2019, HKEX made an announcement of launching a MSCI China A shares index futures. This will be the second offshore product that allow investors to gain exposure to the China A shares Index.

Respite from geopolitical tensions to reduce risk management demand and derivatives volume: With US-China Trade War cooling down and the signing of Phase 1 Trade deal, we believe that the market outlook for FY2020 will be less uncertain compared to the previous year. On top of that, we believe that the Iron Ore prices fluctuation in FY2019 is mainly due to supply shocks that occur in the first half of the year. With the effects of such events waning and the prices normalizing, we foresee a lower demand in risk management.

Valuations: With a 5-year DCF valuation model as our primary valuation methodology, factoring in a WACC of 6.44% and terminal growth rate of 2.5%, we arrived at a target price of S\$7.78, representing a downside of 10.5% from the last closing price. Our target price corresponds to an implied P/E of 21.4x which is still consistent with the industry norms. We strongly believe that SGX currently does not offer a compelling risk-reward profile for investors given its positioning against macro headwinds and its sole reliance on a single revenue stream.

Key Risks:

Market Risk 3: Possible increase in volatility for the future market outlook due to US 2020 Election Results.

Market Risk 1: Possible re-escalation of US-China Trade war or any other natural disaster that increase the demand for risk management and hedging needs.

Financial Valuation and Key Metrics:

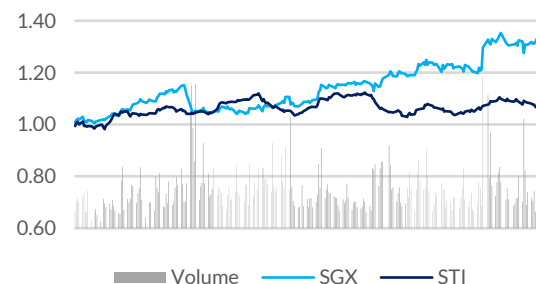
Year	FY19A	FY20E	FY21E	FY22E	FY23E	FY24E
Revenue (\$m)	910	901	876	906	936	967
Rev Growth (%)	391	385	371	380	388	397
Net Income (\$m)	36.4	35.8	34.6	35.4	36.2	37.0
EPS (\$)	34.1	29.8	34.7	35.3	35.9	33.7
CFPS (\$)	7.7%	-1.0%	-2.8%	3.4%	3.4%	3.3%
ROA (%)	18.3%	18.8%	18.8%	19.6%	20.5%	21.6%
ROE (%)	35.9%	36.4%	37.3%	41.1%	46.1%	52.9%
P/E (x)	21.74x	21.89x	23.56x	23.22x	22.87x	22.44x
EV/EBITDA (x)	33.09x	33.46x	34.56x	33.86x	33.31x	34.85x
P/B (x)	7.80x	7.93x	8.75x	9.52x	10.51x	11.83x

Source: Company data, Vanda Capital estimates

Basic Information

Recommendation	SELL
Current Price	S\$8.70
12 Mth Target Price	S\$7.78
Downside	-10.5%

1 Year Price vs STI (Rebased)



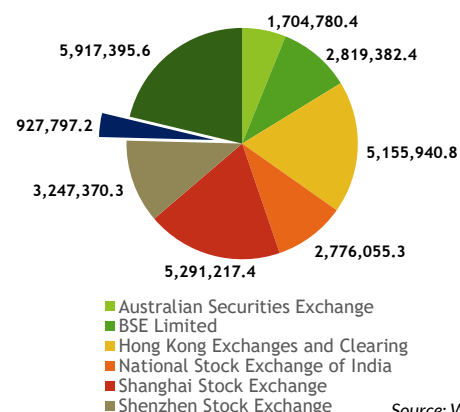
Key Financials

Market Cap (\$m)	9,596
Shares Out. (mm)	1,071
Avg 3M Daily Vlm (mm)	2.79
Float %	76.4%
ROE (%)	35.8%
P/E Ratio	23.4x
Dividend Yield %	3.3%
52 wk High/Low	7.12 to 9.23

Major Shareholder

Temasek Holdings Pte Ltd	23.3%
Japan Exchange Group	3.40%
The Vanguard Group	2.10%
Black Rock Fund Advisors	1.70%

SGX's Market capitalization vs APAC exchanges



Source: WFE

1. Business Overview

Singapore Exchange Ltd (SGX) listed on 23 November 2000 and is Asia's 2nd largest exchange, with a FY19 market capitalization of listed equity securities totaling \$3,863 billion (Figure 1.3). While its securities segment was its biggest revenue contributor, accounting for 46% of its FY10 revenue (Figure 1.1) its derivatives segment has taken over that role, accounting for 51% of its FY19 revenue (Figure 1.2) and it plans to continue building this segment. Today, the Singapore-based, integrated securities exchange derives revenue from three business segments. SGX's equity and fixed-income segment (38% of FY19 revenue) provides issuer, securities trading and clearing, and post trade services. Its derivatives segment (51%) provides a market for equity, currency, and commodity derivatives, and the exchange also has a market data and connectivity business segment (11%) (Figure 1.2). With SGX having an appealing derivatives segment based on our SWOT analysis in Appendix B-2, growth potential for SGX could look to hinge on the future risk management needs of the regional investors. From 1QFY20, SGX reorganized its business segments and correspondingly reclassified its revenues. However, for this report, we use the pre-FY20 classification to maintain continuity and highlight the implications of the reclassification, where appropriate.

2. Industry Overview & Competitive Positioning

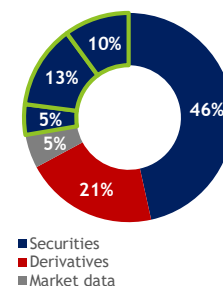
2.1 Key Industry Factors. Singapore Exchanged Limited (SGX) supports the financial arm of Singapore's economy in being the sole capital market of Singapore companies and global MNCs look to raise capital for the expansion of their business. Therefore, local and global macroeconomic developments would significantly impact SGX's top line. Services offered by SGX include clearing and settlement fees from new listings to contracts and financial data provider. Being a key financial service provider, attractiveness of a strong economy and financial hub is a critical factor for the success in driving volume towards SGX. In addition, SGX functions as a self-regulatory organisation (SRO) in which they have duality of roles as a front-line market regulator and a commercial organisation. New tighter regulations passed by Singapore's government might dampen with the on-going obligations of ensuring enough liquidity within the capital market to their investors. Refer to Appendix B-1 for our detailed Porter 5 Forces on the Industry.

2.2 Competitive Positioning

SGX attempts to differentiate itself from other Asian exchanges in one of three ways. First, SGX positions itself as a single-point access and conduit to Asia capital markets. Compared to its competitors, SGX offers a wide range of Asian equity derivatives and currency derivatives. In some cases, SGX has products that allow for exclusive offshore access to other Asian markets, such as its Nifty derivatives and the SGX FTSE China A50 Index futures (Figure 2.1).

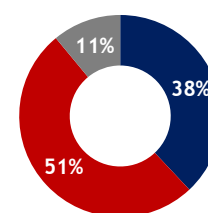
Second, SGX prides itself on being a multi-asset exchange, being a marketplace for capital-raising products such as equity and fixed-income securities, as well as access and risk-management products such as equity, currency, and commodity derivatives. Compared with other Asian exchanges, SGX seems to be relatively successful in its diversification efforts (Figure 2.2). In comparison to SGX's main competitors HKEX and CME, SGX holds a dominant front in offering a well-balanced mix of equities and derivatives asset classes (Appendix A-1). By covering a wide range of asset classes SGX is able to cater to the risk appetite of global investors looking to gain exposure to the Asian marketplace.

Fig 1.1 Securities dominating FY10 revenue mix



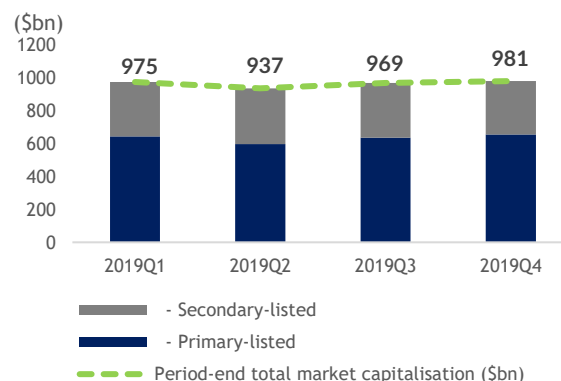
Source: Company data

Fig 1.2 Derivatives leads in FY19 revenue mix



Source: Company data

Fig 1.3 Increasing securities market cap in FY19



Source: Company data

Fig 2.1 Regional Exchanges geographic reach in APAC based on Products provided

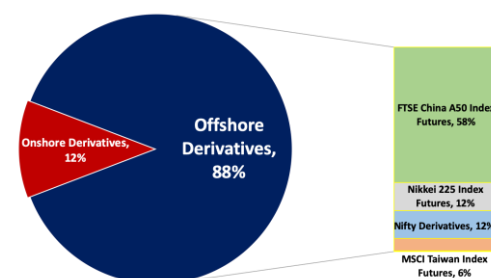
	APAC Offshore Products					
	SGX	HKEX	SET	JPX	PXP	NSE
Singapore						
Hong Kong						
China						
India						
Japan						
Thailand						
Philippines						
Taiwan						

Source: Team estimates

This multi-asset strategy benefits SGX as its top line is not overly dependent on any one particular source, resulting in resilient revenues. It is also potentially appealing to market participants as they can benefit from trading multiple asset classes on the SGX. For instance, as a one-stop platform, SGX allows participants to trade the “virtual steel mill”, which comprises commodities futures contracts related to steel; this allows for capital efficiencies that are not otherwise possible by trading different futures contracts with multiple other exchanges.

SGX claims that 50% of its market participants trade more than one asset class on its platform and our correlation analysis corroborates this claim. The correlations for traded volumes of its iron ore derivatives are largely positive, as are correlations between its iron ore and coking coal derivatives (Figure 2.5).

Fig 2.2 SGX's derivatives product mix



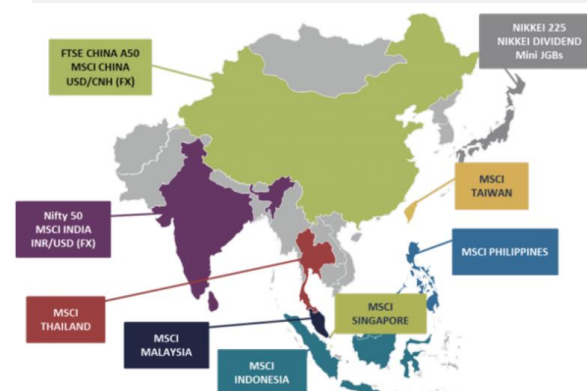
Source: Team estimates

Fig 2.5 Correlation of Steel Value Chain

Virtual Steel Mill Correlation Matrix	Coking Coal	Iron Ore 62%	Iron Ore 65%	Iron Ore Lump	Forward Freight
Coking Coal Futures	1.00				
Iron Ore 62% Futures	0.25	1.00			
Iron Ore 65% Futures	0.24	0.56	1.00		
Iron Ore Lump Premium Futures	0.28	-0.06	-0.09	1.00	
Forward Freight Agreement Futures	0.51	0.30	-0.17	0.51	1.00

Additionally, the correlation between traded volumes of its Nifty derivatives and USDINR futures is positive, but zero when benchmarked to the correlation with USDCNH futures. Although the correlation between traded volumes of its FTSE China A50 and USDCNH futures is positive, it is also equally positive when benchmarked to the correlation with USDINR futures; however, these correlations are likely spurious since the FTSE China A50 futures contract is settled in USD (Figure 2.6).

Fig 2.3 Offshore Derivatives



Source: Team estimates

Fig 2.6 Index & FX Futures Correlation

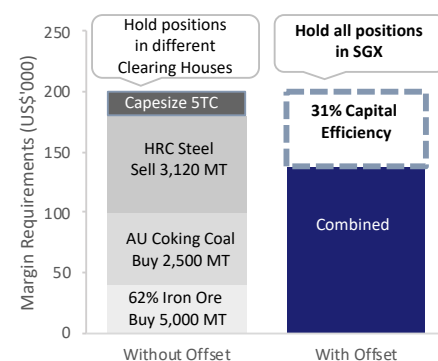
Index & FX Futures Correlation Matrix	INR_USD FX Futures	USD_CNH FX Futures
FTSE China A50 Index Futures	0.40	0.29
Nifty 50 Index Futures	0.34	0.04

Third, SGX operates in an environment that is conducive for a capital market to thrive. Singapore is a politically stable country with low, transparent taxes, and a sound legal and regulatory framework. Its strong economy attracts international companies to base their operations in the country and its status as a financial hub attracts capital flows. As the only exchange in Singapore, SGX has pricing power for its equities segment because investors can only trade single-listed equities on its platform. However, SGX is not the only exchange operating under a favorable legal, economic, and regulatory environment. It is often compared to Hong Kong Exchanges and Clearing Ltd (HKEX), which is a preferred listing destination for many companies.

3. Investment Thesis

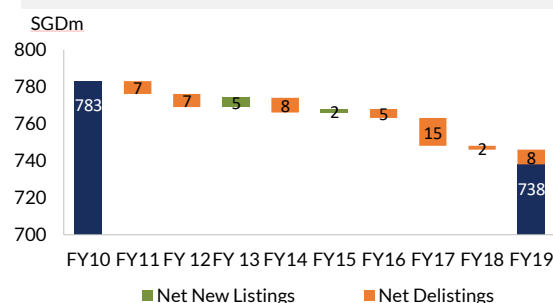
3.1 Equities to continue languishing with net delisting and low turnover velocity Net delisting over the years has reduced equity proportion of listing revenue – SGX has experienced an average annual net new delisting of approximately 5 in the last 10 years this is further elaborated in Appendix C-1, reducing its number of listed equity securities from 783 in FY10 to 738 in FY19 (Figure 3.1.1).

Fig 2.4 Capital Efficiencies in Steel Value Chain



Source: Team

Fig 3.1.1 Net delisting outpacing New listings



Source: Company data

Its inability to retain and attract listings has resulted in a corresponding decrease in equities listing revenue from \$34.54 million to \$29.81 million over the period. The total listing revenue however may appear to be increasing, but the increase in listing revenue is due to the increase in Fixed Income Listing Revenue. (Figure 3.1.2). Even worse, the average listing is becoming smaller: the average market capitalization of a new listing has decreased from \$380 million in FY10 to \$85 million in FY19.

Lower turnover velocity and average clearing fees have led to declining clearing revenues - All else equal, the smaller market capitalization translates into lower traded values and, hence, smaller access and clearing revenues as they are based on contract values. However, all else is not equal. Turnover velocity has actually declined, from 59% in FY10 to 36% in FY19, which resulted in a decrease in securities daily average traded value (SDAV) from \$1.54 bn to \$1.04 bn over the same period (Figure 3.1.3). In an attempt to stem the decline in SDAV, SGX introduced market makers and liquidity providers (MM/LPs) in June 2014, which contributed to a moderation of the decline in the latter half of the decade. However, this has come at a cost—as clearing fee rebates are given to MMLPs to help boost liquidity, this resulted in a reduction of the average clearing fee from 3.01 bps in FY15 to 2.66 bps in FY19. (Figure 3.1.4) The end result is a consistent decline in clearing revenues throughout the decade, caused primarily by declining SDAV in the early half and average clearing fees in the later half.

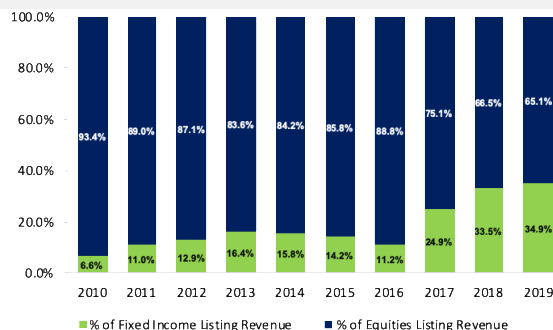
Going forward, we do not expect the abolishment of quarterly reporting requirements to reverse the trend of net delisting (Appendix C-1). Also, in spite of the protests in Hong Kong, we do not find evidence that SGX is benefitting at HKEX's expense (Appendix C-2) and, thus, expect SDAV and average clearing fees to stay muted for the foreseeable future.

3.2 Impending competition from HKEX for SGX's most popular derivative contract

China A50 directing SGX's revenue - For FY15-19, the total revenue for SGX has moved in tandem with its derivatives revenue, which is in turn driven primarily by the volume of its FTSE China A50 Index futures contract (Figure 3.2.1). Since SGX's operating expenses of relatively stable from year-to-year, this implies that SGX's share value will be particularly sensitive to volume fluctuations. In FY19, equity derivatives account for the largest proportion (82.81%) of derivatives volume traded on the SGX, with the FTSE China A50 being its most popular contract, representing 46.77% of traded volume (Figure 3.2.2). This is largely because the FTSE China A50 is currently the only offshore futures on the China A-Share market.

A fierce competitor looms - However, this monopoly will be over at some point, as the Hong Kong Exchanges and Clearing (HKEX) intends to launch its MSCI China A Index futures contract. Although the launch date has not been firmed up, the announcement of HKEX's plans in March 2019 saw SGX's share price fall by from \$8 to \$7.38 (-8.04%) over an 11-trading day window centered on the announcement date of 11 March 2019 (Figure 3.2.3). This slump was the worst slide in 13 months. Applying a drop of this magnitude to our valuation model implies the market estimates a FY21 volume reduction of at least 15% for SGX's FTSE China A50 contracts and a market share erosion of 33% on China A50 futures volume (Appendix D).

Fig 3.1.2 Increase in Listing Revenue drop is bolstered by Fixed Income Listing Revenue



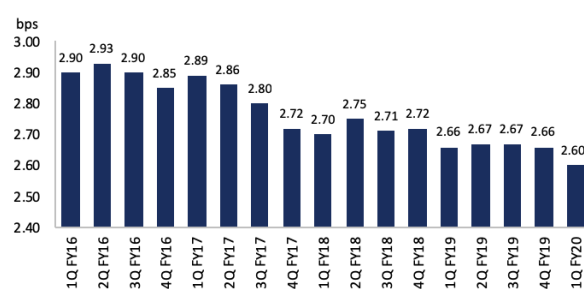
Source: Company Data

Fig 3.1.3 SDAV has dwindled due to lower turnover velocity in the first half of the decade...



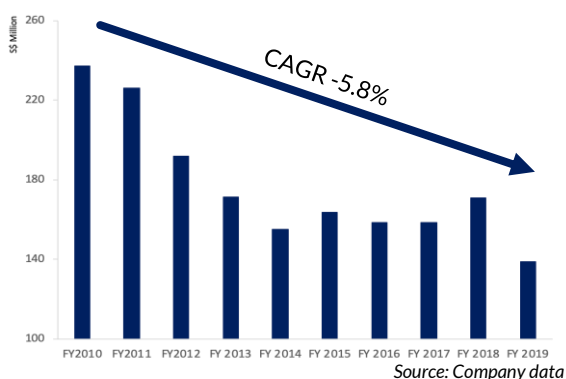
Source: Company data

Fig 3.1.4 ...while average clearing fees have declined in the second half...



Source: Company data

Fig 3.1.5 ...resulting in declining clearing revenues throughout the decade



Source: Company data

Therefore, we believe that HKEX's launch of its MSCI China A poses a real threat to SGX, making existing volumes for its FTSE China A50 unsustainable. Furthermore, HKEX does not appear to be done, with strategic plans in place to launch new fixed-income, commodities, and currencies products to build up a renminbi-based derivatives market.

Also, as China continues to open its financial markets, it may also encourage investors to trade A-share index futures onshore instead. Also, as the Shanghai-/Shenzhen-Hong Kong Stock Connect continues to mature, northbound trading may become the preferred mode to access the A-share market directly instead of through derivatives. We would be remiss not to mention the growth in SGX's currency and commodity derivative volumes, which have been growing at FY15-19 CAGRs of 58.22% and 29.27%, respectively (Figure 3.2.4)

Despite the growth, these segments only account for 8.40% and 8.79%, respectively, of FY19 total derivatives volume (Figure 3.2.2). Also, although offering complementary products such as those in the virtual steel mill suite and Nifty with INR_USD derivatives increases customer stickiness, these synergies are double-edged and can be lost should a competing exchange launch a similar suite of complementary products. This possibility is quite real as financial products are particularly amenable to replication.

3.3 Respite from geopolitical tensions and recovery from supply shocks to reduce demand for equity and commodity risk management

Cooling of US-China Trade War – With the signing of Phase 1 of the US-China trade deal in January 2020, the US cancelled the 15% tariffs that it had planned to levy on USD 160 billion of key Chinese goods in December 2019, and existing tariffs of 15% on another USD 120 billion in goods that have been in place since September 2019 will be halved to 7.5%.

This bodes well for China in the short-term. Historically, we observe an inverse relation between volumes of the FTSE China A50 and the China Cyclical Activity Tracker (CAT), an alternative way formulated by Fernald, Gerstein, and Spiegel to measure fluctuations in Chinese economic activity using a weighted average of non-GDP indicators (Figure 3.3.1). The inverse relation likely occurs because there is less demand for risk management products when China's economy is doing well and vice versa. With an easing of the US-China trade war, the China CAT is likely to see an uptick, implying lower FTSE China A50 volumes in the near term.

Stabilising of Iron Ore Prices – Iron ore prices have seen extreme volatility in CY19, especially in the second half of the year. The sharp increase in iron ore prices from \$72.35/tonne at the start of the year to a high of \$126.20/tonne by July 2019 is due to supply shocks—namely, the dam disaster of a Vale mine in Brazil, which significantly affected Vale's production, and cyclone damage in Australia, which resulted in lower output from BHP and Rio Tinto. These three mining companies account for 25% of the world's iron ore production while Brazil and Australia account for 55.80% (Figure 3.3.2). The resulting price volatility led to a significantly greater traded volume of iron ore derivative contracts—5.85 million contracts in 1QFY20 versus 2.95 million contracts a year earlier a 98% increase.

Fig 3.2.1 FTSE China A50 futures driving SGX's total revenue

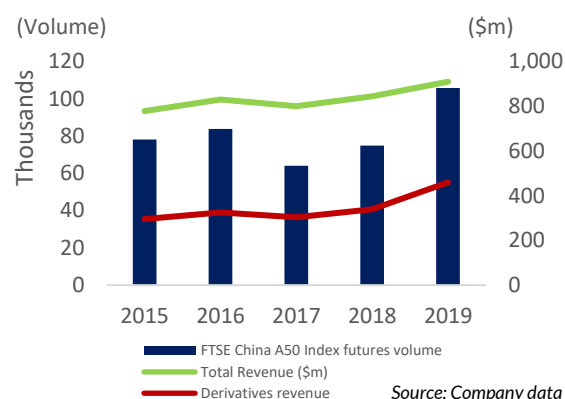


Fig 3.2.2 Equity index derivatives having the largest volume traded (FY19)

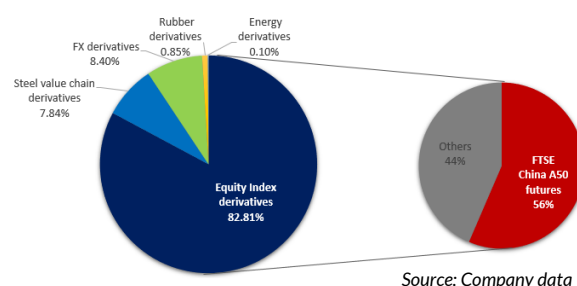
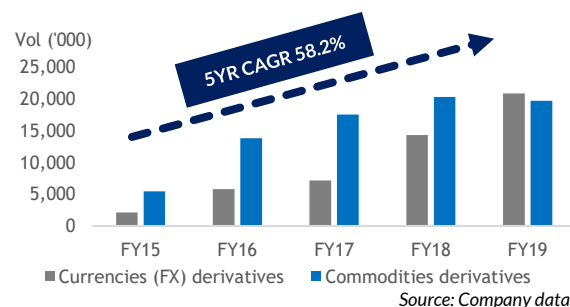


Fig 3.2.3 Drastic drop in SGX share price after announcement of MSCI China A futures



Fig 3.2.4 Rapidly increasing currencies and commodities derivatives volume traded



However, as the effects of these supply shocks wane and price volatility normalizes, the need for hedging price risk decreases. This is corroborated by the traded iron ore derivatives volume of 4.08 million contracts in 2QFY20, which only represents a 5% increase over the 3.90 million contracts traded a year earlier (Figure 3.3.3). Looking ahead, we expect iron ore prices to stabilize (Figure 3.3.4) and expect iron ore derivatives traded volumes to moderate, as will traded volumes for freight derivatives given the positive correlation.

We are mindful of the fast-evolving situation of the 2019-nCov, which has a degree of spread and extent of damage that is difficult to assess. As of this writing, however, if the experience of SARS is any guide, it is unlikely to have too big an impact on market uncertainty and traded derivative volumes (Appendix E-1).

4. Financial Analysis

4.1 Segmented revenue contribution – The growth of the Derivatives segment is the highest at 9.2%, albeit with the largest variance. The dependence of the derivatives volume on market and macroeconomic conditions makes it the most susceptible to variation with high global uncertainty in recent years and potentially the years ahead. The growth of the Equities and Fixed Income segment has been mostly flat from FY2015 to FY2018. The recent drop in FY2019 resulted in a negative CAGR of -2.8%. This is tied to the negative net equity listings and fee structure of the fixed income portion. This segment will decrease in its total revenue contribution, being on the decline. Overall, this will result in SGX being even more sensitive to market and macroeconomic conditions as the highly volatile revenue segment of derivatives is expected to represent a larger proportion of SGX's revenue. (Figure 4.1 & 4.3)

4.2 Weakening EBIT Margins – SGX's EBIT margins have been weakening throughout the years comparing to EBIT growth (Figure 4.2). Growth is due by nature of business, however, SGX's increase in total revenue while stagnating EBIT margins reveals that its business cost efficiency did not improve despite heavy investments in technology related expense.

4.3 Decreasing Efficiencies - Revenue per software has been declining over the years at a CAGR of -2.8% (Figure 4.5); SGX has poor productivity despite being in a global environment of heavy technological advancements. Refer to Figure 4.4 for its biggest OPEX cost components. However, financial measures of efficiency are less appropriate to measure a firm like SGX (Appendix F).

4.4 Declining ROE – Perhaps the most important indicator for investors, SGX's Roe has been declining ROE from 35.7% to 33.13%, in the period of 3 years (2015 to 2018). We do however realize and note that the ROE in 2019 is 35.85%, which we believe is a one-off situation due to an exceptionally high revenue earned in derivatives, which lead to a higher Total Asset Turnover. Using the DuPont analysis, we broke down the ROE segments. **1) Net Profit Margin Dropped from 2015A** – SGX traditionally has a rather constant Net Profit Margin, however based on the trend of the past 5 years, the Net profit margin is dropping compared to 2015A. **2) Total Asset Turnover Ratio** – SGX peaked the 5-year ROA at 2015A with 0.43x, and performed rather stable in this test, with the average between 39x to 43x (Appendix M). **3) Equity Multiplier** – As the company is a full equity firm, the equity multiplier is healthy with 1.95x in 2019A, a 0.1x increase from 2015A. Refer to Appendix H for the graphs of each DuPont Analysis breakdown in detail.

Fig 3.3.1 China cyclical activity tracker looking to turn positive after phase 1 deal

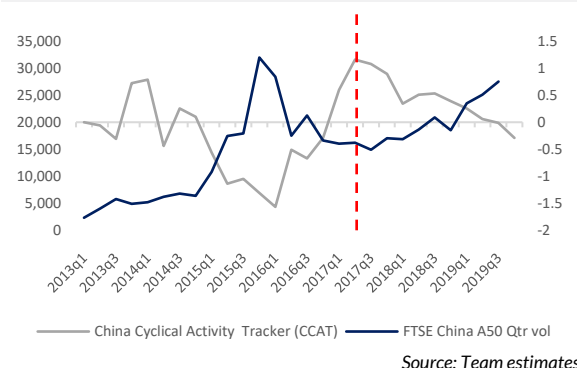


Fig 3.3.2 Top 3 mining companies comprises a quarter of global iron ore production

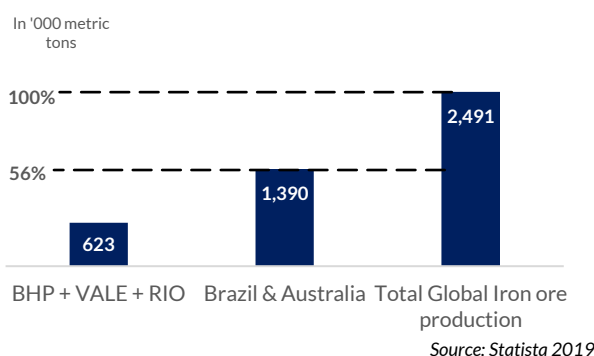


Fig 3.3.3 Decreasing y-o-y traded volume for iron ore derivatives

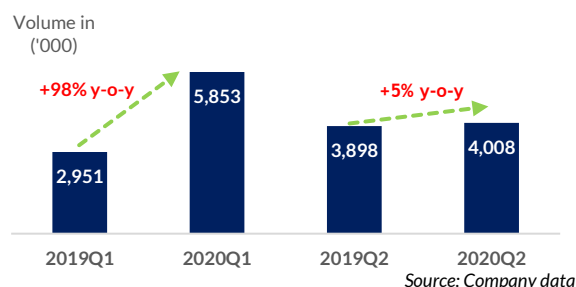
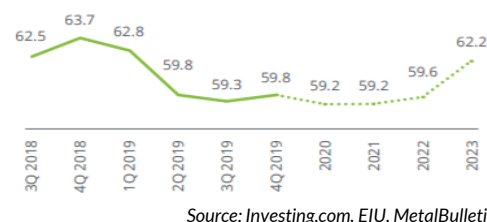


Fig 3.3.4 Iron ore prices relatively stable in 2020 & 2021



5. Valuation

Given SGX's stable operating cash flows and predictable capex requirements, we adopted a 5-year DCF valuation model as the primary valuation method (Appendix L). Based on a WACC of 6.44% and a terminal growth rate of 2%, we arrived at a target price of S\$7.78, representing a downside of 10.5% from the current price of S\$8.70. Our target price corresponds to an implied P/E of 21.4x and EV/EBITDA of 15x, which are relatively reasonable when compared to its peers (Appendix K).

5.1 Revenue projection – We projected each revenue segment separately using key drivers of those revenues, and incorporate our investment thesis into the projections, where applicable. Comparing the initial and reclassified revenues for 1QFY19, we were able to separate equity and fixed-income listing revenues.

(1) Equities revenue – Equities revenue is projected based on each revenue stream. Listing revenue is split by fixed income and equity listing revenues. Fixed-income Listing is projected based on the number of bond listings and the listing fees. We believe the high number of bond listings in FY19 and 18 to persist due to an increase in China Companies tapping onto offshore funds. Equities listing is projected based off the Market Capitalization in SGX. The Market Capitalization is reduced based on the historical average rate of net delisting. Securities clearing is forecasted based off the SDAV and Effective clearing rate. The SDAV is derived from the Market Capitalization we have computed and an estimated turnover velocity. Refer to Appendix I-2 for the other projections.

(2) Derivatives – Derivatives Contracts are forecasted based on their volume traded and the respective average clearing fee for Equities Derivatives and FX & Commodities Derivatives.

Equity Derivative's average clearing fee is derived to be \$1.78. The volume traded is expected to decline as the US-China Trade tensions unwind. Declining revenue from key equity-derivatives products, will be further exacerbated by the expected release of MSCI China A50 Futures by HKEX to capture a market share of 33% in the 2021E onwards respectively against SGX- (Figure 5.2). It is reference from the case study of CME sharing the Japan Nikkei 225 futures, read more in Appendix D-2. We then projected our revenue using the average fees per contract of traded in Derivatives – Equity segments of S\$1.78 (2019 reclassified), further elaborated in Appendix I-2.

FX Derivative's average clearing fee is derived to be \$3.25. The volume is projected based on the regression analysis on the FX derivatives respective countries inflation rate. The regression analysis conducted shows a **strong correlation coefficient**. As the volatility of the currencies are vulnerable to the respective countries inflation rate from our analysis in the international economics.), further elaborated in Appendix I.

(3) Market data connectivity – Management announced to double the DCI revenue segment within 5 years. However, based on the recent acquisition of Scientific Beta (Appendix G), we derived a projected CAGR of 8% based off the AUM under Scientific Beta.

Fig 4.1 Segmented revenue contribution

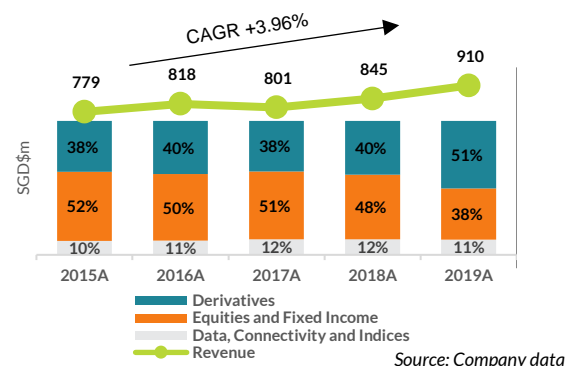


Fig 4.2 Weakening EBIT Margin

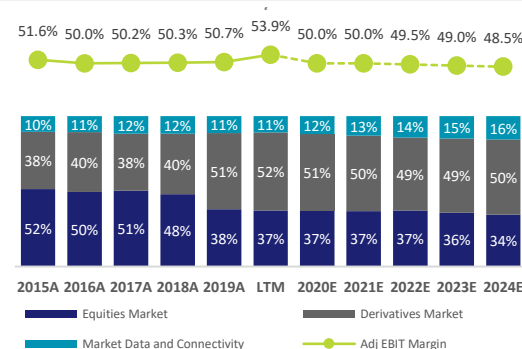


Fig 4.3 Segmented CAGR of Business lines

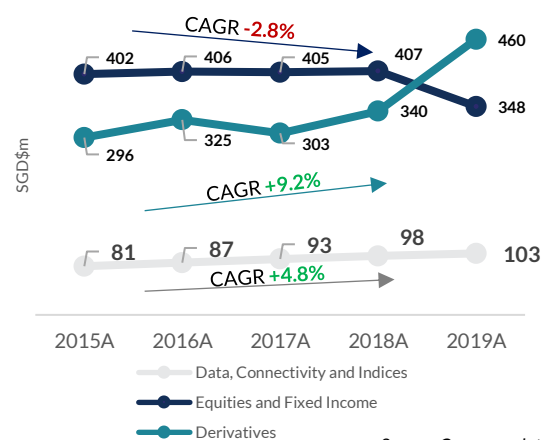
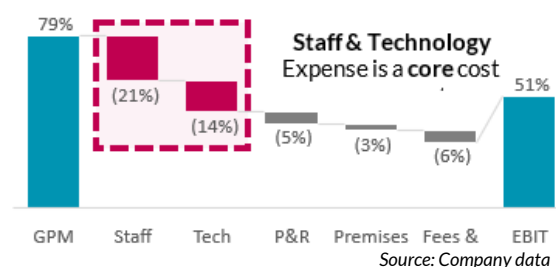


Fig 4.4 Staff & Technology as core cost



5.2 WACC and terminal growth – As SGX operates fully in Singapore, the team uses the average 10-year STI market return of 7.25%. Furthermore, the team uses AAA-rated Singapore 10Y government bond with a yield of 1.46% remains the best proxy for a risk-free rate, hence, obtained a 5.84% as market risk premium. (Figure 5.1) For Beta, we used a bottom-up approach to attain a beta of 1.10 after including the 1.5 billion debt in SGX's capital structure (Appendix N). Lastly, a terminal growth of 2% is attained by the average of forecasted inflation rate from 2% to 3% as announced by SGX management, combined with the forecasted inflation rate from IMF at 1.3%.

Figure 5.3 Selected Trading Comparable Analysis

Company Name	Fiscal Period	Price	Shares Outstanding	SGD Denominated Market Cap	Enterprise Value	EV/EBIT	EV/EBITDA	P/E	NTM P/E
SGX	06/30/2019	8.4	1072	9,034	8,343	19.3x	18.2x	32.0x	22.7x
London Stock Exch Grp	12/31/2019	126.7	350	79,756	46,353	16.0x	16.3x	73.6x	37.2x
ASX	06/30/2019	75.8	194	13,784	13,269	16.4x	18.0x	37.5x	32.2x
HKEX	12/31/2019	39.7	1261	8,520	14,477	26.0x	10.8x	49.7x	33.0x
Nasdaq	12/31/2019	135.9	165	30,435	27,144	17.8x	16.5x	31.7x	20.8x
Japan Exchange Group, Inc.	31/3/2019	1799.0	535	12,522	848,630	13.8x	13.1x	24.5x	24.2x
CME Group	12/31/2019	204.1	358	99,483	76,414	26.3x	25.5x	40.6x	30.2x
Sum				253,534		135.68x	118.38x	289.45x	200.40x
Mean						19.38x	16.91x	41.35x	28.63x
Median						17.85x	16.49x	37.53x	30.19x
Weighted Averaged						20.32x	18.05x	45.24x	29.17x
1st quartile						16.19x	14.69x	31.81x	23.48x
3rd quartile						22.65x	18.11x	45.10x	32.59x

5.3 Alternative valuation methods – To supplement our primary DCF valuation, we used the Exit-multiple (EV/EBITDA) based DCF model, which derived an intrinsic share price of S\$7.73, which is below that of our TP of S\$7.78.

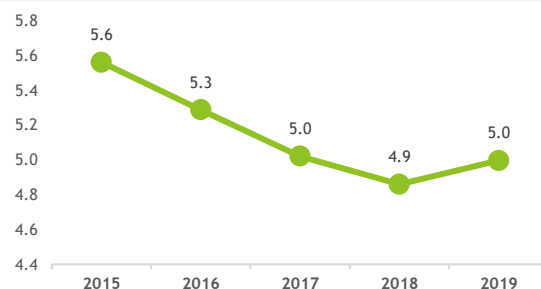
On a relative valuation basis (Figure 5.3), SGX is currently trading at an NTM forward P/E of 22.7x, as compared to a mean NTM P/E benchmark of 28.6x for its global stock exchange peers; indicating that SGX is trading at a discount relative to its global peers. However, we recognise the limitations of RV for a stock like SGX for the following reasons: (i) Dissimilar geographical divisions and multi-asset product mix (ii) Different market capitalisation size of selected comparable stock exchanges. Refer to Appendix K for further details of SGX's trading comparable.

After consolidation of the implied prices, Figure 5.3.1 shows our football field comparison ranging from NTM P/E and trading comparable EV/EBIT, trading comparable EV/EBITDA and DCF EV/EBITDA. These methods achieved an intrinsic share price of S\$10.63, S\$9, S\$ 8.64 and \$8.01 respectively. DCF models use Bull and Bear cases in the Football Field Analysis.

Figure 5.3.1 Football Field Analysis



Fig 4.5 Decreasing revenue per software



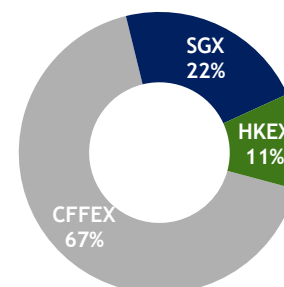
Source: Company data

Fig 5.1 WACC Computation

Cost of Equity (CAPM)	Remarks	Capital Structure
Risk-Free Rate	10-yr treasury yield 1.46%	Debt 0.41
Market Risk Premium	5.84% rate	Equity 0.59
Levered Beta	1.10 Bottom-Up Beta	
Cost of Equity	7.91%	
Cost of Debt	SG Prime Rate	Peer Group 0.52x
Cost of Debt	5.25% (MAS)	Unlevered 0.52x
Pre-Tax Cost of Debt	5.25%	Tax Rate 17%
Tax Rate	17%	
Post-Tax Cost of Debt	4.36%	
		SGX D/E ratio 1.38x
		SGX Levered Beta 1.10
		WACC 6.44%

Source: Team

Fig 5.2 HKEX eating into SGX's China A50 futures volume



Source: Team

5.4 Sensitivity Analysis – We conducted a sensitivity test on the WACC ($\pm 2.0\%$) and terminal growth rate ($\pm 1.5\%$) in our DCF perpetual growth rate valuation model (Figure 5.4.1). The result of our test ranges from \$7.32 to \$8.44. Moreover, we conducted a sensitivity test on the Derivatives Volume growth ($\pm 15.0\%$) and the Average Daily Traded (ADT) Value (± 150), resulting in a range from \$6.92 to \$9.07 (Figure 5.4.2). These two tests further affirm our analysis.

5.5 Monte Carlo Simulation – As the growths of each SGX revenue segment has exhibited highly vulnerability to market conditions, the growth ahead could also display large variations. We performed a Monte Carlo simulation to explore the distribution of probabilities of SGX's share price based on historical variance of each segment. The result is a 13.64% probability of the share price being above the current price of \$8.70 (Figure 5.5). Moreover, the right skewed distribution also displayed a 56.09% probability of the share price falling below our target price of \$7.78, further justifying our sell call on SGX.

5.6 Further de-rating Catalyst

5.6.1 Approval of crypto assets in Singapore – MAS proposed to Singapore government to approve the formal crypto exchange in Singapore. With the launched of crypto derivatives contracts in November 2019 in Singapore, formalising an exchange will be a potential catalyst to the further deteriorate SGX market shares in derivatives market.

5.6.2 Delay in debt borrowing – As SGX had announced the intention to take on a multi-currency debt, we have modelled the \$1.5 billion debt into our WACC computation (Figure 5.1). As we believe that introducing debt into the current debt-free capital structure will decrease the WACC, any delay in the undertaking of the debt might result in a higher consensus WACC, resulting in a lower share price.

6. Investment Risks

Market risk (MR1): Increasing market uncertainty due to natural disasters, epidemics with escalating chaos within China creates the need to engage in hedging activities boosting iron ore futures volume.

Market risk (MR2): HKEX's failure or delayed release of the MSCI China A shares futures. This will allow SGX to enjoy a temporal extension of being the monopoly in China offshore derivatives segment.

Market risk (MR3): Uncertainty revolving around US 2020 elections. Trump might impose erratic policies to increase his re-election possibilities and impeachment news might cause unforeseen volatility in the US market.

Operational risk (OR1): Potential formulation of products within Steel Value Chain that will bolster the synergy among the other freight, FX and commodities products.

Strategic risk (SR1): Possible further synergy between FX and Commodities derivatives with the acquisition of BidFX in 2019. SGX has plan to 'open up' its FX OTC platform which might drive the volume of such products even higher. SGX has plan to open its FX OTC platform which might drive the volume of such products even higher.

Regulatory risk (RR1): Favorable shift in regulatory requirements for equity listings and private listings market to compete with the regional exchanges.

Fig 5.4.1 Sensitivity Analysis for Perpetual Growth

	Perpetuity Growth Rate				
	1.0%	1.5%	2.0%	2.5%	3.0%
WACC	4.0%	\$ 8.44	\$ 8.44	\$ 8.44	\$ 8.44
	5.0%	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.14
	6.0%	\$ 7.86	\$ 7.86	\$ 7.86	\$ 7.86
	7.0%	\$ 7.58	\$ 7.58	\$ 7.58	\$ 7.58
	8.0%	\$ 7.32	\$ 7.32	\$ 7.32	\$ 7.32

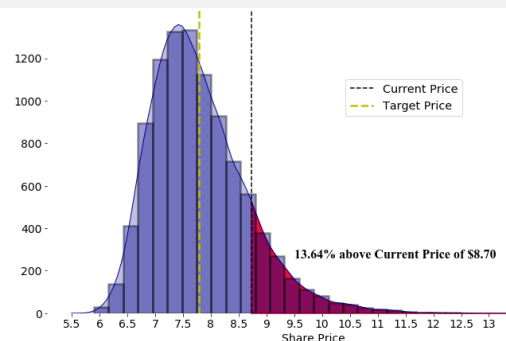
Source: Team estimates

Fig 5.4.2 Sensitivity Analysis of ADT & DVG

		Derivatives volume growth (%YoY)						
		-7%	-2%	3%	8%	13%	18%	23%
ADT (\$m/d)	800	\$ 6.92	\$ 7.07	\$ 7.21	\$ 7.36	\$ 7.50	\$ 7.64	\$ 7.79
	850	\$ 7.05	\$ 7.20	\$ 7.35	\$ 7.50	\$ 7.65	\$ 7.80	\$ 7.95
	900	\$ 7.18	\$ 7.34	\$ 7.50	\$ 7.66	\$ 7.81	\$ 7.97	\$ 8.13
	950	\$ 7.33	\$ 7.50	\$ 7.66	\$ 7.83	\$ 7.99	\$ 8.16	\$ 8.33
	1000	\$ 7.50	\$ 7.67	\$ 7.85	\$ 8.02	\$ 8.20	\$ 8.37	\$ 8.55
	1050	\$ 7.68	\$ 7.87	\$ 8.05	\$ 8.24	\$ 8.42	\$ 8.61	\$ 8.79
	1100	\$ 7.89	\$ 8.09	\$ 8.28	\$ 8.48	\$ 8.68	\$ 8.87	\$ 9.07

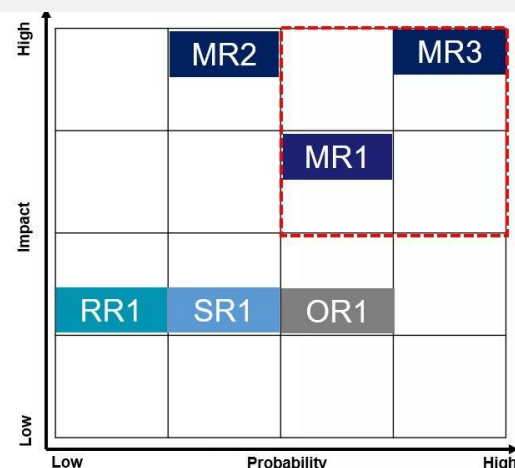
Source: Team estimates

Fig 5.5 Monte Carlo Simulation



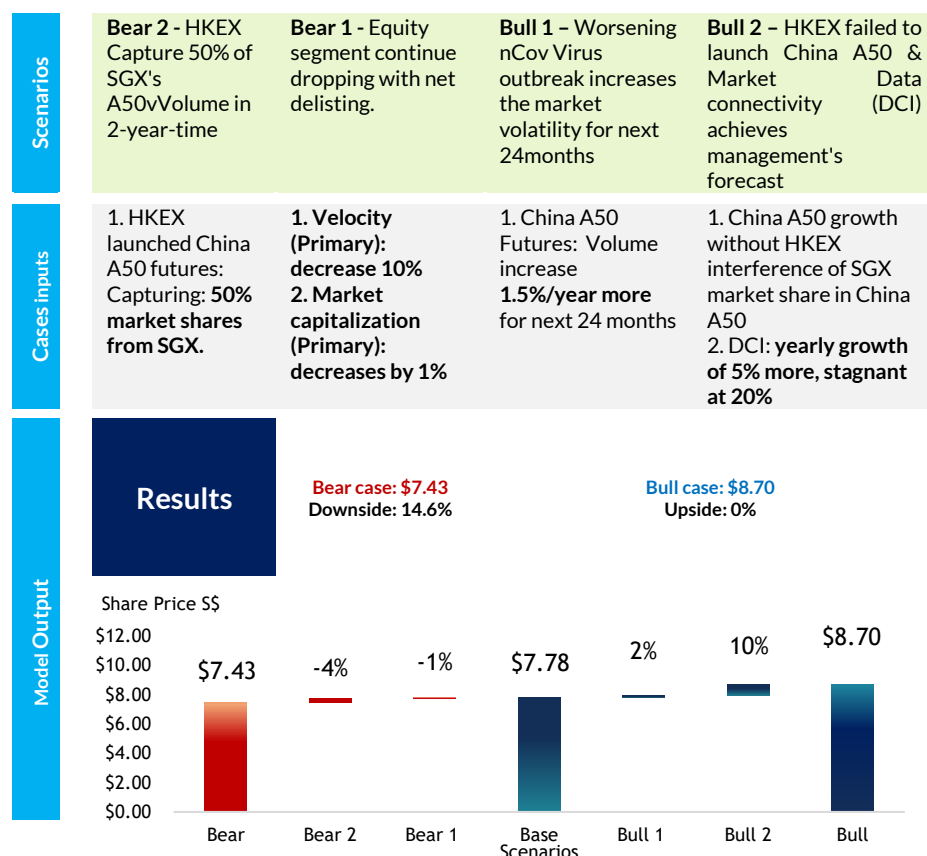
Source: Team estimates

Fig 6.1 Risk Matrix



Source: Team estimates

Waterfall Scenario Analysis – We factored in the different market risk and strategic risk as our bull scenarios and obtained the waterfall scenario analysis. We observed that even after adding an optimistic growth in the Data Connectivity and Indices (DCI) segment by 15% Y-o-Y growth from our base case and removing HKEX intervention into China A50 futures market, a most bullish scenario of S\$8.70 was attained, which is a 0% upside to the current market price of S\$8.70. We believe that our investment recommendation still holds despite the potential risks.

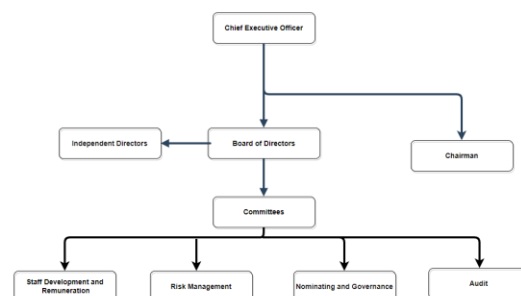


7. Corporate Governance

All SGX board members have had at least a decade's experience in managing, directing and as board members, executive committee members or consultants of other companies. Mr Loh Boon Chye, SGX's CEO has been a director in SGX for the past 7 years, being familiar with its internal operations. Many of its committee chairpersons have been serving on the SGX board for the past 5 years at least. Apart from individuals highly experienced in the finance and audit industries, its board also consists of highly distinguished individuals in the fields of corporate law, academics, info-communications and technology, and engineering. This diversity allows better decisions and strategies to be made for SGX as various viewpoints are considered. SGX has its audit, remuneration and staff development, nominating and governance and risk management committees. Its audit committee conducts internal and external audits, prepares financial statements for upper management, reviews internal control and compliance frameworks as well as whistleblowing and fraud policies to ensure risk of fraud and insider trading is minimized. It also manages compliance and financial reporting risks. Lastly, the risk management committee safeguards the company against taking on businesses with risks beyond their risk appetite- that would adversely affect its financial position. The RMC also sets in place frameworks for risk management in various areas, such as clearing and counterparty risks, technology risks and other enterprise risks. Overall, SGX's appears to adopt a good corporate governance structure to minimize and manage risk.

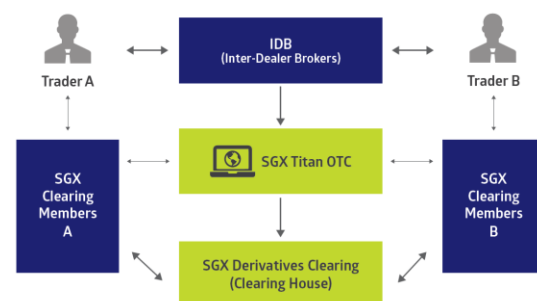
Conclusion: We strongly believe that SGX currently does not offer a compelling risk-reward profile for investors given its positioning against macro headwinds and its sole reliance on a single revenue stream. We reiterate a **SELL** call with a target price of **S\$7.78, representing a downside of 10.5%** to its current price.

Fig 7.1 Board of directors



Source: SGX Annual Report, 2019

Fig 7.2 Trade Regulatory Process



Source: SGX Dry Bulk Factsheet

Appendix A

Appendix A-1: Asset classes analysis across SGX's top 2 competitor

(Derivatives classes)

	Agriculture derivatives	Equity index derivatives	FX derivatives	Dividend Index derivatives	Interest rate derivatives	Bitcoin futures	Single stock	Commodities derivatives	OTC Derivatives
SGX									
HKEX									
CME									

(Equities classes)

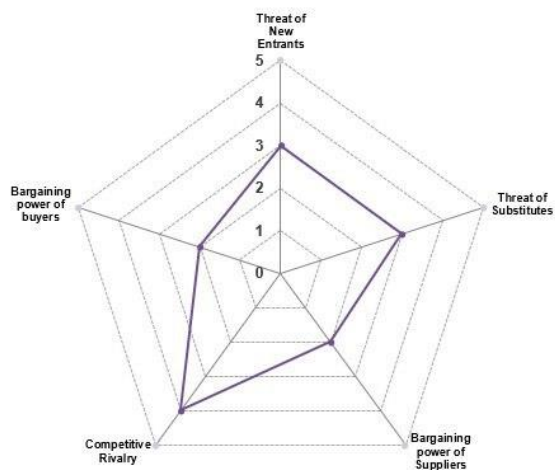
	Equities securities	Exchange traded products / ETFs	Derivative warrants	Inline warrants	Callable bull / bear contracts	REITS	Debt securities (Fixed income)	Business trusts	Leveraged and Inverse products	Daily leverage certificates	Structured warrants	American depositary receipts
SGX												
HKEX												
CME												

HKEX derivatives products offered

Equity Index products	Equity products	Currency futures products	Interest rates and fixed income products	Commodities products
<ul style="list-style-type: none"> Hang Seng Index Options Mini-Hang Seng Index Options Hang Seng China Enterprises Index Options Mini-Hang Seng China Enterprises Index Options Hang Seng Index (Gross Total Return Index) Futures Hang Seng Index (Net Total Return Index) Futures Hang Seng China Enterprises Index (Gross Total Return Index) Futures Hang Seng China Enterprises Index (Net Total Return Index) Futures Dividend Futures CES China 120 Index Futures Sector Index Futures 	<ul style="list-style-type: none"> Stock Futures Stock Options 	<ul style="list-style-type: none"> USD/CNH Futures & Options EUR/CNH Futures JPY/CNH Futures AUD/CNH Futures CNH/USD Futures 	<ul style="list-style-type: none"> HIBOR Futures 	<ul style="list-style-type: none"> USD Gold Futures CNH Gold Futures Iron Ore Futures - Monthly Contract Iron Ore Futures - Quarterly Contract USD London Metal Mini Futures CNH London Metal Mini Futures

Appendix B

Appendix B-1: Porter's Five Forces



Source: Team Estimate

Rivalry among existing competitors | 4

As technology improve and global financial markets become more interlinked, the financial geographical boundaries of a countries are blurring. SGX's main competitors are no longer just exchanges within the region, but exchanges from all over the world. With more suppliers in the market, the competition in this industry is expected to increase even further and fees will be suppressed too.

Appendix B-2: SWOT Analysis

SGX – Business model	Equity & Fixed Income Segment
<p>Strengths. Monopoly in Singapore market positioned as gateway to the emerging Southeast Asia Capital Market. Full-equity firm, with healthy cash flows and rich in retained earnings. Strong cashflow for venture business. Volume driven business model instead of margin driven, easier to pass on COGS inflation.</p>	<p>Strengths. Highly valued in REITS industry, growing demands for catalyst listing. Offer digital bond trading system and various international bonds and fixed income.</p>
<p>Weaknesses. Externally driven, vulnerable to macro-economic risks, commodities. Investment opportunities are limited, increasing number of delisting over the past few years.</p>	<p>Weaknesses. Delisting over the years from 738 to 738. Lacklustre interest in Singapore's equity markets while HKSE has seen a 6.37% CAGR increase in listed companies between the same period. Losing investor interest in listing.</p>
<p>Opportunities. Capitalising on Singapore's dominant economic position as a trade & financial hub, marketing its intermediary position providing greater access to various markets, tapping on larger economies. Rising cryptocurrency exchange can be a new market for SGX.</p>	<p>Opportunities. SEA in the growth stage and regional growth, such as Indonesia and Vietnam may arrive a potential opportunity from being the matured capital market in the region. Rising trend of passive investing reported a CAGR of 5.01% by PwC.</p>
<p>Threats. Volume driven revenue model, vulnerable to the macro-economic factors and economic cycle.</p>	<p>Threats. Rising opportunities means the rising competitors, the stability political in Singapore has attracted main exchanges to share the pie in the SEA such as Intercontinental exchange. Rising passive investing can potentially hurts the top line for equity segment</p>

Source: Team estimate

Threat of new entrants | 3

Setting up a new exchange is extremely tedious, due to the industry being capital intensive and having strict regulatory requirement. The barrier of entry is high and usually one country only has one exchange.

Bargaining power of suppliers | 2

In general exchange operators develops and operates its trading platform in-house, which means the suppliers' bargaining power is limited. On top of that, even if an exchange chooses to engage an external consultant for a specific project, the supplier's bargaining power is limited due to the similarity of technology services provided by a wide range of companies.

Threat of substitution | 2

Given the rise of decentralized trading platform, there are more and more ways a company can choose to raise funds. As such platforms usually have little regulations surrounding it, some of the firms might find it easier to raise capital through such method. SGX has noticed this trend and invested in new Fintech companies. However, the regulations in Singapore still doesn't recognize decentralized trading platform as a form of investment, so this threat is not an alarming concern.

Bargaining power of buyers | 2

In the context of the exchange operator, the bargaining power of the buyer refers to investors and traders in the market. The bargaining power of buyers is dependent on their price sensitivity, ability to substitute and difference between competitors. Given that SGX have a strong presence in the derivatives market around the region, buyers' bargaining power is minimised.

Appendix B-2: SWOT Analysis (Cont.)

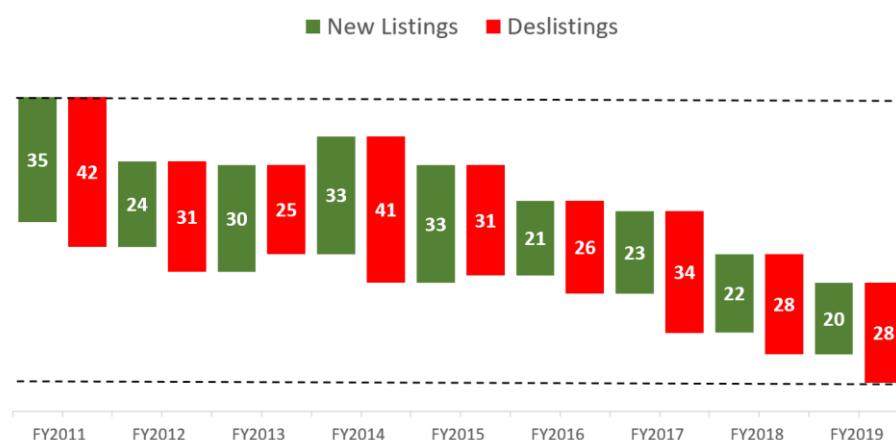
Derivatives Segment	Data, Connectivity and Indices Segment
<p>Strengths – Commodities. Geographical advantage in SEA to capture the high demand of commodities contracts. Present capability of financial technology to ease the transaction and entice more business to trade in SGX.</p> <p>Strengths – Equity. Offering of China A50 and MSCI Taiwan and various MSCI derivatives. One stop exchange to offer various maintenance margin offset.</p> <p>Weaknesses. Top line is highly depending on derivatives Segment. As volume driven revenue growth, it is highly vulnerable to macro events.</p> <p>Opportunities – Commodities. Admits rising global trade uncertainty and price volatility in raw material production over the globe, generating bigger industry market capitalization in derivative segment.</p> <p>Opportunities – Equity. International presences, top exchanges to represent and market Asia Indices.</p> <p>Threats. Other exchanges are easy to enter, such as the venturing of MSCI China A 50 Futures by HKEX; easy deteriorate SGX market share in derivatives segment.</p>	<p>Strengths. Strong financial technology and blockchain subsidiary as a data provider, multiple acquisitions to build on the Indices business in 2019/2020.</p> <p>Weaknesses. Relatively new in the segment Despite continuous effort in upgrading fixed asset over last 3 years, the acquisitions have yet to justify the returns.</p> <p>Opportunities. As the world is moving towards data driven, data connectivity has various vendors and SGX is one of the largest financial data providers in SEA.</p> <p>Threats. SGX hold no edge over technology giants, the delisting trend will result in lesser data for SGX. Other data vendors are able to offer Indices calculation, it is not an absolute edge.</p>

Source: Team estimate

Appendix C

Appendix C-1: SGX Equity Securities Listing Analysis

Figure C-1. SGX Delistings outweigh new listings

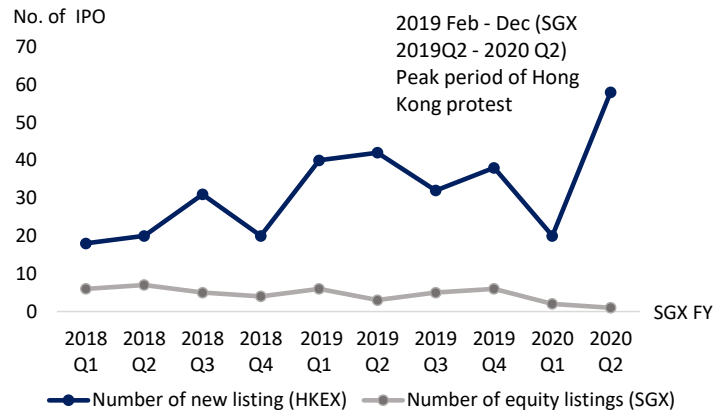


Source: Company Data

In 7 out of 9 years from 2011 to 2018, SGX experienced more delistings than new listings (negative net listings), with an average of -7.43 net listings in these 7 years. This is of larger magnitude in comparison to both of the only 2 years (2013 & 2015), where the net listings were positive at 5 and 2 respectively.

Appendix C-2: HKEX and SGX IPO Analysis

Figure C-2. HKEX experienced strong IPO growth despite political uncertainty



Source: HKEX Company Data, SGX Company Data

In March 2019, Hong Kong experienced a political protest, however, HKEX has experienced a growing number of IPOs of 58 in Q2 2020 after a drop from 38 to 20 in Q4 2019 and Q1 2020 (Figure 7.1). Concurrently, SGX experienced a decreasing number of IPOs in Q1 2020 and Q2 2020 of 2 and 1 (Figure 7.1). Hence, this implied that the weakening equity segment of SGX is not due to shifting market sentiment, but it is rather the intrinsic unattractiveness of SGX being an avenue of IPO.

Appendix D

Appendix D-1: Case study of Deteriorating Market Share of SGX China A50

Figure D-1. FY2016 China A50 Futures Market Shares

China A50 Futures

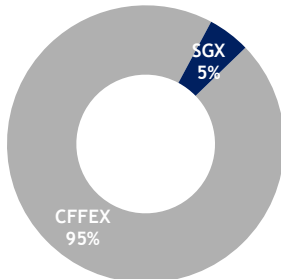
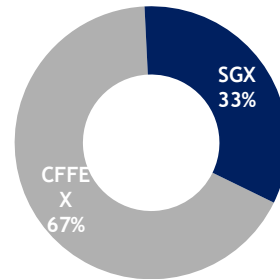


Figure D-2. FY2017 China A50 Futures Market Shares



Source: SGX Company Data

In Figure D-1, SGX obtained a total 33% China A50 Futures market share, 100% till date. With reference from SGX's marketshare in Nikkei 225 Futures market (Figure D-3 and Figure D-4), we projected our revenue in a similar way when HKEX enters the into the China A50 Futures market, leaving SGX with 22% of market share, 67% of the of the off shore China A 50 Futures market share.

Figure D-3. FY2016 Nikkei 225 Futures Market Shares

Nikkei 225 Futures

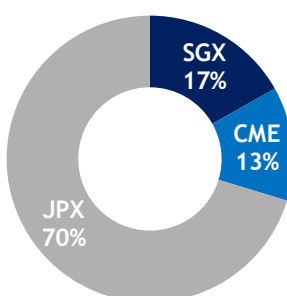
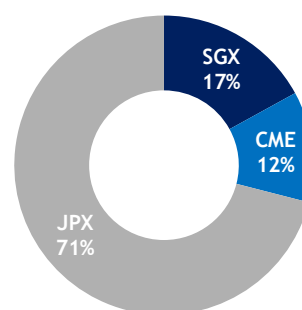


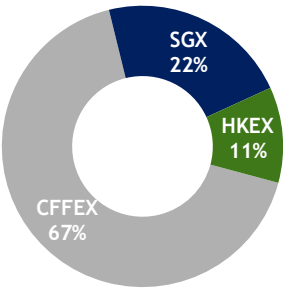
Figure D-4. FY2017 Nikkei 225 Futures Market Shares



Source: SGX Company Data

Figure D-5. FY2021F China A50 Futures Market Shares

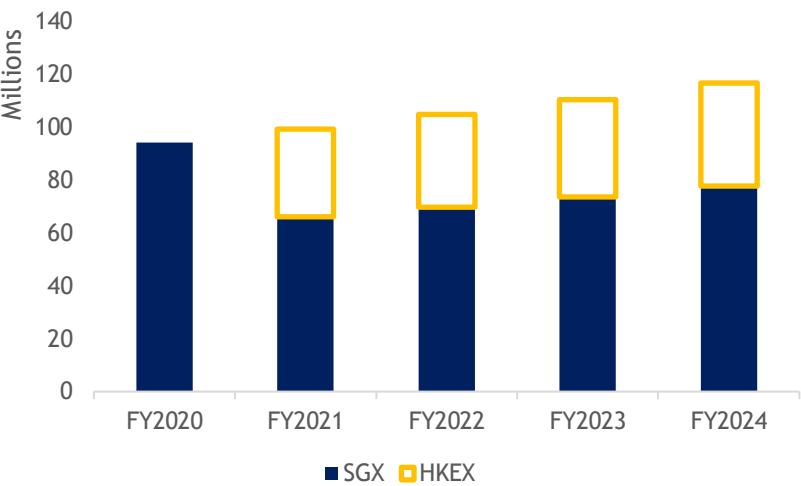
Projected China
A50 Futures
Market Shares



Source: Team Estimate

Following our analysis from Appendix D-1, we observe a similar pattern in terms of the SGX market share, therefore, we continue to write a 11% market share erosion to SGX from HKEX, representing a 67% of offshore market share in China A50.

Figure D-6. HKEX Deteriorate SGX China 50 Market Shares.



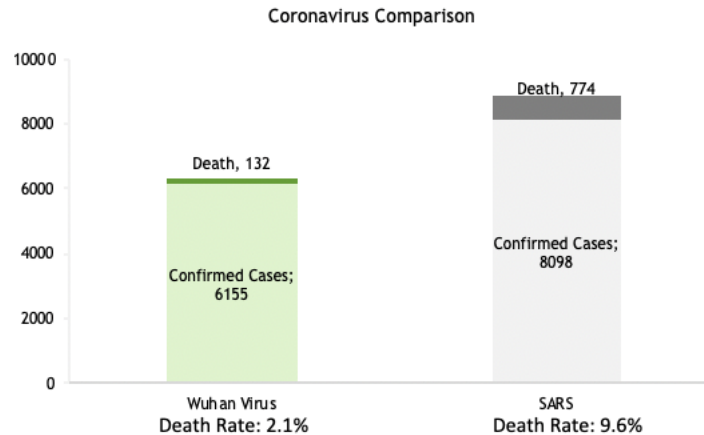
Source: Team Estimate

To illustrate the deterioration of SGX’s volume of A50 futures contracts by HKEX’s A50 Futures launch, we modelled one-third of the original projections to be lost to HKEX. Figure D-6 shows the change in the revenue growth with/without the HKEX intervention of China A50 Futures Market.

Appendix E

Appendix E-1: Coronavirus analysis

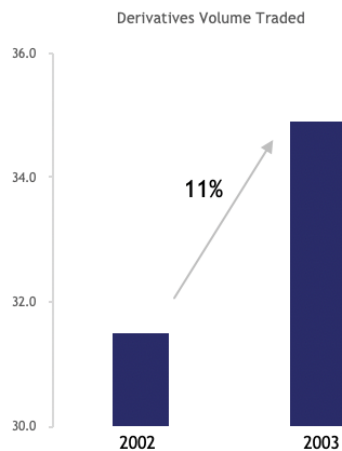
Figure E-1. Coronavirus is Spreading Fast



Source: CNN

We believe that the outbreak of Wuhan Virus will have a less significant impact on the China GDP and global economy as compared to the SARS outbreak, which caused a 1% hit to China's GDP Growth in 2003. The rationale behind this is due to 2 main reasons:

- 1) Faster Information Transmission. The Chinese authorities notified World Health Organization (WHO) about the Wuhan virus less than a month after a first case was identified. As compared to the SARS outbreak, China took nearly 3 months before informing WHO.
- 2) Fatality rate. The fatality rate of Wuhan Virus is much lower of about 2% as compared to SARS virus which is about 10%.



Source: Company Data

Based off the reasons stated above, we believe that Wuhan Virus outbreak will not be as deadly as SARS. Referring to SGX derivatives volume for the year 2003, there was a 11% growth in volume traded. Thus, to be in-line with our thesis we apply a 5.5% growth rate for our base case and a 7% growth rate for our bull case on the derivatives volume.

Appendix F

Appendix F-1:

Figure F-1. While Salary Per Employee has been growing (\$mil)...

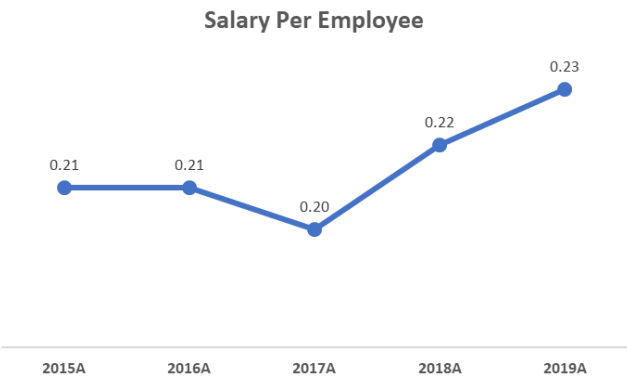
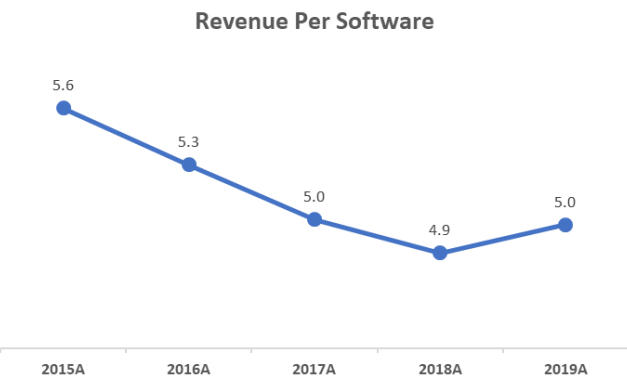
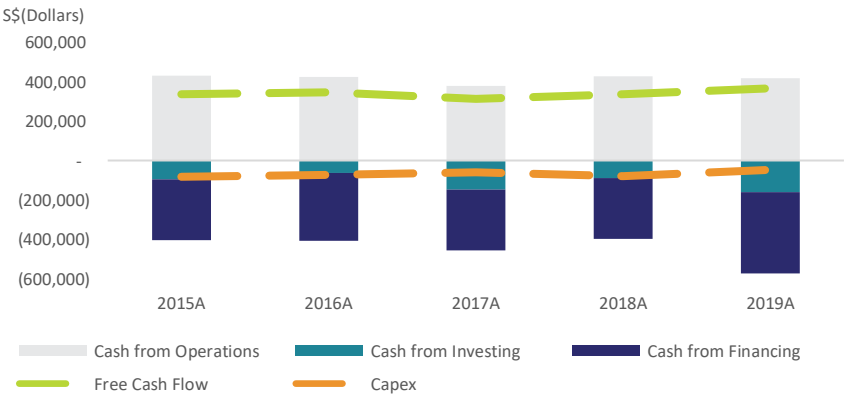


Figure F-2. ...Revenue is Growing as per Employee Expenses also Go Up (\$mil)



SGX possesses strong cashflows due the its debt-free nature. Increasing revenue of S\$0.10 million from FY17 to FY19 after a dip from FY16 to FY17. This implies growing productivity. However, with the nature of SGX’s business, the efficiency analysis is not a good indication of SGX (Figure F-1 & Figure F-2).

Figure F-3 Stable Cashflow Despite Increasing Financing Activities



SGX has strong cashflows as a mature full equity firm, the main expenses from the financing activities are due to the dividends, and a stable yearly CAPEX (Appendix M).

Appendix G

Appendix G-1: SGX Past Acquisition Summary

Completion year	Target company	Implication to SGX	Transaction Cost (SGD Mil)
2004	Full acquisition - Asia Coverage Private Limited	• Investment arm	0.5
2007	Minority stake - Bombay Stock Exchange 5%	• India market & data	65
2014	Full acquisition - Energy Market Company	• Monopoly in energy market	42.6
2015	Investment - SGX Bond Trading	• Digital Bond platform	21.21
2016	Acquisition - Asian gateway investment	• Investment arm – acquire 10% stake in CapBridge (1exchange – private securities exchange & Blockchain)	98.63
2016	Full acquisition - The Baltic Exchange	• London market & International freight market	168
2017	SOLD minority stake - Philippine Dealing Systems	• Philippine derivative exchange	68.6
2017	Investment - SGX Bond Trading	• Digital Bond platform	17.97
2018	Investment - Freightos Ltd.	• Digital Freight marketplace platform	44.4
2019	Minority stake - BidFX for 20% stake	• Digital FX platform	33
2019	Investment - Trumid Financial	• Digital Bond platform	60
2019	Investment - SGX Bond Trading	• Digital Bond platform	3.69
2019	Acquisition – Scientific Beta	• Indices data provider	206.35
Total			692.75
Past 5 Years Total			680.75

Recent acquisition of Scientific Beta announced in January 2019. SGX has clocked a total of S\$680.75 million, showing the expansion plan through investment and acquisitions (FigureG-1). For SGX to achieve the goal of doubling Market Data, Connectivity and Indices Segment from the recent announcement, it requires an average growth rate of 15%, while the historical CAGR lands at 6%. Furthermore, SGX has put in constant effort in building DCI Segment, such as acquisition of Smart Karma in 2019. On the other hand, indices calculation and data industry are saturated.

Investment in Bond Pro Trading Platform and Others to Capture a Pie in OTC Market. In the past five year, SGX has invested a total of S\$102.87 million in SGX bond trading platform (SGX Bond Pro). Till date, fixed income segment only amounts to 1% of the total revenue as at 2020. It is still not yet clear on the prospect ahead for SGX fixed income segment, we do the firm's effort to gain first mover advantage to capture market share on the regulatory requirement of fixed income for the institutions and corporations. Moreover, acquisition of BidFX of S\$25 million can be a significant driver to boost top line growth through developing synergies from complementary product offering. However, we find no evidence to justify a strong growth, besides macro uncertainty.

Appendix H

Appendix H-1: Dupont Analysis

ROE - SGX consistently achieved a return on equity above 32%, with 5-year high of 35.85% in FY19 after a dip in FY17 of 32.9% from the FY15 high of 35.70%. This is due to the increase asset turnover (Figure 9.3) and sustainable performance on equity multiplier (Figure 9.2) and net profit margin (Figure 9.1) of a minimal drop of only 1%. Till date, the net profit margin remains as a disappointment, the top line growth failed to catch up to the operating expenses after the acquisition of Baltic exchange in FY16, the 'complementary products synergies' is no yet to have a material impact to the net profit margin after 3 financial year.

The drop in Net profit margin - Over the years can be explained by the declining of equity clearing segment. The reason behind this phenomenon is due to Equities segment having a higher profit margin as compared to the other SGX's revenue segments. SGX has pricing power when it comes to equities clearing as investors can only go to SGX if they wish to trade SGX listed securities, unless dual listed securities. Unlike the derivatives segment, different exchanges can produce similar or identical futures contract. Thus, SGX has not much pricing power. Moreover, SGX being an international exchange offering futures of other countries can only compete on either price or capital efficiencies to attract investors.

Due the SGX's nature of business, involving high working capital, it requires the clients to maintain an initial margin. With an upcoming issuance of debt planned by SGX, this will raise the equity multiplier even higher, further increase ROE.

SGX is financially healthy - However, we are not comfortable to make judgement solely based on the performance of FY19, as we understand that the top line growth is supported by China A50 with 73% contribution to derivatives segment, while derivative segment contributes to 51% of the total revenue (old classification); which translates to 37% total revenue contribution (refer to business overview).

CAPEX - With reference from Figure H-4, SGX has a growing PP&E turning over ratios after a dip in 2017A with an average growth rate of 2% Y-o-Y till date. While management has provided a consistent CAPEX guidance of the year with 45-50 million for FY20. It shows a sign of growing and expanding sign of the firm.

Figure H-1 Return on equity

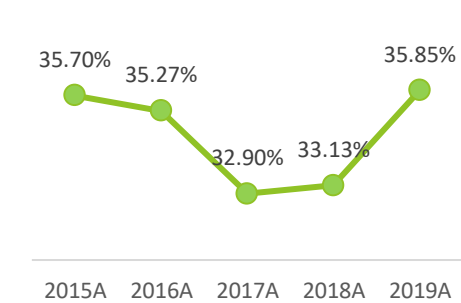


Figure H-2 Net profit margin remain low after 2016 acquisition

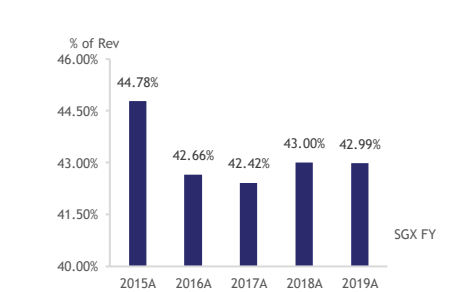


Figure H-3 Equity multiplier remain to about 2 times

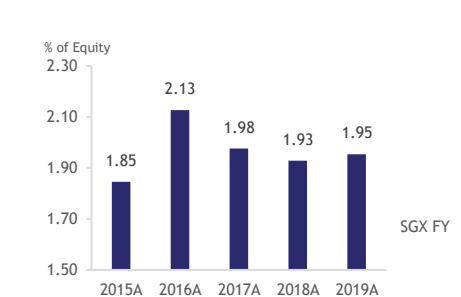


Figure H-4 Total Asset Turnover

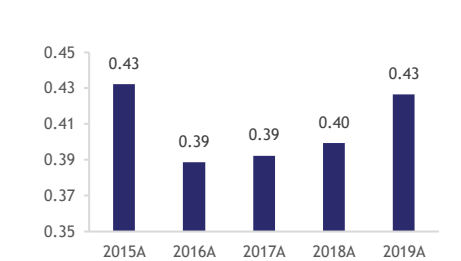
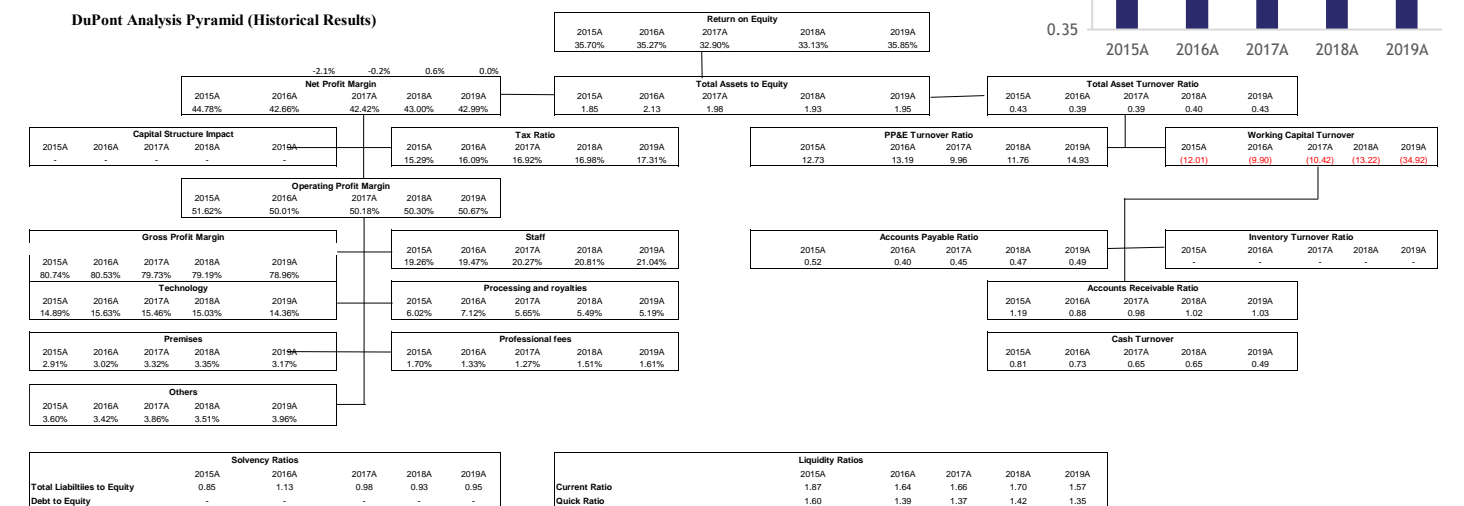


Figure H-4: DuPont Analysis Pyramid



Appendix I

Appendix I-1: Revenue Projection Summary

Figure I-1: Segmented Average Fee Per Contract

New classification revenue reconciled - FY 2019	
FY2019 Equity Derivatives Traded Volume	187,340,224
Average fee per contract - Equity Derivatives	1.780
FY2019A FX Traded Volume	18,993,157
FY2019 Energy Futures Traded Volume	17,741,953
FY2019 Rubber Futures Traded Volume	1,925,395
FY2019 Commodities Derivatives Traded Volume	235,543
Total Derivatives Volume	38,896,048
Average fee per contract - Currencies and Commodities - Derivatives	3.250

Source: Company Data, Team Estimate

From the latest quarter data, we arrive a segmented average fee per contract for Derivative Segment – Equity of S\$1.780 and Derivative Segment - Currencies and Commodities of S\$3.250. Using the product level volume projection (Figure I-1.1), alongside Appendix J, we projected the revenue growth in the Appendix I-3. The volume per product is further adjusted according to our investment thesis.

Appendix I-1.2 - Product Level Revenue Growth Assumption

Equity Derivatives	FY2019A	FY2020A	FY2021A	FY2022A	FY2023A	FY2024A	Growth Assumption	Growth Rate as per growth rate forecast
FTSE China A50 Index Futures	105,819,566	94,001,303	66,114,250	69,750,534	73,586,813	77,634,088	5.50%	IMF forecasted China GDP
MSCI China NTR Index Futures	683,848	921,482	972,164	1,025,633	1,082,043	1,141,555	5.5%	IMF forecasted China GDP
MSCI Hong Kong Index Futures	3,994	12,901	13,068	13,238	13,410	13,585	1.3%	Singapore Inflation rate
MSCI India NTR Index Futures	814,525	876,546	887,941	899,484	911,178	923,023	1.3%	Singapore Inflation rate
MSCI Indonesia Index Futures	264,346	196,379	198,932	201,518	204,138	206,792	1.3%	Singapore Inflation rate
MSCI Indonesia NTR Index Futures	130,933	178,342	180,660	183,009	185,388	187,798	1.3%	Singapore Inflation rate
MSCI Malaysia NTR Index Futures	95,472	116,693	118,210	119,747	121,303	122,880	1.3%	Singapore Inflation rate
MSCI Philippines NTR Index Futures	24,998	32,140	32,558	32,981	33,410	33,844	1.3%	Singapore Inflation rate
MSCI Singapore Index Futures	10,039,351	10,738,409	11,089,438	11,461,389	11,855,508	12,273,116	5.96% * Correlation to MSCI Share Price	Singapore ERP - Damodaran
MSCI Taiwan Index Futures	21,034,743	20,325,243	20,001,887	19,656,542	19,287,714	18,893,806	6.8% * Correlation to MSCI Taiwan Share Price	Taiwan ERP - Damodaran
MSCI Taiwan NTR Index Futures	973,865	1,055,623	1,069,346	1,083,248	1,097,330	1,111,595	1.3%	Singapore Inflation rate
MSCI Thailand Index Futures	802	312	316	320	324	329	1.3%	Singapore Inflation rate
MSCI Thailand NTR Index Futures	125,544	149,050	150,988	152,950	154,939	156,953	1.3%	Singapore Inflation rate
Nikkei 225 Index Futures	22,561,491	22,485,865	22,710,724	22,937,831	23,167,210	23,398,882	1.00%	Japan Inflation Rate
Nifty 50 Index Futures	20,666,819	21,356,527	21,642,705	21,932,717	22,226,616	22,524,452	1.3%	Singapore Inflation rate
Nifty Bank Index Futures	14,801	4,616	4,676	4,737	4,798	4,861	1.3%	Singapore Inflation rate
MSCI Emerging Markets Index Futures	2,797	1,307	1,324	1,341	1,358	1,376	4.8%	IMF Forecasted emerging market GDP
MSCI Emerging Markets NTR Index Futures	409	617	625	633	642	650	4.8%	IMF Forecasted emerging market GDP
MSCI Emerging Markets Asia NTR Index Futures	896,472	931,638	943,750	956,019	968,447	981,037	4.8%	IMF Forecasted emerging market GDP
MSCI Australia NTR Index Futures	305,388	385,472	390,483	395,559	400,702	405,911	1.3%	Singapore Inflation rate
MSCI Japan NTR Index Futures	728,704	721,522	728,593	735,733	742,944	750,224	1.0%	Japan Inflation Rate
MSCI Japan NTR (JPY) Index Futures	1,827,423	1,426,572	1,440,552	1,454,670	1,468,925	1,483,321	1.0%	Japan Inflation Rate
Total	187,340,224	175,918,560	148,693,190	152,999,834	157,515,139	162,250,077		

Equity Derivatives	FY2019A	FY2020A	FY2021A	FY2022A	FY2023A	FY2024A	Growth Assumption	Growth Rate as per growth rate forecast
FTSE China A50 Index Futures	105,819,566	94,001,303	66,114,250	69,750,534	73,586,813	77,634,088	5.50%	IMF forecasted China GDP
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MSCI Japan NTR (JPY) Index Futures	1,827,423	1,426,572	1,440,552	1,454,670	1,468,925	1,483,321	1.0%	Japan Inflation Rate
Total	187,340,224	175,918,560	148,693,190	152,999,834	157,515,139	162,250,077		

FX Derivatives	FY2019A	FY2020A	FY2021A	FY2022A	FY2023A	FY2024A	Growth Assumption	Growth Rate as per growth rate forecast
CNY_USD FX Futures	1,817	1040	1054	1068	1081	1096	1.3%	Singapore Inflation rate
EUR_CNH FX Futures	9,176	10,150	10,454	10,768	11,091	11,423	3.00%	EUR CPI R^2 TO EUR_CNH_Futures volume (LTM)
INR_USD FX Futures	11,872,197	13,299,894	13,834,550	14,390,699	14,969,205	15,570,967	4.02%	INR CPI R^2 TO INR_USD_Futures volume (LTM)
KRW_USD FX Futures	231,650	391,455	397,718	404,081	410,547	417,115	1.60%	KR CPI R^2 TO KRW_USD_Futures volume (LTM)
SGD_CNH FX Futures	355	395	400	406	411	416	1.3%	Singapore Inflation rate
THB_USD FX Futures	125	316	320	324	329	333	1.3%	Singapore Inflation rate
TWD_USD FX Futures	1,523	4,237	4,365	4,495	4,630	4,769	3.00%	US CPI R^2 TO TWD_USD_Futures volume (LTM)
USD_CNH FX Futures	6,823,052	8,335,499	8,585,563	8,843,130	9,108,424	9,381,677	3.00%	US CPI R^2 TO USD_CNH_Futures volume (LTM)
USD_SGD FX Futures	51,531	55,127	55,866	56,614	57,373	58,142	1.34%	SGX CPI R^2 TO USD_SGX_Futures vol
Total	18,993,057	22,098,302	22,890,479	23,711,775	24,563,280	25,446,128		

Appendix I:

Appendix I-2: Revenue Assumptions 1 – Equities

Key Drivers										
Base Case										
Market Capitalisation	1,010.0	898.0	1,016.0	991.0	981.0	977.8	973.7	969.6	965.7	961.7
- Primary-listed	692.0	603.0	666.0	648.0	656.0	650.2	644.5	638.8	633.1	627.5
- Secondary-listed	318.0	295.0	350.0	343.0	326.0	327.6	329.3	330.9	332.5	334.2
Turnover velocity (Primary)	0.39	0.39	0.39	0.40	0.36	0.34	0.34	0.34	0.34	0.34
Turnover velocity (Secondary)	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Total Traded Value (\$\$m)	274,000.0	274,000.0	281,000.0	314,000.0	259,500.0	244,524.3	242,686.6	240,866.7	239,064.6	237,280.0
Trading Days In The Period	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0
Average Daily Traded Value (\$\$m)	1,100.4	1,100.4	1,128.5	1,261.0	1,042.2	982.0	974.6	967.3	960.1	952.9
Effective Clearing Rate (%)	0.06%	0.06%	0.06%	0.05%	0.05%	0.0535%	0.05%	0.05%	0.05%	0.05%
Securities Clearing Revenue (\$\$m)	163.5	158.5	158.6	170.9	138.9	130.9	129.9	128.9	128.0	127.0
Average Bond Listing Fee	0.015									
Number of Bond Listing	487	349	819	1154	1066	1110	1110	1110	1110	1110
Revenue of Bond listing	7.3	5.2	12.3	17.3	16.0	16.7	16.7	16.7	16.7	16.7
Equities listing	44.3	41.4	37.1	34.3	29.8	29.7	29.6	29.5	29.3	29.2
% Equities Listing per Market Cap	4%	5%	4%	3%	3%	3%	3%	3%	3%	3%
% Corporate actions number of listed companies	4.689%	4.703%	4.576%	4.633%	4.607%	33.7	33.3	33.0	32.6	32.3
Number of listed firm	768.0	763.0	752.0	746.0	738.0	730.5	723.0	715.5	708.0	700.5
Total listing revenue	51.6	46.7	49.4	51.6	45.8	46.4	46.2	46.1	46.0	45.9
- Listing revenue	51.6	46.7	49.4	51.6	45.8	46.4	46.2	46.1	46.0	45.9
Listing revenue, % of Market capitalisation	5.1%	5.2%	4.9%	5.2%	4.7%	4.6%	4.5%	4.4%	4.3%	4.3%
- Corporate actions/Other	36.0	35.9	34.4	34.6	34.0	33.7	33.3	33.0	32.6	32.3
Corporate actions as a % of Listing Revenue	70%	77%	70%	67%	74%	72%	72%	72%	72%	72%
Securities Clearing Revenue (\$\$m)	163.5	158.5	158.6	170.9	138.9	130.9	129.9	128.9	128.0	127.0
- Access revenue	37.7	37.6	37.2	40.7	34.3	37.5	37.5	37.5	37.5	37.5
- Collateral management	8.0	8.8	9.2	9.6	9.0	8.9	8.9	8.9	8.9	8.9
- Securities settlement	81.3	105.9	95.7	87.6	76.6	74.1	73.6	73.0	72.5	71.9
% of Settlement with Clearing	50%	67%	60%	51%	55%	57%	57%	57%	57%	57%
- Contract processing	16.0	15.9	11.6	3.4	0.0	0.0	0.0	0.0	0.0	0.0
- Depository management	7.2	8.2	8.4	8.3	9.1	9.1	9.1	9.1	9.1	9.1
Total Equity Segment Revenue	401.3	417.6	404.5	406.6	347.7	340.6	338.5	336.5	334.6	332.6
Growth		4.1%	-3.1%	0.5%	-14.5%	-2.1%	-0.6%	-0.6%	-0.6%	-0.6%
Key Drivers										
Bear Case 1										
Market Capitalisation	1,010.0	898.0	1,016.0	991.0	981.0	976.2	970.5	966.2	961.9	957.6
- Primary-listed	692.0	603.0	666.0	648.0	656.0	648.9	641.9	636.2	630.6	625.0
- Secondary-listed	318.0	295.0	350.0	343.0	326.0	327.3	328.6	329.9	331.2	332.6
Turnover velocity (Primary)	0.39	0.39	0.39	0.40	0.36	0.33	0.33	0.33	0.33	0.33
Turnover velocity (Secondary)	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Total Traded Value (\$\$m)	274,000.0	274,000.0	281,000.0	314,000.0	259,500.0	237,577.3	235,360.1	233,581.3	231,819.4	230,074.4
Trading Days In The Period	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0
Average Daily Traded Value (\$\$m)	1,100.4	1,100.4	1,128.5	1,261.0	1,042.2	954.1	945.2	938.1	931.0	924.0
Effective Clearing Rate (%)	0.06%	0.06%	0.06%	0.05%	0.05%	0.0535%	0.05%	0.05%	0.05%	0.05%
Securities Clearing Revenue (\$\$m)	163.5	158.5	158.6	170.9	138.9	127.2	126.0	125.0	124.1	123.1
Average Bond Listing Fee	0.015									
Number of Bond Listing	487	349	819	1154	1066	1110	1110	1110	1110	1110
Revenue of Bond listing	7.3	5.2	12.3	17.3	16.0	16.7	16.7	16.7	16.7	16.7
Equities listing	44.3	41.4	37.1	34.3	29.8	29.7	29.6	29.5	29.3	29.2
% Equities Listing per Market Cap	4%	5%	4%	3%	3%	3%	3%	3%	3%	3%
% Corporate actions number of listed companies	4.689%	4.703%	4.576%	4.633%	4.607%	33.7	33.3	33.0	32.6	32.3
Number of listed firm	768.0	763.0	752.0	746.0	738.0	730.5	723.0	715.5	708.0	700.5
- Listing revenue	51.6	46.7	49.4	51.6	45.8	46.4	46.2	46.1	46.0	45.9
Listing revenue, % of Market capitalisation	5.1%	5.2%	4.9%	5.2%	4.7%	4.6%	4.5%	4.4%	4.3%	4.3%
- Corporate actions/Other	36.0	35.9	34.4	34.6	34.0	33.7	33.3	33.0	32.6	32.3
Corporate actions as a % of Listing Revenue	70%	77%	70%	67%	74%	72%	72%	72%	72%	72%
Securities Clearing Revenue (\$\$m)	163.5	158.5	158.6	170.9	138.9	127.2	126.0	125.0	124.1	123.1
- Access revenue	37.7	37.6	37.2	40.7	34.3	37.5	37.5	37.5	37.5	37.5
- Collateral management	8.0	8.8	9.2	9.6	9.0	8.9	8.9	8.9	8.9	8.9
- Securities settlement	81.3	105.9	95.7	87.6	76.6	72.0	71.4	70.8	70.3	69.8
% of Settlement with Clearing	50%	67%	60%	51%	55%	57%	57%	57%	57%	57%
- Contract processing	16.0	15.9	11.6	3.4	0.0	0.0	0.0	0.0	0.0	0.0
- Depository management	7.2	8.2	8.4	8.3	9.1	9.1	9.1	9.1	9.1	9.1
Total Equity Segment Revenue	401.3	417.6	404.5	406.6	347.7	334.7	332.4	330.4	328.5	326.6
Growth		4.1%	-3.1%	0.5%	-14.5%	-3.7%	-0.7%	-0.6%	-0.6%	-0.6%

Appendix I

Appendix I-3: Revenue Assumptions 2 – FX/Commodities Derivatives

Base Case

Year	Historical			Projected		
	FY 2019A	FY2020E	FY2021E	FY2022E	FY2023E	FY2024E
Total Derivatives Contract Volume	226,236,272	223,002,289	200,536,982	209,559,056	218,695,864	227,779,877
Volume						
Derivatives - Equity	175,918,560	175,918,560	148,693,190	152,999,834	157,515,139	162,250,077
Derivatives - Commodities and Currencies	50,317,712	47,083,729	51,843,791	56,559,222	61,180,725	65,529,800
Revenue						
Derivatives - Equity	313,099,731	313,099,731	264,644,037	272,308,998	280,345,335	288,772,574
Derivatives - Commodities and Currencies	163,545,297	153,034,034	168,505,442	183,831,785	198,852,839	212,988,435
Total Derivatives Revenue of the year	476,645,028	466,133,765	433,149,479	456,140,783	479,198,174	501,761,009
Revenue Growth		-2%	-7%	5%	5%	5%

Bear Case

Year	Historical			Projected		
	FY 2019A	FY2020E	FY2021E	FY2022E	FY2023E	FY2024E
Total Derivatives Contract Volume	226,236,272	223,002,289	184,008,419	192,121,422	200,299,161	208,371,355
Volume						
Derivatives - Equity	175,918,560	175,918,560	132,164,628	135,562,201	139,118,436	142,841,555
Derivatives - Commodities and Currencies	50,317,712	47,083,729	51,843,791	56,559,222	61,180,725	65,529,800
Revenue						
Derivatives - Equity	313,099,731	313,099,731	235,226,513	241,273,510	247,602,895	254,229,300
Derivatives - Commodities and Currencies	163,545,297	153,034,034	168,505,442	183,831,785	198,852,839	212,988,435
Total Derivatives Revenue of the year	476,645,028	466,133,765	403,731,955	425,105,295	446,455,734	467,217,736
Revenue Growth		-2%	-13%	5%	5%	5%

Bull 1 Case

Year	Historical			Projected		
	FY 2019A	FY2020E	FY2021E	FY2022E	FY2023E	FY2024E
Total Derivatives Contract Volume	226,236,272	225,361,964	204,764,123	215,836,457	226,091,109	236,318,070
Volume						
Derivatives - Equity	177,212,313	177,212,313	151,665,486	157,841,966	163,311,613	169,042,182
Derivatives - Commodities and Currencies	49,023,959	48,149,651	53,098,637	57,994,491	62,779,496	67,275,887
Revenue						
Derivatives - Equity	315,402,352	315,402,352	269,934,126	280,927,021	290,661,895	300,861,158
Derivatives - Commodities and Currencies	159,340,273	156,498,550	172,584,010	188,496,774	204,049,250	218,663,660
Total Derivatives Revenue of the year	474,742,624	471,900,902	442,518,135	469,423,794	494,711,144	519,524,818
Revenue Growth		-1%	-6%	6%	5%	5%

Bull Case 2

Year	Historical			Projected		
	FY 2019A	FY2020E	FY2021E	FY2022E	FY2023E	FY2024E
Total Derivatives Contract Volume	226,236,272	223,002,289	233,594,107	244,434,323	255,489,270	266,596,921
Volume						
Derivatives - Equity	175,918,560	175,918,560	181,750,315	187,875,101	194,308,546	201,067,121
Derivatives - Commodities and Currencies	50,317,712	47,083,729	51,843,791	56,559,222	61,180,725	65,529,800
Revenue						
Derivatives - Equity	313,099,731	313,099,731	323,479,085	334,379,973	345,830,214	357,859,122
Derivatives - Commodities and Currencies	163,545,297	153,034,034	168,505,442	183,831,785	198,852,839	212,988,435
Total Derivatives Revenue of the year	476,645,028	466,133,765	491,984,527	518,211,759	544,683,053	570,847,557
Revenue Growth		-2%	6%	5%	5%	5%

Appendix J: Revenue Assumptions 2 – FX/Commodities Derivatives

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Appendix K

Appendix K: Trading Comparable

Stock	Ticker	Price	Mkt Cap	PE (x)			EPS		EV/EBITDA (x)		EBITDA	NPAT	ROE	Dividend	FCF
Currency: SGD	n Date: Closing	(local)	(SGD,m)	FY2018	FY2019	NTM	FY2018	FY2019	FY2018	FY2019	Mgn(%)	Mgn(%)	FY2019	Yield (%)	Yield (%)
Asian Exchanges															
ASX	ASX:ASX	78.8	15258.3	27.9x	37.5x	32.2x	2.3x	2.2x	13.6x	18.x	76.8	45.2	12.5	2.7	47.9
Bursa Malaysia	KLSE:BURSA	2.0	1605.3	29.5x	26.x	23.5x	.2x	.1x	16.3x	13.4x	58.7	40.9	27.4	5.6	35.9
Hong Kong Exchanges	SEHK:388	47.2	59373.9	41.6x	49.7x	33.x	5.4x	1.x	6.8x	10.8x	71.5	58.8	24.2	2.5	45.7
Japan Exchange Group	TSE:8697	24.7	13242.3	20.6x	24.5x	24.2x	77.9x	1.x	11.6x	13.1x	65.6	40.5	17.4	2.4	7.5
Singapore Exchange	SGX:S68	8.8	9435.1	28.x	32.x	22.7x	.3x	.3x	15.1x	18.2x	53.2	43.0	35.1	3.4	29.8
MCX	NSEI:MCX	25.2	1285.5	41.x	61.x	32.3x	30.1x	.4x	17.5x	30.1x	47.8	37.0	9.3	1.5	69.0
NZX	NZSE:NZX	1.2	342.0	16.8x	30.3x	26.4x	.x	.x	12.2x	18.4x	33.4	17.2	23.8	4.4	1.9
Philippine Stock Exchange	PSE:PSE	4.5	369.2	33.6x	22.x	.x	7.7x	.2x	15.x	9.7x	61.7	45.6	27.1	5.1	36.0
Mean			12614.0	29.9x	35.4x	24.3x	15.5x	.6x	13.5x	16.5x	58.6	41.0	22.1	3.4	34.2

North American Exchanges															
CBOE	BATS:CBOE	161.9	17936.3	29.3x	34.8x	24.9x	3.5x	4.7x	18.4x	16.9x	30.0	15.4	17.0	1.2	15.0
CME	ASDAQGS:CM	282.8	101334.9	37.5x	40.6x	30.2x	4.9x	7.1x	26.2x	25.5x	67.8	45.5	10.2	2.3	30.2
Intercontinental Exchange	NYSE:ICE	131.2	73078.9	29.8x	37.x	24.2x	2.8x	3.6x	17.4x	19.8x	61.7	40.0	11.8	1.1	36.3
	ASDAQGS:NDA	148.9	24413.5	23.1x	31.7x	20.8x	3.9x	4.8x	13.2x	16.5x	30.2	10.7	13.6	1.7	24.0
NASDAQ OMX															
TMX	TSX:X	123.0	6918.5	19.1x	32.3x	20.9x	4.x	3.7x	10.8x	11.9x	62.8	28.2	8.9	2.2	24.7
Mean			44736.4	27.8x	35.3x	24.2x	3.8x	4.8x	17.2x	18.1x	50.5	28.0	12.3	1.7	26.0

European Exchanges															
Bolsas y Mmercados Espanoles	BME:BME	52.1	4317.0	17.8x	25.8x	22.8x	1.3x	2.1x	8.3x	14.3x	58.4	43.9	32.1	4.5	38.5
Deutsche Boerse	XTRA:DB1	223.7	40999.1	24.4x	31.8x	23.8x	5.2x	7.4x	14.1x	18.4x	54.9	28.5	19.5	1.8	25.7
Lonon Stock Exchange	LSX:lse	137.7	49259.1	45.1x	73.6x	37.2x	1.2x	1.9x	10.4x	16.3x	59.7	16.3	16.1	0.8	18.2
Hellenic Exchanges	ATSE:EXAE	7.4	444.7	73.1x	110.8x	43.5x	.1x	.1x	18.8x	30.8x	30.2	12.4	3.0	3.2	7.8
Moscow Exchange	MISX:MOEX	2.5	5550.6	12.x	16.6x	12.1x	6.7x	.1x	NM	NM	69.9	47.1	16.7	6.8	NM
Warsaw Stock Exchange	WSE:GPW	15.1	631.7	14.x	16.x	14.5x	2.7x	1.x	5.6x	7.x	58.5	53.0	21.3	7.4	24.8
Mean			10388.6	28.2x	40.2x	23.3x	3.2x	2.1x	11.7x	17.6x	54.4	37.0	18.5	4.7	24.2

Other Emerging Market Exchanges															
Bolsa de Valores de Colombia	BVC:BVC	4.8	290.6	21.1x	22.9x	.x	567.4x	.2x	14.x	10.1x	27.2	16.9	11.0	4.6	12.1
Bolsa Mexicana de valores	BMV:BOLSA A	3.1	1825.7	17.2x	21.4x	16.6x	2.x	.1x	10.5x	13.4x	51.0	40.9	21.2	4.1	31.9
Dubai Financial Arket	DFM:DFM	0.3	2794.7	62.4x	96.9x	34.5x	.x	.x	11.8x	23.8x	58.4	37.5	1.7	0.0	147.5
JSE South Africa	JSE:JSE	10.5	896.5	16.9x	12.6x	13.1x	7.7x	.8x	11.5x	7.6x	43.8	41.0	24.4	5.8	-51.6
Mean			1451.9	29.4x	38.5x	16.1x	144.3x	.3x	12.x	13.7x	45.1	34.1	14.6	3.6	35.0

Source: Capital IQ, Factset, priced at close of business 24 Jan 2020

Appendix L: DCF Valuation

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Appendix L - 2: DCF Valuation

Discounted Cash Flow (DCF) Analysis				Discount Rate Inputs					
	Model	Exit Multiple	Growth Rate						
Terminal Value (Choose Option -->)	Exit Multiple	16.9x	2.0%						
Terminal Value in Model	8,238,266	8,238,266	8,309,457						
Discount Rate (WACC)	6.44%								
Valuation Date	31/1/2020								
# Shares Outstanding as of Valuation Date (millions)	1,073,722								
Market Price as of Valuation Date	\$8.70								
				Terminal Value					
Valuation Timeline	30/6/2020	30/6/2021	30/6/2022	30/6/2023	30/6/2024	30/6/2024			
	0.42	1.00	1.00	1.00	1.00	1.00			1.00
Free Cash Flow to Firm (FCFF)	133,408	372,506	378,967	385,836	362,042	8,238,266			
Rolling Enterprise Value (NPV) - Exit Mutiple	7,835,871	8,198,819	8,330,650	8,464,100	8,600,308				
Plus: Cash + Marketable Securities	589,240	542,526	486,127	418,820	309,211				
Less: Debt + Capital & Finance Leases									
Equity Value	8,425,111	8,741,345	8,816,777	8,882,919	8,909,520				
Equity value = EV (PV of FCFF) + Non-op assets (includ Cash) - Debt - MIs)/# No. of shares									
Fully Diluted Shares Outstanding	1,073,772	1,073,772	1,073,772	1,073,772	1,073,772				
Rolling SGX Value per Share	\$7.85	\$8.14	\$8.21	\$8.27	\$8.30				
Investor IRR									
Equity Investor Return (After SBC dilution)						\$8.30			
Equity Investor IRR (After SBC dilution)									
EV	7,636,020								
Share Price	\$7.73								
Discounted Cash Flow (DCF) Analysis				Discount Rate Inputs					
	Model	Exit Multiple	Growth Rate						
Terminal Value (Choose Option -->)	y Growth Rate	16.9x	2.0%						
Terminal Value in Model	8,309,457	8,238,266	8,309,457						
Discount Rate (WACC)	6.44%								
Valuation Date	31/1/2020								
# Shares Outstanding as of Valuation Date (millions)	1,073,722								
Market Price as of Valuation Date	\$8.70								
				Terminal Value					
Valuation Timeline	30/6/2020	30/6/2021	30/6/2022	30/6/2023	30/6/2024	30/6/2024			
	0.42	1.00	1.00	1.00	1.00	1.00			1.00
Free Cash Flow to Firm (FCFF)	133,408	372,506	378,967	385,836	362,042	8,309,457			
Rolling Enterprise Value (NPV) - Exit Mutiple	7,891,316	8,257,837	8,393,472	8,530,969	8,671,499				
Plus: Cash + Marketable Securities	589,240	542,526	486,127	418,820	309,211				
Less: Debt + Capital & Finance Leases									
Equity Value	8,480,556	8,800,363	8,879,599	8,949,789	8,980,711				
Equity value = EV (PV of FCFF) + Non-op assets (includ Cash) - Debt - MIs)/# No. of shares									
Fully Diluted Shares Outstanding	1,073,772	1,073,772	1,073,772	1,073,772	1,073,772				
Rolling SGX Value per Share	\$7.90	\$8.20	\$8.27	\$8.33	\$8.36				
Investor IRR									
Equity Investor Return (After SBC dilution)						\$8.36			
Equity Investor IRR (After SBC dilution)									
EV	7,690,051								
Share Price	\$7.78								

Appendix M

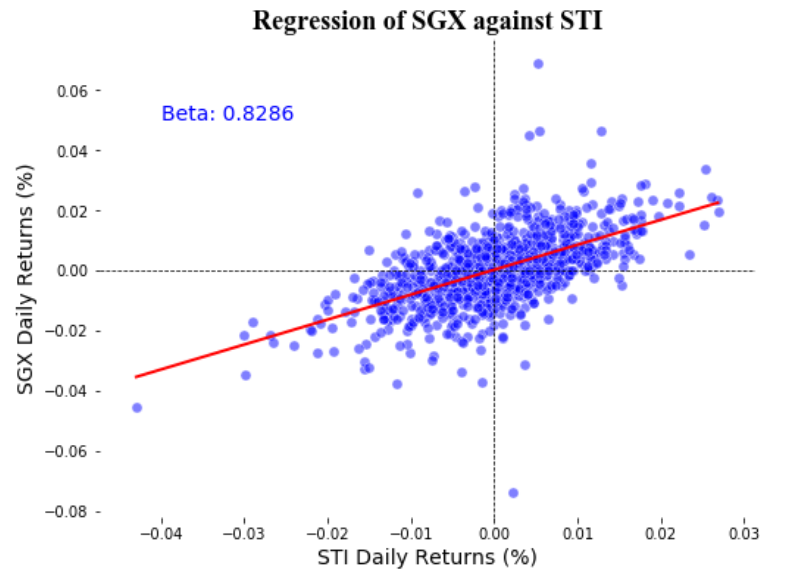
Appendix M: Model Summary

FINANCIAL STATEMENTS		Historical Results						Forecast Period				
All figures are expressed in thousands (\$'000)		2015A	2016A	2017A	2018A	2019A	LTM	2020E	2021E	2022E	2023E	2024E
Ratios												
Income Statement												
Gross Profit Margin		80.7%	80.5%	79.7%	79.2%	79.0%	79.2%	78.7%	78.2%	77.7%	77.2%	76.7%
Operating Profit Margin		51.6%	50.0%	50.2%	50.3%	50.7%	53.9%	50.0%	49.5%	49.0%	48.5%	48.0%
Net Profit Margin		44.8%	42.7%	42.4%	43.0%	43.0%	43.7%	42.7%	42.4%	41.9%	41.5%	41.0%
Tax Ratio		15.3%	16.1%	16.9%	17.0%	17.3%	17.5%	17.0%	17.0%	17.0%	17.0%	17.0%
Interest Coverage Ratio		-	-	-	-	-	-	-	-	-	-	-
Staff		19.3%	19.5%	20.3%	20.8%	21.0%	20.8%	21.3%	21.8%	22.3%	22.8%	23.3%
Technology		14.9%	15.6%	15.5%	15.0%	14.4%	12.2%	15.5%	15.5%	15.5%	15.5%	15.5%
Processing and royalties		6.0%	7.1%	5.7%	5.5%	5.2%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
Premises		2.9%	3.0%	3.3%	3.4%	3.2%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Professional fees		1.7%	1.3%	1.3%	1.5%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Others		3.6%	3.4%	3.9%	3.5%	4.0%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%
Balance Sheet												
Quick Ratio		1.6	1.4	1.4	1.4	1.4	1.5	1.3	1.3	1.2	1.1	1.0
Current Ratio		1.9	1.6	1.7	1.7	1.6	1.8	1.6	1.5	1.4	1.3	1.2
Total Asset Turnover Ratio		0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5
Net Asset Turnover Ratio		0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.1	1.3
Days in Period		365	366	365	365	365	365	366	365	365	365	366
Efficiency												
Inventory Turnover Ratio		-	-	-	-	-	-	-	-	-	-	-
Inventory Days		-	-	-	-	-	-	-	-	-	-	-
Accounts Receivable Ratio		1.2	0.9	1.0	1.0	1.0	1.7	1.0	1.0	1.0	1.0	1.0
Accounts Receivable Days		306	416	371	357	355	220	360	360	360	360	360
Accounts Payable Ratio		0.5	0.4	0.4	0.5	0.5	0.8	0.5	0.5	0.5	0.5	0.5
Accounts Payable Days		696	906	816	774	741	471	700	700	700	700	700
PP&E Turnover Ratio		13	13	10	12	15	17	16	17	18	18	16
Working Capital Turnover		(12.0)	(9.9)	(10.4)	(13.2)	(34.9)	118.3	35.5	53.6	110.2	(1,937.7)	(99.2)
Cash Turnover		0.8	0.7	0.6	0.7	0.5	0.6	0.4	0.4	0.3	0.2	0.1
Leverage & Solvency												
Debt to Equity		-	-	-	-	-	-	-	-	-	-	-
Debt to Capital		-	-	-	-	-	-	-	-	-	-	-
Debt to Tangible Net Worth		-	-	-	-	-	-	-	-	-	-	-
Total Liabilities to Equity		0.8	1.1	1.0	0.9	1.0	1.1	0.8	0.8	0.9	1.0	1.1
Total Assets to Equity		1.8	2.1	2.0	1.9	2.0	2.1	1.8	1.8	1.9	2.0	2.1
Debt to EBITDA		-	-	-	-	-	-	-	-	-	-	-
Capital Structure Impact		-	-	-	-	-	-	-	-	-	-	-
Acid Test		1.6	1.4	1.4	1.4	1.4	1.5	1.3	1.3	1.2	1.1	1.0
Rates of Return												
Return on Equity (ROE)		35.7%	35.3%	32.9%	33.1%	35.9%	36.7%	36.4%	37.3%	41.1%	46.1%	52.9%
Return on Assets (ROA)		19.4%	16.6%	16.6%	17.2%	18.3%	20.4%	18.8%	18.8%	19.6%	20.5%	21.6%

Appendix N

Appendix N: WACC Assumptions

Weighted Average Cost of Capital (WACC)		Assumptions
Cost of Equity (CAPM)		Assumptions
Risk-Free Rate	1.46%	10-yr treasury yield
Market Risk Premium	5.84%	Avg. 10years STI return
Levered Beta	1.10	Bottom-Up Beta
Cost of Equity	7.91%	
Cost of Debt		
Cost of Debt	5.25%	SG Prime Rate (MAS)
Pre-Tax Cost of Debt	5.25%	
Tax Rate	17%	
Post-Tax Cost of Debt	3.94%	
Capital Structure		
Debt	0.41	(1.5 Billion Debt)
Equity	0.59	
Peer group unlevered	0.52x	
Tax Rate	17%	
SGX D/E ratio	1.38x	
SGX levered beta	1.10	
WACC	6.44%	



Ticker	Revenue	Revenue Denominated by SGD	Weightage	Corp Tax	5 year beta	Debt/Equity	5 year Unlevered beta
Singapore	909.8	909.8	4%		17%	0.83	0.00
London Stock Exch Grp	3,022.	5,318.7	22%		19%	1.02	0.55
ASX	1,089.4	1,024.	4%		30%	0.91	2.83
HKEX	16,221.	2,757.6	12%		17%	1.24	4.45
Nasdaq	4,331.	5,890.2	25%		21%	0.85	1.19
Japan Exchange Group, Inc.	125,291.6	1,628.8	7%		4%	1.12	0.08
CME Group	4,598.3	6,253.7	26%		21%	0.69	0.14
Sum		23,782.8	100%				0.52

Appendix O

Appendix O: Pro-forma financial Statements

FINANCIAL STATEMENTS SGX: S68	Historical Results						Forecast Period				
	2015A	2016A	2017A	2018A	2019A		2020E	2021E	2022E	2023E	2024E
All figures are expressed in thousands (\$'000)											
Income Statement											
Operating revenue											
Equities and Fixed Income	401,552	405,763	404,521	406,600	347,529	340,388	338,377	336,384	334,406	332,446	
Derivatives	295,791	325,304	303,051	339,812	459,749	449,610	417,795	439,972	462,212	483,975	
Market Data and Connectivity	81,174	87,042	93,242	98,266	102,530	110,732	119,591	129,158	139,491	150,650	
Management fees from subsidiaries	-	-	-	-	-	-	-	-	-	-	
Dividends from subsidiaries	-	-	-	-	-	-	-	-	-	-	
Operating revenue	778,517	818,109	800,814	844,678	909,808	900,731	875,764	905,513	936,109	967,071	
Operating expenses											
Staff	149,953	159,262	162,340	175,743	191,417	192,193	191,244	202,269	213,783	225,690	
Technology	115,911	127,846	123,835	126,922	130,674	139,613	135,743	140,355	145,097	149,896	
Processing and royalties	46,891	58,280	45,247	46,334	47,258	47,630	46,310	47,883	49,501	51,138	
Premises	22,642	24,734	26,571	28,304	28,831	22,748	22,118	22,869	23,642	24,424	
Professional fees	13,260	10,882	10,131	12,789	14,603	13,809	13,426	13,882	14,351	14,826	
Others	28,025	27,965	30,873	29,690	36,008	33,971	33,029	34,151	35,305	36,473	
Operating expenses	376,682	408,969	398,997	419,782	448,791	449,964	441,871	461,409	481,679	502,446	
Operating profit	401,835	409,140	401,817	424,896	461,017	450,766	433,893	444,105	454,430	464,624	
Other gains/(losses) – net	7,811	5,709	5,655	11,306	13,468	12,927	13,108	13,291	13,478	13,666	
Profit before tax and share of results of associated companies a	409,646	414,849	407,472	436,202	474,485	463,693	447,001	457,396	467,907	478,291	
Share of results of associated companies and joint venture	1,903	1,112	1,412	1,268	(1,500)	-	-	-	-	-	
Profit before tax	411,549	415,961	408,884	437,470	472,985	463,693	447,001	457,396	467,907	478,291	
Tax	(62,937)	(66,944)	(69,192)	(74,270)	(81,887)	(78,828)	(75,990)	(77,757)	(79,544)	(81,309)	
Net profit after tax (Net Income)	348,612	349,017	339,692	363,200	391,098	384,865	371,011	379,639	388,363	396,981	
Attributable to:											
Equity holders of the Company	348,612	349,017	339,692	363,200	391,098	384,865	371,011	379,639	388,363	396,981	
Supplementary											
Basic Shares Outstanding	1,070,745	1,070,925	1,070,443	1,070,534	1,070,155	1,070,161	1,070,161	1,070,161	1,070,161	1,070,161	
Shares granted under the Plan and the Scheme	3,465	2,873	3,202	3,041	3,617	3,800	3,800	3,800	3,800	3,800	
Diluted Shares Outstanding	1,074,210	1,073,798	1,073,645	1,073,575	1,073,772	1,073,772	1,073,772	1,073,772	1,073,772	1,073,772	
Earnings per Share (in cents per share)											
Basic	32.6	32.6	31.7	33.9	36.5	36.0	34.7	35.5	36.3	37.1	
Diluted	32.5	32.5	31.6	33.8	36.4	35.8	34.6	35.4	36.2	37.0	
EBITDA	445,316	461,092	450,858	474,808	513,044	507,362	491,290	501,462	509,644	487,139	
EBITDA Margin	57.2%	56.4%	56.3%	56.2%	56.4%	56.3%	56.1%	55.4%	54.4%	50.4%	

Appendix P

Appendix P: Pro-forma Cashflow Statement

FINANCIAL STATEMENTS SGX: S68 All figures are expressed in thousands (\$'000)	Historical Results						Forecast Period				
	2015A	2016A	2017A	2018A	2019A		2020E	2021E	2022E	2023E	2024E
Cash Flow Statement											
Cash flows from operating activities											
Profit before tax and share of results of associated company	409,646	414,849	407,472	436,202	474,485	463,693	447,001	457,396	467,907	478,291	
Adjustments for:											
Depreciation and amortisation	57,273	59,855	57,694	60,838	62,512	56,595	57,398	57,357	55,215	22,514	
Share-based payment expense	13,792	7,903	8,653	10,926	10,485						
Loss on disposal of available-for-sale financial asset	-	-	3,961	-	-						
Impairment loss on available-for-sale financial asset	-	6,000	-	-	-						
Net write-off of property, plant and equipment and software	-	165	51	826	407						
Net losses/(gain) on disposal of property, plant and equipment and	-	(43)	(122)	(103)	203						
Grant income for property, plant and equipment and software	-	-	(201)	-	-						
Interest income	(5,317)	(9,445)	(9,387)	(10,021)	(12,748)	(12,927)	(13,108)	(13,291)	(13,478)	(13,666)	
Gains on dilution of interests in associated companies	-	-	-	-	(221)						
Dividend income from financial assets, at FVOCI/available-for-sale financial assets	-	-	-	(13)	(99)						
Dividend income from other investments	(415)	(1,327)	-	-	-						
Finance charges	-	-	-	-	-						
Operating cash flow before working capital change	474,979	477,957	468,121	498,655	535,024	507,362	491,290	501,462	509,644	487,139	
Change in working capital											
Cash committed for National Electricity Market of Singapore	3,245	(922)	(7,846)	(5,921)	10,831	(4,612)	283	(684)	(709)	(727)	
Trade and other receivables	115,153	(275,586)	121,413	(13,721)	(59,368)	(514)	22,198	(29,342)	(30,176)	(27,931)	
Trade and other payables	(100,673)	292,302	(136,849)	13,090	10,675	(50,919)	(13,164)	37,470	38,875	37,194	
Cash generated from operations	492,704	493,751	444,839	492,103	497,162	451,318	500,607	508,906	517,634	495,675	
Income tax paid	(63,656)	(70,281)	(67,090)	(65,285)	(79,694)	(78,828)	(75,990)	(77,757)	(79,544)	(81,309)	
Net cash provided by operating activities	429,048	423,470	377,749	426,818	417,468	372,490	424,617	431,149	438,089	414,365	
Cash flows from investing activities											
Investments in associated companies	-	-	-	(1,499)	(71,693)						
Purchase of financial assets, at FVOCI	-	-	-	-	(48,947)						
Purchase of available-for-sale financial assets	-	-	-	(25,517)	-						
Proceeds from disposal of available-for-sale financial assets	-	-	40,995	-	-						
Purchases of property, plant and equipment and software	(82,431)	(73,847)	(60,126)	(78,559)	(47,347)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	
Purchase and sale of call options	-	-	-	-	(5,541)						
Interest received	5,190	8,651	7,677	11,028	13,181	12,927	13,108	13,291	13,478	13,666	
Dividend received from financial assets, at FVOCI/available-for-sale financial assets	-	-	-	8	104						
Dividend received from associated company	-	672	-	4,941	-						
Dividend payment to the former shareholders of a subsidiary	-	-	(16,535)	-	-						
Acquisition of a subsidiary, net of cash acquired	(18,550)	-	(120,096)	-	-						
Dividend received from other investments	415	1,327	-	-	-						
Proceeds from disposal of property, plant and equipment and soft	-	-	172	103	-						
Grant received for property, plant and equipment and software	-	-	373	-	-						
Top-up of club memberships	-	-	(38)	(8)	-						
Net cash used in investing activities	(95,376)	(63,197)	(147,578)	(89,503)	(160,243)	(37,073)	(36,892)	(36,709)	(36,522)	(36,334)	
Cash flows from financing activities											
Dividends paid	(299,889)	(332,154)	(299,852)	(299,860)	(401,402)	(417,458)	(434,156)	(451,523)	(469,584)	(488,367)	
Purchase of treasury shares	(8,025)	(12,637)	(8,638)	(8,192)	(9,502)						
Repayment of lease liabilities	-	-	-	-	-						
Net cash used in financing activities	(307,914)	(344,791)	(308,490)	(308,052)	(410,904)	(417,458)	(434,156)	(451,523)	(469,584)	(488,367)	
Net increase in cash and cash equivalents											
	25,758	15,482	(78,319)	29,263	(153,679)	(82,041)	(46,432)	(57,082)	(68,016)	(110,335)	
Cash and cash equivalents at beginning of financial year	606,843	632,601	598,083	520,323	549,597	445,512	363,471	317,039	259,957	191,940	
Effects of currency translation on cash and cash equivalents	-	-	559	11	(406)						
Increase/(Decrease) in cash committed for Singapore Exchange Derivatives											
Clearing Limited Clearing Fund	-	(50,000)	-	-	50,000						
Cash and cash equivalents at end of financial year	632,601	598,083	520,323	549,597	445,512	363,471	317,039	259,957	191,940	81,605	

Appendix Q

Appendix Q: Pro-forma Balance Sheet

FINANCIAL STATEMENTS SGX: S68	Historical Results						Forecast Period				
All figures are expressed in thousands (\$'000)	2015A	2016A	2017A	2018A	2019A	2020E	2021E	2022E	2023E	2024E	
Assets											
Current assets											
Cash and cash equivalents											
Cash and cash equivalents per statement of cash flows	632,601	598,083	520,323	549,597	445,512	363,471	317,039	259,957	191,940	81,605	
Singapore Exchange Derivatives Clearing Limited Clearing Fund	150,021	200,021	200,021	200,021	150,021	150,021	150,021	150,021	150,021	150,021	
Securities Clearing Fund	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	
National Electricity Market of Singapore	7,280	8,202	16,048	21,969	11,137	15,749	15,465	16,149	16,859	17,586	
Net Cash and cash equivalents	849,902	866,306	796,392	831,587	666,670	589,240	542,526	486,127	418,820	309,211	
Trade and other receivables	653,508	929,981	814,701	826,786	885,451	885,965	863,767	893,109	923,286	951,217	
Derivative financial instruments	311	2,665	1,450	40	256	256	256	256	256	256	
Available-for-sale financial assets	-	-	-	22,003	-	-	-	-	-	-	
Financial assets, at FVOCI	-	-	-	-	24,780	24,780	24,780	24,780	24,780	24,780	
	1,503,721	1,798,952	1,612,543	1,680,416	1,577,157	1,500,241	1,431,328	1,404,272	1,367,142	1,285,465	
Non-current assets											
Available-for-sale financial asset	50,956	44,956	-	3,648	-	-	-	-	-	-	
Derivative financial assets	-	-	-	-	5,851	5,851	5,851	5,851	5,851	5,851	
Financial assets, at FVOCI	-	-	-	-	58,783	58,783	58,783	58,783	58,783	58,783	
Investment property	-	-	26,193	26,234	24,596	24,487	24,375	24,260	24,142	24,021	
Property, plant and equipment	61,169	62,030	80,421	71,824	60,951	56,862	52,824	49,678	52,933	59,208	
Software	139,977	154,702	159,477	173,799	182,090	181,927	180,914	179,052	172,935	196,501	
Right-of-use asset	-	-	-	-	-	-	-	-	-	-	
Intangible asset	26,462	25,556	63,544	61,428	57,566	55,332	53,097	50,863	48,628	46,394	
Goodwill	9,614	9,614	88,401	88,628	85,299	85,299	85,299	85,299	85,299	85,299	
Investment in associated company	9,426	9,387	10,307	8,628	78,967	78,967	78,967	78,967	78,967	78,967	
Investment in joint venture	-	-	-	-	100	100	100	100	100	100	
Other assets	287	287	325	333	928	928	928	928	928	928	
	297,891	306,532	428,668	434,522	555,131	548,536	541,138	533,781	528,566	556,052	
Total assets	1,801,612	2,105,484	2,041,211	2,114,938	2,132,288	2,048,776	1,972,466	1,938,053	1,895,707	1,841,516	
Liabilities											
Current liabilities											
Trade and other payables	718,326	1,012,652	891,566	890,662	911,506	860,587	847,423	884,893	923,769	960,963	
Dividends payable	-	-	-	-	-	-	-	-	-	-	
Derivative financial instruments	84	66	79	1,967	1,293	1,293	1,293	1,293	1,293	1,293	
Taxation	76,802	75,262	71,398	82,440	77,167	77,167	77,167	77,167	77,167	77,167	
Lease liabilities	-	-	-	-	-	-	-	-	-	-	
Provisions	9,433	9,775	10,353	10,963	11,507	11,507	11,507	11,507	11,507	11,507	
	804,645	1,097,755	973,396	986,032	1,001,473	950,554	937,390	974,860	1,013,736	1,050,930	
Non-current liabilities											
Trade and other payables	1,807	312	18	-	-	-	-	-	-	-	
Lease liabilities	-	-	-	-	-	-	-	-	-	-	
Deferred tax liabilities	18,764	17,836	35,264	32,674	39,966	39,966	39,966	39,966	39,966	39,966	
	20,571	18,148	35,282	32,674	39,966	39,966	39,966	39,966	39,966	39,966	
Total liabilities	825,216	1,115,903	1,008,678	1,018,706	1,041,439	990,520	977,356	1,014,826	1,053,702	1,090,896	
Net assets	976,396	989,581	1,032,533	1,096,232	1,090,849	1,058,256	995,110	923,226	842,006	750,620	
Equity											
Capital and reserves attributable to the Company's equity holders											
Share capital	428,568	426,445	428,031	429,236	429,113	429,113	429,113	429,113	429,113	429,113	
Treasury shares	(12,049)	(12,855)	(12,561)	(11,363)	(13,233)	(13,233)	(13,233)	(13,233)	(13,233)	(13,233)	
Cash flow hedge reserve	146	2,152	1,069	(1,405)	(128)	(128)	(128)	(128)	(128)	(128)	
Currency translation reserve	(835)	(1,325)	2,972	2,864	(3,297)	(3,297)	(3,297)	(3,297)	(3,297)	(3,297)	
Fair value reserve	-	-	-	111	8,931	8,931	8,931	8,931	8,931	8,931	
Securities clearing fund reserve	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	
Derivatives clearing fund reserve	34,021	34,021	34,021	34,021	34,021	34,021	34,021	34,021	34,021	34,021	
Share-based payment reserve	19,695	17,430	15,448	15,875	18,865	18,865	18,865	18,865	18,865	18,865	
Retained profits	310,625	359,631	399,460	441,377	511,342	478,749	415,603	343,719	262,499	171,113	
Proposed dividends	171,225	139,082	139,093	160,516	80,235	80,235	80,235	80,235	80,235	80,235	
Total equity	976,396	989,581	1,032,533	1,096,232	1,090,849	1,058,256	995,110	923,226	842,006	750,620	