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Details of Filing

Document Lodged:	Affidavit - Form 59 - Rule 29.02(1)
File Number:	NSD2191/2018
File Title:	IN THE MATTER OF HALIFAX INVESTMENT SERVICES PTY LTD (IN LIQUIDATION) ACN 096 980 522
Registry:	NEW SOUTH WALES REGISTRY - FEDERAL COURT OF AUSTRALIA



A handwritten signature in blue ink that reads "Sia Lagos".

Dated: 22/06/2020 2:04:59 PM AEST

Registrar

Important Information

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IN THE HIGH COURT OF NEW ZEALAND
AUCKLAND REGISTRY
I TE KŌTI MATUA O AOTEAROA
TĀMAKI MAKĀURAU ROHE
COMMERCIAL PANEL

CIV-2019-404-2049

UNDER section 284 of the Companies Act 1993, section 66
of the Trustee Act 1956 and Part 19 of the High
Court Rules 2016

IN THE MATTER OF **HALIFAX NEW ZEALAND LIMITED (IN
LIQUIDATION)**

BETWEEN **MORGAN JOHN KELLY and PHILIP ALEXANDER
QUINLAN** (in their capacity as liquidators)

First Applicants

**HALIFAX NEW ZEALAND LIMITED (IN
LIQUIDATION)**

Second Applicant

**MORGAN JOHN KELLY and PHILIP ALEXANDER
QUINLAN** (in their capacity as trustees)

Third Applicants

(continued on next page)

**AFFIDAVIT OF IAN JOSEPH SIMMONDS
SWORN 22 JUNE 2020**

Next event date: 30 November 2020 (final hearing)
Judicial officer: Venning J

**Russell
McAugh**

Counsel: A Leopold SC (Aust)
E Holmes

M Kersey
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PO Box 8
DX CX10085
Auckland

Affidavit

No. 2191 of 2018

Federal Court of Australia

District Registry: New South Wales

Division: General

IN THE MATTER OF HALIFAX INVESTMENT SERVICES PTY LTD (IN LIQUIDATION)

ACN: 096 980 522

Morgan John Kelly and Philip Alexander Quinlan in their capacities as joint and several liquidators of Halifax Investment Services Pty Ltd (In Liquidation) ACN 096 980 522 and another named in the Schedule

Plaintiffs

Choo Boon Loo and others named in the Schedule

Defendants

Affidavit of: **Ian Joseph Simmonds**

Address: Level 1, 483 Riley Street, Surry Hills NSW 2010

Occupation: Consultant

Date: 22 June 2020

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3.	Confidential Exhibit "IJS-1", being confidential materials referred to in the Expert Report of Ian Joseph Simmonds dated 22 June 2020	[3]	1-135

Filed on behalf of

Prepared by

Law firm

Tel +61 2 9513 2300

Email Jason.Opperman@klgates.com

DX 170 Sydney

Address for service Level 31, 1 O'Connell Street, Sydney NSW 2000

Philip Alexander Quinlan and Morgan John Kelly in their capacities as joint and several liquidators of Halifax Investment Services Pty Ltd (In Liquidation), Plaintiffs

Jason Opperman and Simon Correggia**K&L Gates**

Fax +61 2 9513 2399

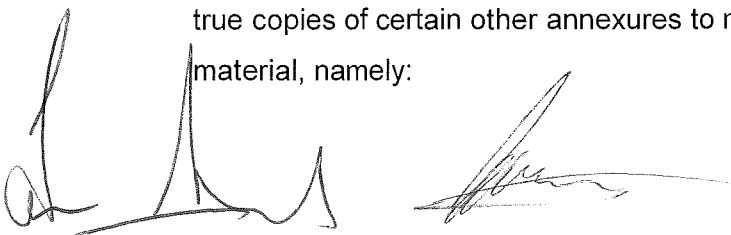
and Simon.Correggia@klgates.com

Ref 7

[Form approved 01/08/2011]

I, Ian Joseph Simmonds of Level 1, 483 Riley Street, Surry Hills NSW 2010, Consultant, say on oath:

1. I am a Consultant in the area of institutional stockbroking. The following facts are within my own personal knowledge except as otherwise stated.
2. Shown to me at the time of swearing this affidavit is a folder of documents marked "IJS-1" (the **Exhibit**). The Exhibit contains a true copy of my expert report prepared for filing in these proceedings dated 22 June 2020 (**Report**). A true copy of my Report is at **pages 1-49** of the **Exhibit**. The Exhibit also contains true copies of certain annexures to my Report, namely:
 - (a) Resume, which is at **pages 50-52** of the **Exhibit**;
 - (b) Liquidity Article (as defined in paragraph 2.13 of my Report), which is at **pages 81-82** of the **Exhibit**;
 - (c) ASX Glossary (as defined in paragraph 2.13 of my Report), which is at **pages 83-87** of the **Exhibit**;
 - (d) IMF Working Paper (as defined in paragraph 2.13 of my Report), which is at **pages 88-151** of the **Exhibit**;
 - (e) OTC Article (as defined in paragraph 2.13 of my Report), which is at **pages 152-156** of the **Exhibit**;
 - (f) Investopedia Article (as defined in paragraph 2.13 of my Report), which is at **page 157** of the **Exhibit**;
 - (g) Futures Article (as defined in paragraph 2.13 of my Report), which is at **pages 158-177** of the **Exhibit**;
 - (h) IG Markets Article (as defined in paragraph 2.13 of my Report), which is at **pages 178-183** of the **Exhibit**;
 - (i) ICE HB Website (as defined in paragraph 2.13 of my Report), which is at **pages 184-185** of the **Exhibit**;
 - (j) Screenshot of the Australian Investors Association website, which is at **page 186** of the **Exhibit**;
 - (k) Screenshot of the International Securities Identification Number website, which is at **page 187** of the **Exhibit**; and
 - (l) Warrants Guide (as defined in paragraph 2.13 of my Report), which is at **pages 188-231** of the **Exhibit**.
3. Shown to me at the time of swearing this affidavit is a folder of documents marked "**Confidential Exhibit IJS-1**" (**Confidential Exhibit**). The Confidential Exhibit contains true copies of certain other annexures to my Report that I consider contain confidential material, namely:



- (a) KPMG Share Spreadsheet (which was included with my letters of instruction set out at paragraphs 6 and 7 below and is defined in paragraph 2.9 of my Report), which is at **pages 1-68** of the **Confidential Exhibit**;
 - (b) KPMG Derivatives Spreadsheet (which was included with my letters of instruction set out at paragraphs 6 and 7 below and is defined in paragraph 2.9 of my Report), which is at **pages 69-75** of the **Confidential Exhibit**;
 - (c) Share Spreadsheet (as defined in paragraph 2.11 of my Report), which is at **pages 76-117** of the **Confidential Exhibit**;
 - (d) Derivative Spreadsheet (as defined in paragraph 2.11 of my Report), which is at **pages 118-122** of the **Confidential Exhibit**; and
 - (e) A current company search extracted from the database of the Australian Securities and Investments Commission as described at paragraph 4.48 of my Report, which is at **pages 123-135** of the **Confidential Exhibit**.
4. The Confidential Exhibit contains information of the investment positions contained in the Halifax portfolio. There is a risk that market participants could take advantage of this information, in particular, the highly illiquid positions are potentially price sensitive if there is a decision to sell them. In my experience, professional investors seek to keep their positions confidential ahead of trading in the market.
 5. I have been instructed to provide a written expert report in relation to certain questions for Morgan Kelly and Phillip Quinlan (**Liquidators**), the joint and several liquidators of Halifax Investment Services Pty Ltd (In Liquidation) (**Halifax AU**) and Halifax New Zealand Ltd (in liquidation) (**Halifax NZ**) for filing in Federal Court of Australia proceeding NSD 2191 of 2018 and High Court of New Zealand proceeding CIV-2019-404-2049.
 6. A copy of the letter of instruction, including an addendum to the letter of instruction, issued by Mr Jason Opperman of K&L Gates in Sydney, Australia, the solicitors for the Liquidators of Halifax AU is at **pages 53-75** of **Exhibit**.
 7. A copy of the letter of instruction issued by Mr Matt Kersey of Russell McVeagh in Auckland, New Zealand, the solicitors for the Liquidators of Halifax NZ is at **pages 76-80** of the **Exhibit**.
 8. K&L Gates have also provided me with a copy of Federal Court of Australia Expert Evidence Practice Note (**GPN-EXPT**), dated 25 October 2016. A copy of GPN-EXPT is at **pages 61-73** of the **Exhibit**. I have read, understood and complied with the contents of GPN-EXPT including the Harmonised Expert Witness Code of Conduct and agree to be bound by the practice note.

9. Russell McVeagh have also provided me with a copy of the High Court of New Zealand Code of Conduct for Expert Witnesses (**Code of Conduct**). A copy of the Code of Conduct is at **pages 78-80** of the **Exhibit**. I have read, understood and complied with the contents of the Code of Conduct and agree to be bound by the Code of Conduct.
10. The questions that I address in my Report are set out in paragraph 2.1 of my Report and are within my area of expertise. The opinions expressed in my Report are based wholly or substantially on the knowledge I have gained from my training, study and experience, primarily in institutional stockbroking, as set out in paragraphs 1.1-1.10 of the Report and in my current curriculum vitae which is at **pages 50-52** of the **Exhibit**).
11. The facts and assumptions on which my opinions are based are set out throughout my Report (in particular, in paragraph 2.9). I also set out the literature and other materials that I have used or relied on in forming the opinions expressed in my Report (in particular, in paragraphs 2.7-2.9 and 2.11). Where I express an opinion in my Report, I set out the reasons for that opinion.
12. I confirm that the information contained in this affidavit and in my Report is true and correct to the best of my knowledge and belief. Where I believe that a part of my evidence may be incomplete or inaccurate without some qualification, I have stated that qualification in the relevant part of my Report. Where I believe that my opinion could be further advanced with additional information, I have stated that in my Report (in particular, in paragraph 10.1).

Sworn by the deponent
at Sydney
in New South Wales
on 22 June 2020
Before me:

)
)
)
)
)

Signature of deponent

Signature of witness

Name of witness: LES MAROUN

Address of witness: LEVEL 20, 1 CASTLEREAGH ST, SYDNEY NSW

Qualification of witness: SOLICITOR

Rule 29.02(8)

Certificate identifying exhibit

No. NSD2191 of 2018

Federal Court of Australia

District Registry: New South Wales

Division: General

IN THE MATTER OF HALIFAX INVESTMENT SERVICES PTY LTD (IN LIQUIDATION)

ACN: 096 980 522

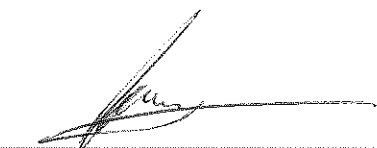
Morgan John Kelly and Philip Alexander Quinlan in their capacities as joint and several liquidators of Halifax Investment Services Pty Ltd (In Liquidation) ACN 096 980 522 and another named in the Schedule

Plaintiffs

Choo Boon Loo and others named in the Schedule

Defendants

This is the exhibit marked "IJS-1" now produced and shown to **Ian Joseph Simmonds** at the time of swearing his affidavit on 22 June 2020 before me:



Signature of person before whom the affidavit is sworn

Filed on behalf of
Prepared by
Law firm

Philip Alexander Quinlan and Morgan John Kelly in their capacities as joint and several liquidators of Halifax Investment Services Pty Ltd (In Liquidation), Plaintiffs
Jason Opperman and Simon Correggia
K&L Gates

Tel +61 2 9513 2300

Fax +61 2 9513 2399

Email Jason.Opperman@klgates.com

And Simon.Correggia@klgates.com

DX DX 170 Sydney

Ref 7410175.00017

Address for service Level 31, 1 O'Connell Street Sydney NSW 2000

[Form approved 01/08/2011]

**Expert Report of Ian Joseph Simmonds of N.I. Consulting Pty Ltd
dated 22 June 2020**

This is the annexure marked "IJS-1" referred to in the
affidavit of Ian Joseph Simmonds sworn at Sydney this
22nd day of June 2020 before me:

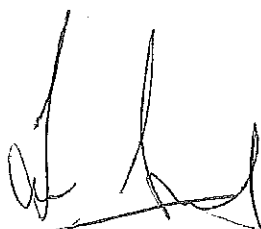
Signature.....

A person duly authorised to administer oaths in New
South Wales

Name: LES MAROUN

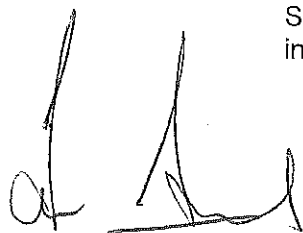
Qualification: SOLICITOR

City: SYDNEY



1. Professional Background

- 1.1 I, Ian Joseph Simmonds, have over 40 years' experience in institutional stockbroking based in Sydney and London.
- 1.2 I have held various roles over that period, including, most recently, as head of institutional sales at Ascot Securities (**Ascot**), from 2016 until my retirement in December 2019. Ascot is an ASX Market Participant and offers wealth management solutions and a broad range of financial services to wholesale and wealth advisory clients including, stockbroking, financial planning, corporate, funds management and research services. In my role at Ascot, I advised institutional and corporate clients globally on secondary market and equity capital market strategies in ASX listed securities.
- 1.3 Prior to joining Ascot, from 2014 to 2016, I was employed as the managing director, CEO and institutional stockbroker at Olivetree Asia (**Olivetree**), a subsidiary of Olivetree Financial Group. Olivetree is a specialist, technology driven, secondary market, global, institutional stockbroking firm. Secondary market involves trading shares that are already listed. While at Olivetree, I was responsible for establishing the business and managing all aspects of running the business including advising institutional clients globally on secondary market strategies in ASX and other exchanges across Asia.
- 1.4 From 2010 to 2014, I was employed as a director at Ord Minnett Pty Ltd (**Ord**). Ord is a diversified financial services business that includes institutional and retail stockbroking, corporate advisory, margin lending and wealth management and investment solutions. My responsibilities at Ord included managing an institutional sales team, advising institutional and corporate clients globally on secondary market and equity capital market strategies in ASX listed securities.
- 1.5 From 2001 to 2009, I was employed at Tricom Equities Limited (**Tricom**) as joint head of institutional broking. At some point Tricom became known as Stonebridge Securities Limited (**Stonebridge**). Tricom/Stonebridge was a diversified financial services business that included institutional and retail stockbroking, corporate advisory, and margin lending. In around 2009, I was appointed as an ASX Responsible Executive of Stonebridge. As an ASX Responsible Executive, I managed the stockbroking business of Stonebridge and assisted in winding down the securities lending (margin lending) book of Stonebridge. Securities lending is an arrangement under which a holder of securities agrees to provide its securities to a borrower for a specified period of time, with an associated agreement by the borrower to return equivalent securities at the end of an agreed period.
- 1.6 I have also held a number of roles in which I advised institutional clients on trading strategies in Australia, the United Kingdom, Europe, United States and Asia. This advice included considering the liquidity of securities.
- 1.7 During my career, I obtained experience in trading in shares and other types of securities such as options and warrants, primarily in the Australian market. However, I also traded Australian-listed shares in the United States, United Kingdom and Europe and Asian-listed shares in Tokyo, Hong Kong and Singapore. From this experience, I understand how these markets operate, including how brokers trade and settle in them.

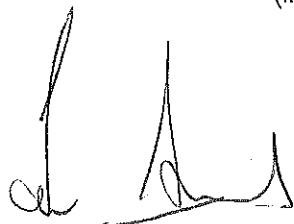


- 1.8 From the early 1980s until around 2000, I actively traded for clients in the options market.
- 1.9 Around the mid-1990s, I received accreditation in derivatives trading, which allowed me to make recommendations or to give advice to retail clients in relation to derivatives, including options and warrants (**derivatives accreditation**). Around 2000, my derivatives accreditation lapsed. I have not advised retail clients as my business has been institutional and corporate advisory. However, as a matter of good practice, from 2001 to 2019 I maintained RG146 Licensing: Training of Financial Product Advisors, issued by ASIC, which allowed me to make recommendations or to give advice to retail clients in relation to shares.
- 1.10 A copy of my current curriculum vitae, which summarizes my qualifications and professional experience is at **Annexure A**.

2. Introduction

Instructions and briefing material

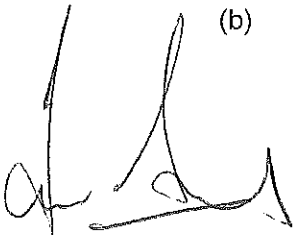
- 2.1 I have been instructed to review and provide an opinion on the liquidity (or illiquidity, as the case may be) of the open investment positions as at 29 May 2020 of Halifax Investment Services Pty Ltd (In Liquidation) (**Halifax AU**) and Halifax New Zealand Limited (In Liquidation) (**Halifax NZ**) (together, **Halifax**), which positions are set out in **Confidential Annexures A and B** to this report (**Halifax Portfolio**). In particular, I have been instructed to answer the following questions:
- (a) What factors affect the ease or difficulty with which and time within which the shares listed in the spreadsheet in **Confidential Annexure A** to these questions can be realised?
 - (b) Which of those shares (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.
 - (c) How could the shares that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.
 - (d) How could the shares that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.
 - (e) Please answer questions 1-4 in relation to:
 - (i) warrants listed in the spreadsheet in **Confidential Annexure B** to these questions;
 - (ii) contracts for difference listed in the spreadsheet in **Confidential Annexure B** to these questions;
 - (iii) options listed in the spreadsheet in **Confidential Annexure B** to these questions;



- (iv) future options listed in the spreadsheet in **Confidential Annexure B** to these questions; and
 - (v) futures listed in the spreadsheet in **Confidential Annexure B** to these questions.
- 2.2 In question 1 above, I understand the word 'realised' to mean the sale of the relevant security for cash in a long position, or the purchase of the relevant security for cash in a short position.
- 2.3 A copy of the letter of instruction issued by Mr Jason Opperman of K&L Gates in Sydney, Australia, the solicitors for Morgan Kelly and Philip Quinlan (**Liquidators**), in their capacity as the joint and several liquidators of Halifax AU on 12 June 2020 is at **Annexure B**. On 17 June 2020, I received an addendum to the letter of instruction from K&L Gates (**Addendum**). A copy of this Addendum is attached as **Annexure C**.
- 2.4 A copy of the letter of instruction issued by Mr Matt Kersey of Russell McVeagh in Auckland, New Zealand, the solicitors for the Liquidators in their capacity as joint and several liquidators of Halifax NZ is at **Annexure D**.
- 2.5 As at 29 May 2020, the Halifax Portfolio contained the following types of investments:
- (a) shares;
 - (b) warrants;
 - (c) contracts for difference (**CFDs**);
 - (d) options;
 - (e) future options;
 - (f) futures.
- 2.6 In this report, I use the following definitions of the types investments above:
- (a) Shares: The Australian Investors Association (**AIA**) (a non-profit organisation which represents the interests of private investors across various investment products in the retail market) defines the words "stock" and "share" as follows:

The words "stock" and "share" are often used interchangeably. However, each word does have a slightly different meaning. Stock is the total of all shares on issue for a particular company. Shares are the smallest unit of division of ownership in a company. For example, if you own ANZ shares, the number of shares you own determines the extent of your ownership or equity in the stock ANZ. (Australian Investors Association website, "Common Terms", <https://www.investors.asn.au/education/shares/understanding-shares/common-terms/>)

The explanation of "stock" and "share" provided by the AIA matches my own understanding and experience of what a "stock" and "share" is.
 - (b) Warrants, CFDs, options, future options and futures are types of financial instruments with a value that is reliant upon or derived from an underlying asset




or groups of assets. In this report, I refer to these types of financial instruments as **derivatives**.

- 2.7 In this report, I use the term "**security**" or "**securities**" to refer collectively to shares and derivatives. In addition, I use the terms **turnover** and **trades** interchangeably to mean the number of securities bought or sold.
- 2.8 For the purposes of my task, K&L Gates provided me with the following documents:
- (a) A spreadsheet titled "Open Positions Share Spreadsheet.xlsx", which lists the shares in the Halifax Portfolio held by Interactive Brokers (**IB**) on their platform as at 29 May 2020 (**KPMG Share Spreadsheet**); and
 - (b) A spreadsheet titled "Open Positions Derivatives Spreadsheet", which lists the derivatives in the Halifax Portfolio held by IB on their platform as at 29 May 2020 (**KPMG Derivative Spreadsheet**),
- (collectively, **Briefing Materials**).
- 2.9 Copies of the Briefing Materials are at **Confidential Annexures A and B**.
- 2.10 I am instructed to assume that the Briefing Materials, taken together, contain all open positions of shares and derivatives held by or on behalf of Halifax AU and Halifax NZ investors as at 29 May 2020. To analyse the liquidity of each security, I added additional data fields to the Briefing Materials. I explain the additional data fields at paragraphs 4.1(k)-4.1(l) and 4.1(o)-4.1(q) and 5.3(o) - 5.3(t) below. A copy of the Briefing Materials with my additional data are at **Confidential Annexures C and D**. In this report, I refer to the KPMG Share Spreadsheet with my additional data fields as the **Share Spreadsheet** (see **Confidential Annexure C**). I refer to the KPMG Derivative Spreadsheet with my additional data fields as the **Derivative Spreadsheet** (see **Confidential Annexure D**).
- 2.11 A summary of my conclusions in relation to the questions is set out at paragraph 2.17 below.

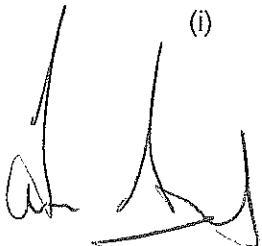
Additional material

- 2.12 In the course of preparing this report, I have consulted the following resources/material:
- (a) A paper published on the ASX website (ASX Investment and Finance Newsletter, "Why share liquidity is so important" (Michael Kemp) (2014) <https://www.asx.com.au/education/investor-update-newsletter/201405-why-share-liquidity-is-so-important.htm>) (**Liquidity Article**). This Liquidity Article has been published on the ASX website. Material published on the ASX is generally a reliable source of information on market activities. The ASX has conducted significant research into stock market liquidity which it has used to create and maintain the ASX indices, which are now the S&P ASX indices. For example, the most common benchmark index in Australia is the S&P ASX 200 Index. A copy of the Liquidity Article is at **Annexure E**;
 - (b) ASX, the "Products", "Research" and "Glossary" sections of the ASX website (<https://www.asx.com.au/index.htm>) (**ASX Glossary**) – I am of the view that this



source is authoritative for the reasons described at paragraph 2.12(a) above. Copies of the relevant sections of the ASX Glossary are at **Annexure F**;

- (c) A major study that was conducted by the International Monetary Fund (**IMF**) about the liquidity of global financial markets (International Monetary Fund Working Paper WP/02/232, "Measuring Liquidity in Financial Markets" (Abdourahmane Sarr and Tonny Lybek) (2002)) (**IMF Working Paper**). The IMF is a global body with a membership base of 189 countries and it oversees international monetary systems and monitors economic and financial policies of its 189 members. Prior to my retirement, if I needed information about macro-economic concepts and policies, which were relevant to my job, I searched the ASX. If I could not find this information on the ASX, I checked whether the IMF had relevant materials. In my opinion the IMF Working Paper is a reliable source of information including on matters such as liquidity. A copy of the IMF Working Paper is at **Annexure G**;
- (d) CMC Markets, "What does over the counter (OTC) mean?", which is an article on the website of CMC markets (<https://www.cmcmarkets.com/en/>) (**OTC Article**). CMC Markets is an active participant in over-the-counter (OTC) trading and I adopted its definition of OTC trading. CMC's definition of OTC accords with my industry knowledge and experience. A copy of the OTC Article is at **Annexure H**;
- (e) Investopedia, "Trading Order Types & Processes: Long Position (Long)", which is an article on the website of Investopedia (<https://www.investopedia.com/terms/l/long.asp>) (**Investopedia Article**). Investopedia's explanation of long positions accords with my industry knowledge and experience. A copy of the Investopedia Article is at **Annexure I**;
- (f) CME Group (**CME**), "Options on Futures", which is an article on the website of CME, which is the merged former Chicago Mercantile Exchange and the former Chicago Board of Trade (<https://www.cmegroup.com/education/files/options-on-futures-brochure.pdf>) (**Futures Article**). CME is the largest futures marketplace in the world. Their description of future options accords with my understanding of a future option. A copy of the Futures Article is at **Annexure J**;
- (g) IG Markets Limited (**IG Markets**), "What is CFD trading and how does it work?", which is an article on the website of IG Markets, a financial services company (<https://www.ig.com/au/cfd-trading/what-is-cfd-trading-and-how-does-it-work>) (**IG Markets Article**). The definition of CFDs in the IG Markets Article accords with my industry knowledge. A copy of the IG Markets Article is at **Annexure K**;
- (h) Intercontinental Exchange, "Sugar No. 11 Futures" which is a webpage on the Intercontinental Exchange website that describes the Sugar No. 11 contract as the "world benchmark contract for raw sugar trading", (<https://www.theice.com/products/23/Sugar-No-11-Futures#:~:text=The%20Sugar%20No.,of%20origin%20of%20the%20sugar>) (**ICE HB Website**). I used this website to analyse the future option within the Halifax Portfolio. A screenshot of the ICE HB Website is at **Annexure L**;
- (i) The Australian Investors Association (**AIA**), "Common Terms", which is a webpage on the AIA website



(<https://www.investors.asn.au/education/shares/understanding-shares/common-terms/>). As noted above at paragraph 2.6(a), the AIA's explanation of "shares" and "stock" accords with my understanding of these terms. A screenshot of the relevant section of the AIA website is at **Annexure M**;

- (j) International Securities Identification Number (ISIN) website, (<https://www.isin.net/>), which is relevant to one of the columns in the Share Spreadsheet and Derivative Spreadsheet, as described below at paragraphs 4.1(j) and 5.3(k). A screenshot from the ISIN website is at **Annexure N**;
- (k) The guide called *Understanding Trading and Investment and Warrants*, published by the ASX in January 2016 (<https://www.asx.com.au/documents/products/understandingwarrants.pdf>) (**Warrants Guide**). A copy of the Warrants Guide is at **Annexure O**.


2.13 I have referred to this material where relevant in the body of my report, and explained the reliance I have placed on it and its relevance to my opinion.

Acknowledgements

- 2.14 The opinions and observations contained in this report are based solely on my experience and on the Briefing Materials, except where otherwise stated. Should I receive further information, I may supplement my report.
- 2.15 K&L Gates have also provided me with a copy of Federal Court of Australia Expert Evidence Practice Note (GPN-EXPT), dated 25 October 2016. A copy of GPN-EXPT is at **Annexure B**. I have read, understood and complied with the contents of GPN-EXPT including the *Harmonised Expert Witness Code of Conduct* and agree to be bound by the practice note.
- 2.16 The opinions expressed in this report are based wholly or substantially on the knowledge I have gained from my training, study and experience as set out in paragraphs 1.1-1.10 above.
- 2.17 Russell McVeagh have also provided me with a copy of the High Court of New Zealand Code of Conduct for Expert Witnesses (**Code of Conduct**). A copy of the Code of Conduct is annexed to this report at **Annexure D**. I have read, understood and complied with the contents of the Code of Conduct and agree to be bound by the Code of Conduct.
- 2.18 I understand that this report will be annexed to an affidavit that I will swear for filing in both the Federal Court of Australia and the High Court of New Zealand.

3. Summary of conclusions

- 3.1 **Question 1:** *What factors affect the ease or difficulty with which and time within which the shares listed in the Share Spreadsheet can be realised?* **Answer:** I consider that average daily turnover in each of the shares held to be the most important factor contributing to the relative ease or difficulty in realising a portfolio of shares: see below paragraphs 4.9-4.12. Factors that influence average daily turnover include overall market sentiment, tightness, immediacy, depth, breadth, resilience and connectivity: see below paragraphs 4.14-4.23.



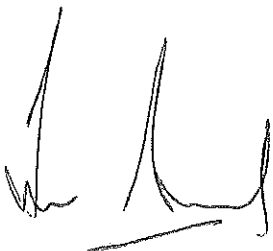
3.2 At an individual share level, when handling large transactions in institutional broking, an order to buy or sell more than 30% of the average daily turnover in a company's shares would likely be expected to start having an impact on the price traded (**Rule of Thumb**). That impact would be expected to increase as an order size accounts for an increasingly larger percentage of that day's turnover in that stock. I have used the Rule of Thumb as the metric to assess the liquidity of the shares listed in the Share Spreadsheet: see below paragraphs 4.11-4.12.

3.3 **Question 2:** Which of the shares listed in the Share Spreadsheet (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Answer: The tables at paragraphs 3.11 and 0 summarise my answer to this question. I consider that:

- (a) shares that represent 30% or less of average daily turnover in that stock as at 12 June 2020 are highly liquid (**Highly Liquid Shares**): see below paragraph 4.36;
- (b) shares that represent more than 30% but less than 100% of average daily turnover in that stock as at 12 June 2020 are relatively liquid (**Relatively Liquid Shares**): see below paragraph 4.37;
- (c) shares that represent more than 100% of average daily turnover in that stock as at 12 June 2020 are relatively illiquid (**Relatively Illiquid Shares**): see below paragraph 4.38;
- (d) shares that have no recorded value as at 12 June 2020 have no value (**No Value Shares**): see below paragraph 4.26; and
- (e) shares that have a last sale price as at 12 June 2020 but are categorized as "Value" in Column C have a nominal value (**Nominal Value Shares**): see below paragraph 4.29.

3.4 **Question 3:** How could the shares that are liquid be realised? Answer:

- (a) The shares within the Halifax Portfolio that are liquid could be realised through the IB trading platform because, assuming that the shares were initially purchased through this platform, IB should have the infrastructure in place for the sale of these shares. This would be the most expedient manner of realising the liquid shares within the Halifax portfolio: see below paragraphs 4.39-4.44.
- (b) The Highly Liquid and Relatively Liquid Shares will likely be sold within, respectively, one day and 1-3 days: see below paragraphs 4.36-4.37.
- (c) The following transaction costs are involved in the sale of shares: (i) brokerage fees; (ii) government transaction fees or levies or other transaction fees; (iii) "tightness" (which, as explained in paragraph 4.15 below, is a transaction cost representing the extent to which the shares are traded below the last sale price to meet the highest bid price (in other words, the difference between the last sale price and the price actually realised)): see below paragraph 4.44.



3.5 **Question 4:** *How could the shares that are relatively illiquid be realised?* Answer:

- (a) Subject to paragraph 3.5(c) below, the process and costs for selling relatively illiquid shares within the Halifax Portfolio is the same as the process for selling liquid shares: see below paragraphs 4.39- 4.44 .
- (b) The Relatively Illiquid Shares may take more than three days to sell and, in some cases, significantly more time (possibly one month or more): see below paragraph 4.38.
- (c) If the Relatively Illiquid Shares were not bought on market through the IB platform but were transferred in from another broker, a specialist broker could sell the shares in a more advantageous manner; however, this may involve separate counter-party agreements and higher brokerage fees: see below paragraph 4.47.

3.6 **Question 5A:** *Please answer questions 1-4 in relation to warrants listed in the Derivative Spreadsheet.*

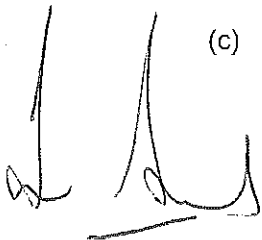
(a) *What factors affect the ease or difficulty with which and time within which the warrants listed in the Derivative Spreadsheet can be realised?* Answer:

- (i) The factors that affect the ease or difficulty with which and time within which the warrants listed in the Derivative Spreadsheet can be realised are the same as the factors that affect the realisation of shares: see below paragraphs 4.8-4.23 and 5.6.
- (ii) I consider that average daily turnover in each of the warrants that are held to be the most important factor in realising a portfolio of warrants: see below paragraphs 4.9-4.11 and 5.8.
- (iii) Trading activity in warrants can be facilitated by a warrant issuer and tends to be most active and concentrated in the months immediately prior to the expiry of the relevant contract: see below paragraphs 5.9.

(b) *Which of those warrants (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all?* Answer: The tables at paragraphs 3.12 and 0 summarise my answer to this question. I consider that:

- (i) warrants that represent 30% or less of average daily turnover in that warrant series as at 12 June 2020 are highly liquid (**Highly Liquid Warrants**): see below paragraph 5.18;
- (ii) warrants that represent more than 30% but less than 100% of average daily turnover in that warrant series as at 12 June 2020 are relatively liquid (**Relatively Liquid Warrants**): see below paragraphs 5.19-5.20;
- (iii) warrants that represent more than 100% of average daily turnover in that warrant series as at 12 June 2020 are relatively illiquid (**Relatively Illiquid Warrants**): see below paragraphs 5.21-5.22; and
- (iv) warrants that have no recorded value as at 12 June 2020 to have no value (**No Value Warrants**): see below paragraph 5.12.

(c) *How could the warrants that are liquid be realised?* Answer:

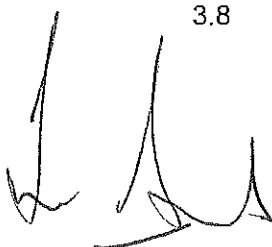


- (i) The process for realising liquid warrants and the transaction costs involved in the process are largely the same as the process for realising liquid shares and the transaction costs involved in that process: see below paragraphs 5.23-5.25.
- (ii) The Highly Liquid and Relatively Liquid Warrants will likely be sold within, respectively, one day and 1-3 days: see below paragraphs 5.18-5.20.
- (d) *How could the warrants that are relatively illiquid be realised?* Answer: The process and costs for realising Relatively Illiquid Warrants is the same as the process for selling Relatively Liquid Warrants. The holder of Relatively Illiquid Warrants does not usually need to use a specialist broker where the value of the warrant positions is not significant: see below paragraphs 5.26-5.27.

3.7 **Question 5B:** Please answer questions 1-4 in relation to **CFDs** listed in the Derivative Spreadsheet.

- (a) *What factors affect the ease or difficulty with which and time within which the CFDs listed in the Derivative Spreadsheet can be realised?* Answer: The factors that affect the ease or difficulty with which and time within which the CFDs listed in the Derivative Spreadsheet can be realised are the same as the factors that affect the realisation of shares: see below paragraphs 4.8-4.23 and 6.7.
- (b) *Which of those CFDs (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all?* Answer: The table at paragraphs 3.12 and 0 summarises my answer to this question. I consider that all of the CFD positions within the Halifax Portfolio are highly liquid in that the equivalent shares underlying each CFD represent 30% or less of average daily turnover in that stock as at 12 June 2020 (**Highly Liquid CFDs**): see below paragraphs 6.8-6.11.
- (c) *How could the CFDs that are liquid be realised?* Answer:
 - (i) The investor could contact directly the issuer of the contract and, for long contracts, the investor would sell back to the issuer or, for short contracts, the investor would buy back from the issuer: see below paragraph 6.12.
 - (ii) The realisation of CFDs within the Halifax Portfolio would likely be immediate: see below paragraph 6.13.
 - (iii) The following transaction costs may be involved in the sale of CFDs: brokerage fee for the issuer or introducing broker and "tightness" (see 4.15 below). I am not aware of government transaction fees or levies or other transaction fees imposed on the realisation of CFDs within Australia. I cannot comment on whether there are transaction fees imposed on the realisation of CFDs in other jurisdictions: see below paragraph 6.14.
- (d) *How could the CFDs that are relatively illiquid be realised?* Answer: There are no CFDs in the Halifax Portfolio which are illiquid.

3.8 **Question 5C:** Please answer questions 1-4 in relation to **options** listed in the Derivative Spreadsheet.

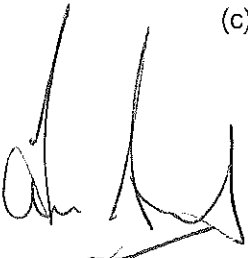


- (a) *What factors affect the ease or difficulty with which and time within which the options listed in the Derivative Spreadsheet can be realised? Answer:*
- (i) The factors that affect the ease or difficulty with which and time within which the options listed in the Derivative Spreadsheet can be realised are the same as the factors that affect the realisation of shares: see below paragraphs 4.8 - 4.23 and 7.7-7.9.
 - (ii) I consider that average daily turnover in each of the options that are held to be the most important factor in realising a portfolio of options: see below paragraph 7.8 .
 - (iii) Trading activity in options tends to be most active and concentrated in the months immediately prior to the expiry of the relevant contract: see below paragraph 7.9.
- (b) *Which of those options (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Answer:* I have not been able to reach a view on the liquidity of the options in the Derivative Spreadsheet because I do not have the average trade data for these options: see below paragraphs 7.10-7.11.
- (c) *How could the options that are liquid be realised? Answer:* For the reasons given at paragraph 3.8(b) above, I have not been able to reach a view on the liquidity of the options in the Derivative Spreadsheet. At a general level, the process for realising options and the transactions costs involved in that process are the same as the process and costs for realising warrants: see below paragraphs 7.12.
- (d) *How could the options that are relatively illiquid be realised? Answer:* I refer to my answer at paragraph 3.8(c) above.

3.9 **Question 5D:** *Please answer questions 1-4 in relation to **future options** listed in the Derivative Spreadsheet. Answer:* There is one future option within the Halifax Portfolio. It expired on 15 June 2020. It follows that all rights under the future option relating to that future contract have ceased to exist and, in relation to that future option, it cannot be realised: see below paragraphs 8.4-8.7.

3.10 **Question 5E:** *Please answer questions 1-4 in relation to **futures** listed in the Derivative Spreadsheet. Answer:* There is one future contract for sugar within the Halifax Portfolio (**Halifax Future**). I have not traded in futures. However, based on my general understanding of futures from working in the securities industry:

- (a) I consider that the Halifax Future is highly liquid because it represented less than 1% of the total average daily turnover in the future contract: see below paragraph 9.4.
- (b) Before the maturity date of March 2021, the Halifax Future would be realised by selling it on the market through which it was purchased and could be realised within one day of trading. I understand that the transaction costs would be similar to those involved in the sale of shares: see below paragraphs 9.5-9.7.
- (c) The Halifax Future can be held until the maturity date of March 2021. At the maturity date, the contract must be settled. On settlement, there is physical



delivery of the commodity (that is, sugar) and the holder of the future contract would pay the value of the contract and for delivery. Delivery is to take place in accordance with the terms of the future contract: see below paragraphs 9.5-9.7.

A handwritten signature in black ink, consisting of stylized, cursive letters that appear to be 'ad' followed by a long horizontal stroke.

3.11 In the table below, I summarise my answer to question 2. I have prepared the numbers in the table below by adding the number of the shares in each liquidity category. Additionally, I have compiled valuation metrics to understand the relative exposure of each category.

Summary of share liquidity categories

Exchange trading venue	No Value Shares		Nominal Value Shares		Relatively Illiquid Shares		Relatively Liquid Shares		Highly Liquid Shares	
	No	A\$	No	A\$	No	A\$	No	A\$	No	A\$
ASX	55				22	1,343,759	44	2,098,129	706	30,053,707
ARCA	0				0	0	1	252,821	159	8,101,447
Corp Action	36				0	0	0	0	2	74
Unlisted	5				0	0	0	0	0	0
London	1				1	512	4	349,647	78	1,551,811
Nasdaq	1				0	0	1	7,636	448	52,480,140
Pink Sheet	9				16	233,125	13	41,928	267	781,453
Hong Kong	0				18	853,971	8	164,161	42	1,222,213
China	1				0	0	0	0	7	941,966
Singapore	7				11	331,737	6	289,978	10	28,168
Venture	9				5	12,862	1	1,546	119	28,597
Pure Trading	1				0	0	0	0	27	26,338
TSE	0				0	0	1	7,256	118	1,029,428
Value	152		22	38,217	0	0	0	0	0	0
Other									516	23,625,442
Category Total	267		22	38,217	73	2,775,966	79	3,213,101	2,499	119,870,784
Percentage (%)	8.77		0.75	0.03	2.50	2.21	2.69	2.55	85.29	95.21

- 3.12 In the table below, I summarise my answer to questions 5A, 5B, 5C, 5D and 5E. I have prepared the numbers in the table below by adding the number of the derivatives in each liquidity category. Additionally, I have compiled valuation metrics to understand the relative exposure of each category.

Summary of derivative liquidity categories

Asset Class	Number of derivatives	Value of derivatives	Relatively Illiquid		Relatively Liquid		Highly Liquid	
			No	A\$	No	A\$	No	A\$
CFDs	143	580,351.37					143	580,351.37
Warrants	84	21,641.03	29	13,035.17	6	15	44	8,590.86
Options	33	69,244.56	33	69,244.56	0	0	0	0
Futures	1	21,294.36	0	0	0	0	1	21,294.36
Future options	1	0	0	0	0	0	0	0
Category Total	262	692,531.32	62	82,279.73	6	15	188	610,236.59
Percentage (%)			23.66	11.87	2.30	0.01	71.74	88.12

3.13 In the table below, I summarise the total number of securities, value of those securities and the percentages that those securities represent in the Halifax Portfolio

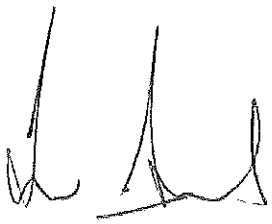
Summary of total securities in Halifax Portfolio

Number of Securities	AUD Value	No		Nominal Value		Relatively Securities		Illiquid		Relatively Securities		Liquid		Highly Securities	Liquid
		No	Value	No	A\$	No	A\$	No	A\$	No	A\$	No	A\$		
3,192	126,590,598	100		22	38,217	135	2,858,245	85	3,213,116	2,687	120,481,020				


4. Shares

Background

- 4.1 Set out below is a description of the Share Spreadsheet (**Confidential Annexure C**):
- (a) The horizontal columns are filled across from A to N.
 - (b) The vertical rows from 1 to 3031 represent the individual holdings of shares within the Halifax Portfolio.
 - (c) The data in columns A – F and I – J was included in the KPMG Share Spreadsheet that I received from K&L Gates.
 - (d) I added the data in columns G – H and K – M as described in paragraphs 4.1(k)-4.1(l) and 4.1(o)-4.1(q) below.
 - (e) Column A is called "Asset Class". In the Share Spreadsheet, the asset class for all entries is "STK". I am instructed that this column indicates the type of financial product to which a row in the KPMG Share Spreadsheet relates. I am instructed that "STK" means stock, which (as described in paragraph 2.6(a)) is often interchangeable with shares.
 - (f) Column B is called "Symbol". I am instructed that this column indicates the identifying code of the share on the IB platform and that this code usually corresponds to the identifying code of that share on the exchange or trading venue where that share is traded and/or listed. From my experience, the share symbol is an abbreviation for a company and describes the actual security offered by that company.
 - (g) Column C is called "Listing Exchange". I am instructed that this column identifies the exchange or trading venue on which the shares are traded and/or listed.
 - (h) Column D is called "Description". I am instructed that this column identifies the company from which the share derives its underlying value and sometimes describes the share itself. For example, line 359 of the Share Spreadsheet refers to "[REDACTED]". In this entry, the company is "[REDACTED]".
 - (i) Column E is called "SecurityID". I am instructed that this column provides the identifying number for each individual investment and has been extracted from the IB platform. I am also instructed that where such number is not recorded in IB, the relevant cell in the KPMG Share Spreadsheet is blank. From my experience, I know that every share that is publicly issued by a company and is traded on a recognized market has a distinct Security Identification Number.
 - (j) Column F is called "SecurityIDType". I am instructed that this column identifies that each SecurityID in column E is an International Securities Identification Number (**ISIN**). According to the ISIN website (<https://www.isin.net/>), an ISIN "uniquely identifies a fungible security. Securities with which ISINs can be used are Equities, Fixed income and ETFs only". A screenshot of the ISIN website is at **Annexure N**.




- (k) Column G is called "Bloomberg Code". It records the Bloomberg security code for each share. The Bloomberg Code comes from Bloomberg Markets (**Bloomberg**), which is an information provider. According to the Bloomberg website (https://www.bloomberg.com/company/?utm_source=bloomberg-menu&utm_medium=bcom), Bloomberg is the global leader in business and financial data. In my experience, this is a commonly held view among finance professionals globally and Bloomberg trading data has the widest market coverage and is the most used trading data. Below in paragraph 4.3, I describe how I obtained information from Bloomberg to complete column G as well as columns H, L and M. The Bloomberg Code is not exactly the same as either the share symbol or ISIN. The Bloomberg Code is a code attributed to a particular share by Bloomberg. I have used the Bloomberg Code to get the average number of shares traded per day (see column M) and the 'Last Sale Price' (see Column H) and to calculate the % of Average Daily Trades (see column N).
- (l) Column H is called "Last Sale". It refers to the last publicly traded price of each share in the Halifax Portfolio at 12 June 2020 (**Last Sale Price**). I obtained this price from Bloomberg as explained below at paragraph 4.3. I also note the following about column H:
- (i) The Last Sale Price is expressed in the stated currency of each exchange or trading venue. For example, the currency on the New York Stock Exchange (**NYSE**) is USD.
 - (ii) I have inserted the currency of each exchange or trading venue into the headings for each exchange or trading venue. For example in line 5, the Share Spreadsheet has the heading 'Euronext NL Stocks', which is an exchange, and I have listed the currency as EUR.
 - (iii) If a stock has a Last Sale Price, this means that the shares in that company are currently trading (that is, it was trading as at 12 June 2020). I have assumed that if a stock does not have a Last Sale Price, it is not currently trading because it is currently in a trading halt, has been suspended or delisted or, it is possible, that the code (as identified in column B) is incorrect.
 - (iv) When there was no Last Sale Price for a stock, I searched for the Bloomberg Code corresponding to the stock to establish whether I had used the correct Bloomberg Code. Sometimes, Bloomberg specified why there was no Last Sale Price – for example, that a company had been delisted or that there was a trading halt in relation to shares in a specific company.
 - (v) If I was satisfied that I had used all options available to me to find the correct Bloomberg Code but could not find information about why there was no Last Sale Price for a particular stock, I did not conduct further inquiries.
 - (vi) I provide in paragraph 4.2 below further information on why I believe there may not be a Last Sale Price for certain stocks.
- (m) Column I is called "Long". I am instructed that this column records the number of individual shares held in a particular company as at 29 May 2020. Having regard to the label for this column, I assume that the positions recorded in this



column were acquired as long positions. According to Investopedia (<https://www.investopedia.com/terms/l/long.asp>), "a long position – also known as simply long – is the buying of a stock, commodity, or currency with the expectation that it will rise in value...A long position is the opposite of a short position (short)". A copy of the Investopedia Article that defined "long position" is at Annexure I. This definition accords with my understanding of long positions. I describe short positions in paragraph 4.1(n) below.

- (n) Column J is called "Short". I am instructed that this column records the number of short sale positions that have been acquired as a short position by an investor or as a hedge held in a particular company as at 29 May 2020. A short sale is where an investor sells shares that they do not currently own, on the expectation the share price will fall. In order to conduct a short sale, an investor must be in a position to deliver shares for settlement, which are usually borrowed from a prime broker (a prime broker is an agent who arranges securities lending amongst other things). The shares are delivered to the settlement agent on the exchange on which they are listed on the settlement date. Sale proceeds are held in escrow until the short sale is closed. On this date, any profit earned is distributed to the short seller. While the short trade is open, if the price of the share goes up, the short seller has to meet a cash margin call equivalent to its loss incurred.
- (o) Column K is called "Value". It records the value of the total shareholding in each company as at 12 June 2020. The value is listed in the stated currency of each exchange or trading venue. I populated column K by (i) manually making all short positions (column J) a separate line item in the Share Spreadsheet and (ii) creating a formula that multiplied the long positions (column I) and short positions (column J) by the Last Sale Price (column H) to derive a valuation for each position, which is column K. Long positions are a positive number and short positions are a negative number.
- (p) Column L is called "Value AUD". In this column, I have converted column K into AUD as at 12 June 2020. I have converted the value of the total shareholding in each company into AUD in order to give a common currency base to the Halifax Portfolio. This assists my understanding of where the largest exposures exist in the Halifax Portfolio. This can only be used as a guide, as share prices and currencies are all constantly changing. I have taken the exchange rates used for conversions in column L from Bloomberg, as at date 12 June 2020. Lines 3,034-3,050 of the Share Spreadsheet contain the foreign exchange rates that I used, as at 12 June 2020, to populate column L and convert column K into AUD.
- (q) Column M is called "Ave Daily Trades", meaning "Average Daily Trades". It records the average volume of shares traded in each company each day over the last 6 months – that is, from 10 December 2019 to 12 June 2020. I have obtained the average daily trades in this column from Bloomberg, as described below at paragraph 4.3. Six months is the maximum length of time for this data on Bloomberg that I was able to access.
- (r) Column N is called "% of Ave Daily Trades". It records the percentage of average daily turnover of shares that each holding in the Halifax Portfolio represents. I populated column N by creating a formula which divided column I (Long) by column M (average daily trades) or divided column J (Short) by column M (average daily trades). The "% of Average Daily Trades" is expressed



as a number, e.g. $0.30 = 30\%$ of the average day's securities traded. For example:

- (i) Line 359 of the Share Spreadsheet records that 23,695 shares (column I) are held in the [REDACTED] (REDACTED) as part of the Halifax Portfolio. These shares are traded on the ASX.
- (ii) On average 4,655,109 [REDACTED] shares trade on ASX every day (column M).
- (iii) The Halifax Portfolio represents approximately 0.5% of the average daily turnover in [REDACTED] shares traded on ASX (column I divided by column M) (which is expressed as 0.005 in the Share Spreadsheet. The reason I use a number rather than a percentage is to identify the number of days average turnover in this stock that each holding represents. The higher the average daily trades each holding represents, the more difficulty and price impact there will be when selling that holding). As explained at paragraph 4.9 below, the percentage of average daily trades in shares is critical to determining liquidity of each shareholding.

4.2 I could not obtain the Last Sale Price (see column H) for approximately 279 shares and hence determine the "% of Ave Daily Trades" (see column N) for that particular stock. As explained at paragraph 4.1(i) above, if a stock does not have a Last Sale Price that stock is not currently trading on an exchange or any trading venue. From my analysis I believe that the reasons I was not able to determine the Last Sale Price and therefore the "% of Ave Daily Trades" were as follows:

- (a) the shares are not trading on an exchange as a result of the company being delisted from the exchange. There are numerous reasons why a company can be delisted. For example, on the ASX, a company can be delisted for the following reasons:
 - (i) if the ASX is of the opinion that the company breaks an ASX listing rule or is unwilling or unable to comply with a rule (for example, the company has no quoted shares;
 - (ii) the company fails to maintain a spread of security holdings in its main class which, in ASX's opinion, is sufficient to ensure that there is an orderly and liquid market in its shares;
 - (iii) the company does not have a structure or operations appropriate for a listed entity;
 - (iv) the company voluntarily delists from the ASX;
 - (v) the company's shares have been suspended from quotation for an extended period of time;
 - (vi) the company fails to pay its listing fees; or
 - (vii) following the issuance of a compulsory acquisition notice;
- (b) the shares are not trading on the exchange due to a trading halt on the those shares. This means that there is a temporary suspension of a company's trading activity that may occur at either the request of the company or where an exchange receives an announcement from a related entity that is deemed to be



market sensitive (such as an impending merger). For shares listed on the ASX, the ASX places the shares into a Trading Halt Session State where market participants can place orders but are not able to trade the shares. Trading generally resumes at the earlier of:

- (i) the time/date announced by the ASX when the trading halt will end;
- (ii) the commencement of normal trading on the second trading day after the trading halt was imposed; and
- (iii) once the listed entity makes an announcement.

Orders made during a trading halt are not automatically purged and remain in the market with the same price/time priority for execution when the trading halt has been lifted.


- (c) I have the incorrect Symbol from which to determine the Last Sale Price from Bloomberg; and / or
- (d) the Symbol for a stock has changed as a result of, for example, a merger of companies and the information in Columns B and D does not match with the current company Symbol and Description.

4.3 Columns G, H, L and M of the Share Spreadsheet contain information that I obtained from Bloomberg. I obtained this information from Bloomberg by coding the Share Spreadsheet so that it communicated with the Bloomberg database. Then:

- (a) In column G, which contains the Bloomberg Code, I copied the stock symbol (column B) and added the Bloomberg country code suffix corresponding to the location of the exchange or the trading venue. I did this through a combination of Excel formulas and manual input.
- (b) In column H, which contains the Last Sale Price for every share in column G, I linked column H to the individual stock codes in column G to search for a Last Sale Price for every share. I did this through an Excel formula.
- (c) Where step (a) did not lead to column G being populated, I searched for the company description (column D) on Bloomberg manually, and manually entered the Bloomberg Code into column G. After I entered the Bloomberg Code into column G, column H was automatically populated as set out in step (b).
- (d) In column L, for each exchange/trading venue that does not trade in AUD, I created a formula which converted the value of the share position in the local currency to AUD. The exchange rates used are those identified in the Share Spreadsheet, which I obtained from Bloomberg.
- (e) I created an Excel formula, which automatically populated column M (average daily trades).

4.4 To illustrate how the Share Spreadsheet works I refer to line 359 ([REDACTED])

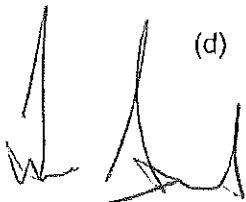
- (a) Column A says STK, which indicates that the asset class of the investment is a share.



- (b) Column B says [REDACTED] which is the share symbol used by Halifax to identify the share.
- (c) Column C indicates that the shares are listed and traded on the ASX.
- (d) Column D identifies the name of the company as [REDACTED]
- (e) Columns E identifies the ISIN as [REDACTED] and column F identifies the Security IDType as "ISIN".
- (f) Column G identifies the Bloomberg Code as [REDACTED] (with "AT" being Bloomberg's international code for Australia and Equity being shares).
- (g) Column H records that the Last Sale Price of one [REDACTED] share on 12 June 2020 was A\$67.32.
- (h) Column I shows that there were 23,695 [REDACTED] shares held in the Halifax Portfolio as at 29 May 2020.
- (i) Column J shows that there were no short positions on [REDACTED] shares in the Halifax Portfolio as at 29 May 2020.
- (j) Column K shows that the total value of the [REDACTED] shareholding held by the Halifax Portfolio is A\$1,595,147.4 as at 12 June 2020. As this value is recorded in AUD, there is no separate entry in column L (Value AUD).
- (k) Column M records that there were on average 4,655,109 daily trades in [REDACTED] shares over the last 6 months.
- (l) Column N records that the total shares held in [REDACTED] within the Halifax Portfolio represented 0.5% of the total average daily trades in all [REDACTED] stock (which is expressed as 0.005 in the Share Spreadsheet for the reasons stated in paragraph 4.1(r)(iii)). As explained below at paragraphs 4.9-4.23, the [REDACTED] shares held in the Halifax Portfolio are highly liquid because the prevalence of buyers and sellers (as expressed by average daily turnover) makes the disposal of this holding easy.

Question 1: What factors affect the ease or difficulty with which and time within which the shares listed in the Share Spreadsheet can be realised?

- 4.5 In answering question 1, I have drawn on my experience in trading shares, including as an ASX Responsible Executive (discussed above at paragraph 1.5), and my post-graduate studies in applied finance and investments.
- 4.6 To ensure that the metrics I consider to affect liquidity are consistent with market standard approaches to determining liquidity, I have reviewed the following material:
 - (a) The Liquidity Article by Michael Kemp.
 - (b) ASX Glossary
 - (c) the IMF Working Paper; and
 - (d) the OTC Article




(collectively, the **Share Reference Materials**).

- 4.7 Copies of these Share Reference Materials are at **Annexures E to H**, respectively.
- 4.8 The primary constraint to realising a share portfolio is the liquidity or illiquidity of the shares in that portfolio. In my experience, there is no agreed upon market definition of an illiquid or liquid share. Whether or not a share is liquid is not a fixed concept – that is, there are no set criteria for classifying a share as liquid or illiquid. However, I consider that there is consensus within the market that certain factors indicate the liquidity (or illiquidity) of shares. My opinion is based on my experience and on the papers described at paragraph 4.6 above.
- 4.9 I consider **individual average share liquidity or average daily turnover** (as defined by the average number of shares traded each day and recorded in column N of the Share Spreadsheet), to be the most important factor in realising a portfolio of shares. This is because the average daily turnover data indicates how long it will most likely take to sell a parcel of shares. If a supply of shares over and above the average number of shares traded in one day was offered for sale into the market, in my opinion this has a tendency to have a depressing effect on the share price. This is because it would be unrealistic to assume that there would be sufficient buyers to purchase more than the average number of shares traded each day without there being a decrease in the share price, in the absence of random buyers of equally large size happening to be in the market on that same day.
- 4.10 While historic turnover data cannot be relied upon to predict future turnover of shares, turnover data tends (although with some margin for error) to be relatively consistent over time (in the absence of a significant transaction or event occurring which would have a material impact on the price of shares in that company).
- 4.11 In my experience, when handling large transactions in institutional broking, an order to buy or sell more than 30% of the average daily turnover in a company's shares would likely be expected to have an impact on the price traded – that is, if the order was to sell more than 30% of the average daily turnover, in one day, the sell order would likely decrease the price of those shares (**Rule of Thumb**). This Rule of Thumb in my experience is widely adopted in stock markets. This means that if a sell order represented more than 30% of the average daily turnover (that is, more than 0.3 in Column N in the Share Spreadsheet), it would be less likely to result in buyers buying all of those shares around the current market price, although I would expect that around 30% of the average daily volume would be accommodated around the current market price.
- 4.12 Below are some examples, which illustrate how the Rule of Thumb works:
- (a) Assume that company X has an average daily turnover of 1 million shares and that a person wanted to sell 1 million shares. Using the Rule of Thumb, I would expect that the person would be able to sell 300,000 of those shares (30% of the shares) in one day without there being a material negative impact on the share price.
- (b) Line 985 of the Share Spreadsheet relates to shares in [REDACTED]. The number of shares in [REDACTED] within the Halifax Portfolio is 3,855,597 (column I) (**Halifax [REDACTED] Shares**). On average, 312,146 shares of [REDACTED] are traded daily (column M). The Halifax [REDACTED] Shares represent

12.352 days of an average turnover (column N). That is, it may take around 12-13 days to sell the Halifax ████████ Shares. Using the Rule of Thumb, I would not expect there to be sufficient demand for ████████ shares to accommodate the sale of all of the Halifax ████████ Shares over a reasonable period of time (that is, over one week) and I would expect the sale price of ████████ shares to decrease. This would potentially have an impact 41 times greater than the Rule of Thumb which I explain above in paragraph 4.11.

- 4.13 In my opinion, average daily turnover is affected by the following factors.
- 4.14 First, **overall market sentiment** affects prices achieved on sale and the ease of selling a portfolio. If global markets are in turmoil, volumes of shares sold tend to be high but prices fall to a greater than normal extent when large sell orders are placed in the market. The IMF Working Paper concluded on page 40, "During periods of stress, the positive correlation between volumes and volatility found in many empirical studies may no longer exist". Conversely, volumes of shares sold tend to be low in flat markets so it could take longer to sell large positions in these types of markets.
- 4.15 Secondly, **tightness** refers to the difference between a Last Sale Price and the price at which a next sale may occur and is measured by the average market price spread between the bid price (highest buy price) and the offer price (lowest sell price). This is an unquantifiable transaction cost until it is incurred. For example:
- (a) if the last traded price is A\$1.00 and the bid price is A\$0.99 and the offer price is A\$1.01, the "bid / offer price spread" is A\$0.02, which is 2% of the last traded price;
 - (b) to "cross the spread" means to sell down to the bid price of A\$0.99 from the last traded price of A\$1.00;
 - (c) if a seller sells a share at the bid price – that is, they "cross" the spread – this is a 1% discount on the recorded last sale (A\$0.99 is 1% less than A\$1);
 - (d) the transaction cost is 1 cent per share (the difference between the previous last sale price and the price actually realised).
- 4.16 The narrower the bid / offer price spread, the tighter the market and I would expect less of a discount against Last Sale Price when selling a share portfolio. A tighter market is a more liquid market because there is more turnover of the shares which arises because the cost of crossing the bid / offer price spread is lower.
- 4.17 Thirdly, **immediacy** is how quickly shares can be sold (that is, traded, cleared and settled). The quicker that shares can be sold, the more liquid they are.
- 4.18 Fourthly, **depth** concerns the size of supply and demand for shares below and above the last traded price, and whether there is demand for shares at every price point below the highest bid price. A deeper market is a more liquid market because there will be a constant demand for shares to buy at price points below the highest bid price. Conversely, there will be a greater supply of shares to sell at prices higher than the lowest offer price. In a shallow market, there is a scarcity in the quantity of shares sought below the highest bid price and offered above the lowest sell price.



- 4.19 Fifthly, **breadth** concerns the number of individual parties involved in paragraph 4.18. The question is whether the market buy and sell orders are both numerous and large in volume. Or, are the market buy and sell orders highly concentrated in the hands of a small number of individuals? If there are more individual buyers, it will increase competition for the purchase of shares, making the market more liquid if a new seller emerges.
- 4.20 The table below contains hypothetical examples of markets for four different companies trading shares at the highest bid price of \$5.00 per share:

Examples of Breadth and Depth of Markets

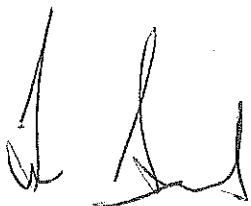
Market	1 (thin and shallow market)	2 (thin and deep market)	3 (broad and shallow market)	4 (broad and deep market)
Bid Price	Number of shares			
\$5.00 (highest bid price)	10,000	10,000	50,000	50,000
\$4.99	20,000	20,000	50,000	50,000
\$4.98	0	30,000	0	70,000
\$4.97	0	30,000	0	90,000
\$4.96 (lowest bid price)	0	30,000	0	150,000
Total # of shares	30,000	120,000	100,000	410,000

4.21 In the table above:

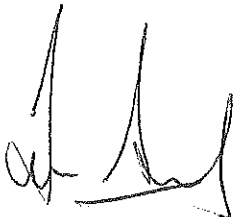
- (a) I describe market 1 as "thin and shallow" because the number of shares at the highest bid price (\$5) and the second highest bid price (\$4.99) is small in comparison to markets 3 and 4, which makes market 1 relatively thin. Below \$4.99, there are no buyers, which makes the market shallow. That is, the demand for shares is small and there is no demand for the shares at lower prices.
- (b) I describe market 2 as "thin and deep" because the number of shares at the highest bid price (\$5) and the second highest bid price (\$4.99) is small in comparison to markets 3 and 4, which makes market 2 relatively thin. However, below \$4.99, there are buyers at every price point which makes the market deep.
- (c) I describe market 3 as "broad and shallow" because there is relatively large quantity of shares at the highest bid price (\$5) and the second highest bid price (\$4.99) but there are no buyers at any price point below \$4.99 which makes market 3 shallow relative to markets 2 and 4.

- (d) I describe market 4 as "broad and deep" because there is a relatively large quantity of shares at the highest bid price (\$5) and the second highest bid price (\$4.99) but in contrast to market 3 there are additional buyers at every price point below \$4.99 and additionally the demand for shares increases as the price points get lower.
- 4.22 Sixthly, **resiliency** concerns how quickly the market for a particular stock corrects itself. For example, consider a hypothetical market where there is demand (buyers) for 1 million shares. A market is less likely to be resilient if one person wants to buy 1 million shares because it is likely that if that 1 person cancels their order, there will be no one else to replace the demand (that is, to purchase those shares). Conversely, if 50 buyers want to buy 1 million shares in a particular company, the market is more resilient. If one buyer drops out, it is likely that demand will still exist for the shares because of the abundance of buyers. The more resilient a market for a company's shares, the more liquid the shares.
- 4.23 Seventhly, shares can only be sold through brokers where there is **connectivity to markets**. The following matters are relevant to establishing connectivity to markets to enable trading:
- (a) There is an agreement in place between the owner of shares and a broker, where the broker has authority to transact on the owner's instructions.
 - (b) The shares to be sold are listed and currently trading on a recognized exchange or trading venue.
 - (c) Ownership, class of shares, quantity of shares and actual location of the shares are verified prior to trading to ensure delivery of shares at the settlement date. Also, shares need to be free to be traded and not subject to any escrow provisions.
 - (d) The broker has access to the markets where the shares are traded.
 - (e) The client can deliver the shares to the broker in a form and at a time that will enable settlement. In my experience, the shares are either held by the beneficial owner of those shares or a custodian who delivers the shares, free of any encumbrance, for settlement at the clearing house exchange or trading venue on the designated settlement day. These shares are received and exchanged for cash at the end of the settlement process. There are regulatory and operational challenges in delivering shares to a third party broker, including:
 - (i) completing KYC (know your customer) processes and any other necessary counterparty agreements;
 - (ii) locating appropriate third party brokers to market potentially illiquid shares; and
 - (iii) checking that the ownership of the shares is unencumbered.

Question 2: Which of the shares listed in the Share Spreadsheet (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain stocks are relatively liquid, relatively illiquid or have no value

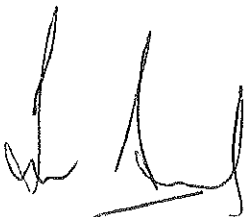


- 4.24 The Share Spreadsheet is comprised of 2,930 individual share positions (**Share Positions**). That is there are 2,930 separate entries of shares as an asset type (column A) in the Share Spreadsheet.
- 4.25 Before setting out which of the shares in the Share Spreadsheet are relatively liquid and which are relatively illiquid, I set out how many shares listed in the Share Spreadsheet have no value. This is because after those shares are excluded, the remaining shares can more easily be grouped into liquid and relatively illiquid shares.
- 4.26 I have concluded that 257 Share Positions have no recorded value as at 12 June 2020 (**No Value Shares**) because they had no Last Sale Price (column H) as at that date. The No Value Shares are marked in yellow and are listed at the end of each exchange. As noted above in paragraph 4.2, those without a Last Sale Price may be delisted, in a trading halt or suspended or else I may have been unable to locate the correct Bloomberg Code using the information provided in the KPMG Share Spreadsheet. I note that a trading halt or a suspension is usually temporary and so it is possible that some of these Share Positions will have a recorded value in the future.
- 4.27 I also note that column C of the Share Spreadsheet shows that 132 Share Positions that have the "ListingExchange" described as "VALUE" (column C) do not have a Last Sale Price. These Share Positions are set out at lines 2900 – 3031 of the Share Spreadsheet. I am instructed that this indicates that the shares relate to delisted entities.
- 4.28 I have marked the No Value Shares in yellow on the Share Spreadsheet.
- 4.29 I note that column C of the Share Positions at lines 2878-2899– that is, 22 Share Positions – also states that listing exchange or trading venue for those positions is "VALUE" (**Nominal Value Shares**). As noted above, I am instructed that this indicates that the shares relate to delisted entities. I found a Last Sale Price recorded for those Share Positions; however, the value of those Share Positions is nominal. I have assumed that the entities to which these shares relate are entities that have recently been relisted. In my experience, shares that emerge from delisting tend to have been reconstructed and I am not confident that the recorded number of shares is correct for such a relisted entity.
- 4.30 I have marked the Nominal Value Shares in blue on the Share Spreadsheet.
- 4.31 Excluding the No Value Shares and Nominal Value Shares, there are 2,651 Share Positions. Of these remaining Share Positions as at 12 June 2020, in my opinion:
- (a) 2,499 Share Positions relate to shares that will likely take approximately one day to sell, the sale of which will likely have no noticeable impact on the share price (**Highly Liquid Shares**);
 - (b) 79 Share Positions relate to shares that will likely take approximately one to three days to sell, the sale of which may have a minor impact on the share price (**Relatively Liquid Shares**). I have marked the Relatively Liquid Shares in green on the Share Spreadsheet;
 - (c) 73 Share Positions relate to shares that may take longer than 3 days to sell, the sale of which will likely have an impact on the share price, or may not be able



to be sold (**Relatively Illiquid Shares**). I have marked the Relatively Illiquid Shares in red on the Share Spreadsheet.

- 4.32 I explain my opinion, which is based on my experience, below in paragraphs 4.36 - 4.38. However, I note that whether there is an equal and opposite buyer to the size of any seller is random in that this depends on individual decisions of market participants and the cash flow available to them.
- 4.33 The Highly Liquid Shares represent 95.21% of the value of the Share Positions. I have calculated this by dividing the total value of the Highly Liquid Shares (A\$119,870,784) by the total value of the shares contained in the Halifax Portfolio (A\$125,898,068).
- 4.34 The Relatively Liquid Shares represent 2.55% of the value of the Share Positions. I have calculated this by dividing the total value of the Relatively Liquid Shares (A\$3,213,101) by the total value of the shares contained in the Halifax Portfolio (A\$125,898,068).
- 4.35 The Relatively Illiquid Shares represent 2.22% of the value of the Share Positions. I have calculated this by dividing the total value of the Relatively Illiquid Shares (A\$2,775,966) by the total value of the shares contained in the Halifax Portfolio (A\$125,898,068).
- 4.36 **Highly Liquid Shares:** As noted above in paragraph 4.31, in my opinion, as at 12 June 2020, 2,499 Share Positions related to Highly Liquid Shares. These are shares that represent 30% or less of average daily turnover in that stock (that is, where the number in Column N is 0.3 or less). As explained above at paragraphs 4.9-4.12, where there is an order to sell less than 30% of the average daily turnover in a company's shares, it is unlikely to have a material diminishing impact on the price of that share and it is likely that all the shares the subject of the order will be sold within a day.
- 4.37 **Relatively Liquid Shares:** As noted above in paragraph 4.31, in my opinion, as at 12 June 2020, 79 Share Positions related to Relatively Liquid Shares. These are shares that represent more than 30% but less than 100% of average daily turnover in that stock (that is, where the number in Column N is between 0.3 and 1). In my experience, shares which represent more than 30% but less than 100% of average daily turnover in that share may or may not be sold in one day without a diminishing impact on the price but are likely to be sold without a diminishing impact on the price over a maximum of three days. The longer that shares remain on the market to be sold, the more difficult it is to sell them without discounting the price because buyers tend to retreat.
- 4.38 **Relatively Illiquid Shares:** As noted above in paragraph 4.31, in my opinion, as at 12 June 2020, 73 Share Positions related to Relatively Illiquid Shares. These are shares that represent more than 100% of average daily turnover in that stock (that is, where the number in Column N is more than 1). In my opinion, it will likely take longer than three days to sell these shares and, in some cases, significantly more time (possibly one month or more). The reason for this is because there may not be a market in those shares or the sale of those shares would lead to a diminishing price outcome. As stated above in paragraph 4.37, the longer it takes to sell a parcel of shares, the harder it becomes as buyers tend to retreat.



Question 3: How could the shares that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

4.39 I am instructed that:

- (a) stocks (which I take to mean shares) were available for trading on the IB Platform, which is a trading platform;
- (b) the holdings of shares within the Halifax Portfolio are held by IB on behalf of Halifax AU or Halifax NZ and Halifax AU or Halifax NZ hold their interest in certain of these shares on behalf of their clients.

4.40 In light of my instructions, I have assumed that some of the shares in the Share Positions were acquired on market through the IB trading platform. In my opinion, the most expedient manner (meaning the quickest and cheapest manner) of realising those shares would be through the IB platform. My reasons for this view are as follows:

- (a) I have not traded on IB; however, from my experience in trading shares, I am aware of the IB platform and that IB is a low cost execution-only broker with a broad global reach in terms of access to exchanges and trading venues and asset classes.
- (b) As the shares are held on the IB platform, I would expect the conditions below in paragraph 4.41 to be satisfied or for IB to have ready access to the information in paragraph 4.41 such as whether the shares are free to be traded. For example, in the Share Spreadsheet I have observed that column C from lines 1070 to 1107 say "CORPACT", meaning Corporate Action. From my experience in trading shares, "Corporate Action" in the context of share trading is where a company is in the process of a restructuring of its capital, which normally would see the shares suspended from trading for a period of time. The description of the shares subject to corporate action (column D) identifies the type of restrictions on the shares – for example, lines 1072 and 1073 relate to shares in companies that are under escrow (column D) and so they cannot be sold.
- (c) If a different broker was used to realise shares that were acquired through the IB trading platform, the conditions below in paragraph 4.41 would need to be satisfied.

4.41 In my experience in trading on the ASX, which I describe in paragraphs 1.1 - 1.10 above, the process for realising liquid shares (that is, selling these shares for cash) is as follows:

- (a) There is an agreement in place between the owner of the shares and a broker, where the broker has authority to transact on the owner's instructions.
- (b) The shares to be sold are listed and currently trading on a recognized exchange or trading venue.
- (c) Ownership, class of shares, quantity of shares and actual location of the shares are verified prior to trading to ensure delivery of shares at the settlement date. Also, the broker will need to verify that the shares can be traded, for example a



broker will need to ensure that the shares are not subject to any escrow provisions under the ASX Listing Rules.

- (d) The broker has access to the markets where the shares are traded and processed for settlement.
- (e) The client can deliver the shares to the broker in a form and at a time that will enable settlement. In my experience, the shares are either held by the beneficial owner or custodian who delivers the shares, free of any encumbrance, for settlement at the clearing house exchange or trading venue on the designated settlement day. These shares are received and exchanged for cash (electronically) at the end of the settlement process. I have already referred above in paragraph 4.23(e) to the regulatory and operational challenges in delivering shares to a third party broker.

4.42 The process for realising shares on other exchanges or trading venues may differ. I have not myself actually traded on every exchange or trading venue listed on the Share Spreadsheet. I have not traded shares for clients on a UK, European or US exchange but have traded Australian shares for institutional clients in the UK, Europe and the US. My observation from interactions with these institutional clients is that the processes in the US, Europe and the UK for realising liquid shares is similar to paragraph 4.41 above, which is largely driven by developments in electronic trading and compliance requirements.

4.43 As stated above at paragraphs 4.36 and 4.37, I consider that the Highly Liquid Shares will likely be sold within one day and the Relatively Liquid Shares will likely be sold within 1-3 days. I consider that the time it will take to sell the shares through IB or through another broker will be the same because my views on time are based on average daily turnover. However, I believe that the process of setting up an account with another broker, which I describe in paragraph 4.41, will take longer.

4.44 From my experience in trading shares, the following transaction costs are involved in the sale of shares:

- (a) direct brokerage fees charged for selling shares;
- (b) government transaction fees or levies or other transaction fees may be imposed in the jurisdictions where the exchanges and trading venues are located; and
- (c) tightness, which I discuss above at paragraphs 4.15-4.16.

Question 4: How could the shares that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.

4.45 The process and costs for selling relatively illiquid shares is the same as the process for selling liquid shares, which I describe above at paragraphs 4.39 - 4.44.

4.46 As stated above at paragraph 4.38, I consider that the Relatively Illiquid Shares may take more than three days to sell and, in some cases, significantly more time (possibly one month or more). I cannot quantify with greater precision how long it will take to sell the Relatively Illiquid Shares.



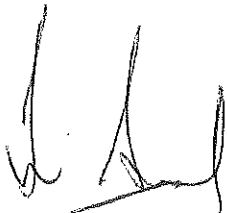
- 4.47 In my experience, as a share becomes less liquid, it is generally the case that a small number of brokers dominate the trading in that company. A specialist broker (that is, a broker which has extensive experience in trading that stock) may sell the Relatively Illiquid Shares faster and at a higher price than a "low touch" broker (that is, a broker that does not provide advice and only provides access to the market) because specialists are more closely connected to the company to which the shares relate and its shareholders as they often manage the company's capital raising requirements. There will be higher brokerage fees associated with engaging a specialist broker than a "low touch" broker. The fees of specialist brokers vary.
- 4.48 My observation of the Halifax Portfolio is that within the Relatively Illiquid Shares there is a portion that are concentrated in small-cap or micro-cap companies (these are small companies that tend to be thinly traded). For example:
- (a) Line 985 relates to shares held in [REDACTED] which are relatively illiquid because Halifax's holding of those shares represents 1,235% of average daily turnover (column N).
 - (b) The total issued share capital in [REDACTED] is 87,697,313 shares. A copy of a current company search of [REDACTED] extracted from the database maintained by Australian Securities and Investments Commission on 16 June 2020 is at **Annexure P**.
 - (c) [REDACTED] is a micro-cap company because its market capitalisation is A\$3,069,476 ($87,697,313 \times \text{Last Sale Price on 12 June 2020 of A\$0.035}$ (column H)). From my experience in trading shares, the benchmark for micro-cap companies in Australia are those with a market capitalisation of less than A\$50 million.
 - (d) The Halifax Portfolio holds 3,855,597 shares in [REDACTED] (column I), which as at 12 June 2020 were valued at A\$134,945.90 (column K).
 - (e) The Halifax [REDACTED] Shares represent around 10% of the value of Relatively Illiquid Shares in the Halifax Portfolio that are listed on the ASX ($\text{A\$134,945.90} / \text{A\$1,343,759}$ (see paragraph 3.11)) and around 5% of the value of the Relatively Illiquid Shares in the Halifax Portfolio ($\text{A\$134,945.90} / \text{A\$2,780,499}$ (see paragraph 3.11)). This is an example of Relatively Illiquid Shares being concentrated in a micro-cap company.
- 4.49 If the Relatively Illiquid Shares were transferred into IB from another broker, for the reasons in paragraph 4.47 it would be advantageous to consider using a specialist broker in that security to realise the holding, if it is practical to do so.

5. Warrants

Background

- 5.1 According to the ASX Glossary, warrants are:

"a form of derivative – that is, they derive their value from another 'thing' (underlying instrument). Some give holders the right to buy, or to sell the underlying instrument (eg. a share) to the warrant issuer for a particular price according to the terms of issue. Alternatively, others entitle holders to receive



a cash payment relating to the value of the underlying instrument at a particular time (eg. index warrants).

Warrants may be issued over securities such as shares and Exchange Traded Funds (ETFs), a basket of different securities, a share price index, debt, currencies, or commodities."

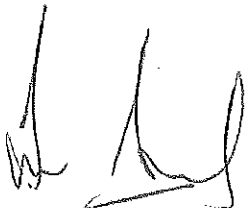
- 5.2 This definition accords with my understanding of warrants. It also accords with my experience which I gained when I was accredited to undertake derivatives trading in the 1990s to around 2000, in the course of which trading I bought and sold warrants.
- 5.3 Set out below is a description of the Derivative Spreadsheet (**Confidential Annexure D**):
- (a) The horizontal columns are filled across from A to M.
 - (b) The vertical rows from 7 to 295 represent the individual holdings of derivatives within the Halifax Portfolio.
 - (c) The data in columns A – I was included in the KPMG Derivative Spreadsheet that I received from K&L Gates.
 - (d) I added the data in columns J – O as described below in paragraphs 5.3(o) - 5.3(t) below.
 - (e) I have organised the Derivative Spreadsheet by Asset Class (column A) and the geographic location of the exchange or trading venue for the asset (**geographic grouping**).
 - (f) Column A is called "AssetClass". I am instructed that this column indicates the type of financial product to which a row in the spreadsheet corresponds. I am also instructed that the asset class for entries are:
 - (i) "CFD", meaning contract for difference;
 - (ii) "FOP", meaning future option;
 - (iii) "FUT", meaning future;
 - (iv) "OPT", meaning option; and
 - (v) "WAR", meaning warrant.
 - (g) Column B is called "Symbol". I am instructed that this column indicates the identifying code of the underlying asset on IB, which usually corresponds to the identifying code of that financial product on the exchange or trading venue where that financial product is traded and / or listed.
 - (h) Column C is called "ListingExchange". I am instructed that this column identifies the exchange or trading venue on which the assets are traded and / or listed.
 - (i) Column D is called "Description". It identifies the financial product. For example:



- (i) In relation to warrants and options, column D shows the symbol for the company to which the warrant or option relates, the date on which the warrant or option expires, the price of that option or warrant and whether it is a call or a put option.
- (ii) In relation to CFDs, column D shows the underlying financial product from which the value of the contract is derived.
- (iii) In relation to future options (line 295), column D shows the contract code, the date at which the future option expires, the exercise price and whether it is a put or a call option.
- (iv) In relation to futures (line 293), column D shows a future contract with an expiry date of March 2021.
- (j) Column E is called "SecurityID". I am instructed that it provides an identifying number for each of the individual investments. This is extracted from the IB Platform. Where such a number is not recorded in IB, the relevant cell in the column is blank. I have not used these numbers in answering the questions asked of me.
- (k) Column F is called "SecurityIDType". I am instructed that it identifies that the Security ID in column E is an International Securities Identification Number or ISIN for each individual investment. Where such a number is not recorded in IB, the relevant cell in the column is blank. I have not used column F in answering the questions asked of me.
- (l) Column G is called "Multiplier". I am instructed that this column identifies how many financial positions are held in each unit of the financial product that is traded and / or listed. Based on this instruction, I understand that the multiplier is the exact number of underlying securities that each derivative contract represents. For example, line 251 of the Derivative Spreadsheet contains an option (column A). There are seven option contracts held (column H) and each contract covers an underlying 100 shares (column G) in [REDACTED] a pharmaceuticals company (column B).
- (m) Column H is called "Long". I am instructed that this column records the quantity of positions held in respect to a derivative. For example:
 - (i) in relation to CFDs and warrants, column H identifies the quantity of positions that relate to the number of underlying financial products to which the CFD or warrant relates; and
 - (ii) in relation to options, futures or future options, column H relates to the number of each of these products taking into account the multiplier. For example, a multiplier of 100 (column G) and quantity of 5 (column H) means there are 500 options, futures or future options as the case may be.

Having regard to the label for column H, I assume that the positions recorded in this column were acquired as long positions. At paragraph 4.1(m) above I describe what a long position is.

- (n) Column I is called "Short". I am instructed that this column identifies the number of units in each derivative that have been acquired as a short position by an



investor or as a hedge. At paragraph 4.1(n) above, I describe what a short position is.

- (o) Column J is called "Bloomberg Code". It records the Bloomberg security code for each warrant, option, future option and future and the security code for the underlying share for each CFD. To populate this column, I used the same process as for populating Column G of the Share Spreadsheet, which I describe above at paragraph 4.1(k). I have used the Bloomberg Code to get the average number of securities traded per day (see column N) and the 'Last Sale Price' (see Column K) and to calculate the percentage of average daily trades (see column O).
- (p) Column K is called "Last Sale". It refers to the last publicly traded price of each warrant, option, future option and future in the Halifax Portfolio and the underlying share price of each CFD in the Halifax Portfolio at 12 June 2020 (**Last Sale Price**). I obtained this price from Bloomberg as explained above at paragraph 4.3. This price is expressed in the stated currency of each exchange or trading venue. For example, the currency on the NYSE is USD. I have inserted the currency of each Last Sale Price in column K before each geographic grouping. If an asset has a Last Sale Price recorded, this means that the asset or the underlying share in the case of CFDs is currently trading. I have assumed that if an asset or the underlying share in the case of CFDs does not have a Last Sale Price, it is not currently trading for the following reasons:
 - (i) a warrant, option, future or future option may have passed its expiry date or may have been terminated prior to the expiry date for a reason stipulated in the relevant contract;
 - (ii) in relation to warrants or options, the shares underlying the warrant or option may have been delisted or are subject to a trading halt (see paragraph 4.2 above);
 - (iii) the warrant or option may be delisted for a reason unrelated to the underlying share (for example, if the warrant or option fails to meet ASX operating rules);
 - (iv) in the case of the underlying share of a CFD, for the same reasons that I made this assumption in relation to the shares in the Share Spreadsheet (see paragraph 4.2 above);
 - (v) in the case of all assets, it is possible, that the code (as identified in column B) is incorrect.
- (q) Column L is called "Value". I have populated Column L by creating a formula to calculate the total of the multiplier (column G) x Long or Short (columns H or I) x Last Sale Price (column K).
- (r) Column M is called "Value AUD". In this column, I have converted the total value of each asset class organised by geographic grouping into AUD as at 12 June 2020. I have converted the value of the derivatives in the Halifax Portfolio into AUD in order to give a common currency base to the portfolio. This assists my understanding of where the largest exposures exist in the Halifax Portfolio. This can only be used as a guide because derivative prices and currencies are constantly changing. I have taken the exchange rates used for conversions on column M from Bloomberg as at 12 June 2020. Lines 298-315 of the Derivative



Spreadsheet contain the foreign exchange rates that I used, as at 12 June 2020, to populate column M and convert column L into AUD. For example:

- (i) Lines 147-153 contain CFDs relating to underlying shares traded in HKD on the Hong Kong Stock Exchange (SEHK). I have recorded the total value of the shares underlying the CFDs in AUD in cell M153 (A\$74,748.94) and have used the exchange rate for converting HKD to AUD in cell B303.
- (ii) Lines 254-255 contain options that are traded on the NYSE in USD. Line 256 contains an option which is traded on SEHK in USD. I have recorded the total value of the options in AUD in cell M256 (A\$13,957.43) and have used the exchange rate for converting USD to AUD in cell B311.
- (s) Column N is called "Ave Daily Trades", meaning "Average Daily Trades". It contains the following information:
 - (i) In relation to CFDs, column N records the average volume of the underlying shares traded over the last 6 months – that is, from 12 December 2019 to 12 June 2020 – in each company that a CFD covers. For example, line 9 of the Derivative Spreadsheet relates to CFDs (column A) with the underlying financial product being USD [REDACTED] shares (column D) [REDACTED] CFDs [REDACTED] is traded on the NASDAQ (column C). On average over the past six months, there have been 4,940,340 daily trades in one [REDACTED] share (column N). As at 12 June 2020, one [REDACTED] share was worth US\$2,472.41 (column K). One CFD covers 1 [REDACTED] share, as shown in column G (multiplier). There are two [REDACTED] CFDs (column H). As at 12 June 2020, the total value of the two [REDACTED] CFDs, expressed as the value of the shares underlying those CFDs, was US\$4,944.82 (column L; US\$2,472.41 (column K) x 2).
 - (ii) In relation to warrants, column N records the average volume of the specific warrant to which an entry relates traded over the last 6 months – that is, from 12 December 2019 to 12 June 2020. Below at paragraph 5.4, I provide an example of how the Derivative Spreadsheet applies to a warrant.
 - (iii) In relation to futures, column N records the actual turnover in relation to the futures contracts over the last 6 months – that is, from 12 December 2019 to 12 June 2020. I discuss the future contract within the Halifax Portfolio recorded in line 293 of the Derivative Spreadsheet below at paragraph 9.2.
 - (iv) I have obtained the average daily trades in column N from Bloomberg, as described above at paragraph 4.3.
 - (v) On Bloomberg, I was unable to locate turnover data for options and the future option.
- (t) Column O is called "% Of Ave Daily Trades", meaning "% of Average Daily Trades". It contains the following information:
 - (i) In relation to CFDs, column O records the percentage of average daily turnover of shares underlying each CFD within the Halifax Portfolio. I populated column O in relation to CFDs by creating a formula which

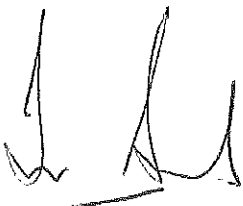


divided column H (Long) by column N (average daily trades) or divided column I (Short) by column N (average daily trades). The "% of Average Daily Trades" is expressed as a number, e.g. 0.30 = 30% of the average day's securities traded. For example, in line 137 of the Derivative Spreadsheet relates to CFDs (column A) with the underlying financial product being [REDACTED] (column D) ([REDACTED] CFDs). [REDACTED] is traded on the ASX (column C). On average over the past six months, there have been 925,699 daily trades in one [REDACTED] share (column N). As at 12 June 2020, one [REDACTED] share was worth A\$0.20 (column K). One [REDACTED] CFD covers one [REDACTED] share, as shown in column G (multiplier). There are 26,656 [REDACTED] FDs (column H). The [REDACTED] shares underlying the [REDACTED] CFDs represent approximately 3% of the average daily turnover in [REDACTED] shares traded on the ASX (column H divided by column N).

- (ii) In relation to warrants, column O records the percentage of average daily turnover in a warrant series that each holding in the Halifax Portfolio represents. I populated column O in relation to warrants by creating a formula which divided column H (Long) by column N (average daily trades) or divided column I (Short) by column N (average daily trades). Again, "% of Average Daily Trades" is expressed as a fraction of the average day's securities traded. Below at paragraph 5.4, I provide an example of how the Derivative Spreadsheet applies to a warrant.
- (iii) In relation to futures, column O records the percentage of average daily turnover of contracts in the series with that description – that is, the description in column D. I discuss the future contract within the Halifax Portfolio recorded in line 293 of the Derivative Spreadsheet below at paragraph 9.2.
- (iv) In relation to options and the future option, column O is blank because, respectively, I was unable to locate turnover data for options and I was unable to locate turnover data and the Last Sale Price for the future option.

5.4 To illustrate how the Derivative Spreadsheet works in relation to warrants I refer to line 163:

- (a) In Column A WAR indicates that the asset class of the investment is a warrant.
- (b) In Column B [REDACTED] is the symbol for the warrant issued.
- (c) Column C indicates that the warrant is listed and traded on the ASX.
- (d) Column D indicates that (i) the warrant contract relates to shares in [REDACTED] and (ii) the contract expires on 13 September 2024 and gives the warrant holder the right (but not the obligation) to buy one [REDACTED] share at 6.3 cents. The "C" in the description column indicates that the warrant is a call, meaning that the warrant holder has the right but not the obligation to buy the underlying share.
- (e) Columns E and F identify the ISIN as [REDACTED].
- (f) Column G identifies the multiplier as 1, indicating that one warrant contract corresponds to one underlying share in [REDACTED].



- (g) Column H shows that there were 118 warrant contracts relating to [REDACTED] as at 29 May 2020.
- (h) Column I is blank, indicating that there were no short positions in warrant contracts relating to [REDACTED] as at 29 May 2020.
- (i) Column J identifies the Bloomberg Code for the warrant, which is [REDACTED]
- (j) Column K records that the Last Sale Price for one [REDACTED] warrant on 12 June 2020 was A\$0.012.
- (k) Column L records that the total value of the [REDACTED] warrant contracts identified in line 163 as at 12 June 2020 was A\$1.41.
- (l) Column N records that there were on average 769 daily trades in the [REDACTED] warrant contract over the last 6 months – that is, from 12 December 2019 to 12 June 2020.
- (m) Column O records that the total [REDACTED] warrants within the Halifax Portfolio represented 15% of the total average daily trades in [REDACTED] warrant contracts as at 12 June 2020.

Question 5A(i): What factors affect the ease or difficulty with which and time within which the warrants listed in the Derivative Spreadsheet can be realised?

- 5.5 In answering question 5A(i), I have drawn on my experience in trading warrants until about 2000, discussed above at paragraphs 1.1-1.10, and my post-graduate studies which have included learning about market dynamics of which liquidity is an integral part. Since around 2000, I have not given advice to institutional clients, in trading derivatives (including warrants) but to the best of my recollection I handled some institutional trades in derivatives (including warrants) on an execution-only basis.
- 5.6 In my opinion, the factors that affect the ease or difficulty with which and time within which the warrants listed in the Derivative Spreadsheet can be realised are the same as the factors that affect the realisation of shares, which I discuss above at paragraphs 4.8-4.23. In my view the reason for this is because the financial product underlying the warrants in the Halifax Portfolio is a share. The guide called *Understanding Trading and Investment and Warrants*, published by the ASX in January 2016 (<https://www.asx.com.au/documents/products/understandingwarrants.pdf>) (**Warrants Guide**) states at p 25:
- “This is the risk that you may not be able to sell your warrants for a reasonable price in the market. This could be because there are insufficient orders to buy your warrants, or the price at which others are prepared to buy them is very low. In some cases a lack of liquidity in a warrant series may be due to a lack of liquidity in the underlying instrument.”
- A copy of the Warrants Guide is at **Annexure O**.
- 5.7 For the reasons above at paragraph 2.12(a), I consider documents published by the ASX to be reliable. The Warrants Guide points out the link between the

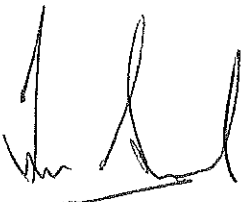


liquidity of warrants and the "underlying instrument" – that is, the underlying share.

- 5.8 As with shares, for the reasons in paragraphs 4.9-4.11, I consider that **average daily turnover** (as defined by the percentage of average daily turnover in warrant series and recorded in column O of the Derivative Spreadsheet) to be the most important factor in realising a portfolio of warrants.
- 5.9 One distinguishing factor in relation to options, warrants, futures and future options is that they have an expiry date. Shares and CFDs do not have an expiry date. In my experience, trading activity in options and warrants tends to be most active and concentrated in the months immediately prior to expiry of the relevant contract. This is particularly notable for derivatives with an exercise price that is close to the current price of its underlying asset, which is known as "at the money". This is because around this time investors have greater confidence in the relationship between the derivative exercise price and the underlying share price – that is, whether the derivative exercise price is higher or lower than the underlying share price and whether it is in the realm of possibility that the derivative exercise price will represent a profitable trade, given the likely share price on the date of expiry.

Question 5A(ii): Which of those warrants (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.

- 5.10 The Derivative Spreadsheet contains 84 individual warrant positions (**Warrant Positions**). That is there are 84 separate entries of warrants as an asset type (column A) in the Derivative Spreadsheet. The Warrant Positions are at lines 156-248 of the Derivative Spreadsheet.
- 5.11 Before setting out which of the Warrant Positions in the Derivative Spreadsheet are relatively liquid and which are relatively illiquid, I set out how many Warrant Positions have no value. This is because after those warrants are excluded, the remaining Warrant Positions can be grouped into liquid and relatively illiquid Warrant Positions.
- 5.12 I have concluded that 5 Warrant Positions have no recorded value as at 12 June 2020 (**No Value Warrants**) because they have no Last Sale Price (column K) as at that date. The No Value Warrants are marked in yellow on the Derivatives Spreadsheet. As noted above in paragraph 5.3(p), a warrant without a Last Sale Price may be past its expiry date, terminated early, delisted, in a trading halt or suspended or else I may have been unable to locate the correct Bloomberg Code using the information provided in the KPMG Derivatives Spreadsheet. I note that a trading halt or a suspension is usually temporary and so it is possible that some of the Warrant Positions will have a recorded value in the future.
- 5.13 Excluding the No Value Warrants, there are 79 Warrant Positions. Of these remaining Warrant Positions as at 12 June 2020, in my opinion:
- (a) 44 Warrant Positions relate to warrants that will take approximately one day to sell, the sale of which will likely have no noticeable impact on the warrant price (**Highly Liquid Warrants**);
- (b) 6 Warrant Positions relate to warrants that will likely take approximately one to three days to sell, the sale of which may have a minor impact on the warrant



price (**Relatively Liquid Warrants**). I have marked the Relatively Liquid Warrants in green on the Derivative Spreadsheet; and

- (c) 29 Warrant Positions relate to warrants that may take longer than 3 days to sell, the sale of which will likely have an impact on the warrant price (**Relatively Illiquid Warrants**). I have marked the Relatively Illiquid Warrants in red on the Derivative Spreadsheet.

5.14 I explain my opinion, which is based on my experience, below in paragraphs 5.18-5.22. However, as with shares, I note that whether there is an equal and opposite buyer to the size of any seller is random in that this depends on individual decisions of market participants and the cash flow available to them.

5.15 The Highly Liquid Warrants represent 1.2% of the value of the derivatives contained in the Halifax Portfolio (being A\$8,590.86 divided by A\$692,531.32).

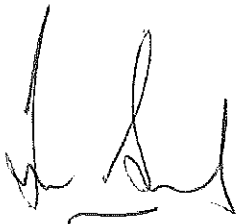
5.16 The Relatively Liquid Warrants represent 0.01% of the value of the derivatives contained in the Halifax Portfolio (being A\$15.00 divided by A\$692,531.32)

5.17 The Relatively Illiquid Warrants represent 1.9% of the value of the derivatives contained in the Halifax Portfolio (being A\$13,035.17 divided by A\$692,531.32).

5.18 **Highly Liquid Warrants:** As noted above at paragraph 5.13(a), in my opinion as at 12 June 2020, 44 Warrant Positions related to Highly Liquid Warrants. These are warrants that represent 30% or less of average daily turnover in that warrant series (that is, where the number in column O is 0.3 or less as explained in paragraph 4.1(r)(iii) above). Where there is an order to sell less than 30% of average daily turnover in a certain warrant series, it is unlikely to have a material diminishing impact on the price of that warrant and it is likely that all the warrants the subject of the order will be traded within a day. I refer to paragraphs 4.9-4.12 above, where I explain this Rule of Thumb in relation to shares, and paragraph 5.8 above, where I note that the Rule of Thumb also applies to warrants.

5.19 **Relatively Liquid Warrants:** As noted above at paragraph 5.13(b), in my opinion, as at 12 June 2020, 6 Warrant Positions related to Relatively Liquid Warrants. These are warrants that represent more than 30% but less than 100% of average daily turnover in that warrant series. There is one group of Relatively Liquid Warrants in the Halifax Portfolio at lines 163-168 of the Derivative Spreadsheet. There are six holdings within the Halifax Portfolio of the [REDACTED] warrant series recorded. Separately, each holding represents 15% of average daily turnover in that warrant series (column O). However, in aggregate the holding represents 90% of average daily turnover in that warrant series (15% x 6).

5.20 In my experience, warrants which represent more than 30% but less than 100% of average daily turnover in that warrant series may or may not be sold in one day without a diminishing impact on the price but are likely to be sold without a diminishing impact on the price over a maximum of three days. After a prolonged period of time, the price of a derivative instrument with a fixed expiry time could fall due to time decay. That is, if interest rates and the price of the underlying share (or other asset) remain constant, the derivative may lose value as the expiry date approaches; however, there may also be increased trading activity as the expiry date nears. Therefore, after a prolonged period of time, Relatively Liquid Warrants may lose value but may become more liquid as their expiry date draws near.



5.21 **Relatively Illiquid Warrants:** As noted above at paragraph 5.13(c), in my opinion as at 12 June 2020, 29 Warrant Positions related to Relatively Illiquid Warrants. These are warrants that represent more than 100% of average daily turnover in that warrant series. This occurs where:

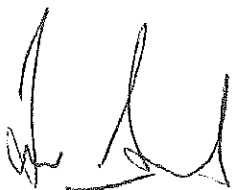
- (a) The number in column O is more than 1. For example, line 169 contains a warrant for [REDACTED], which is due to expire on 31 August 2020 and gives the warrant holder the right (but not the obligation) to buy one [REDACTED] share at 0.05 cents (column K). The [REDACTED] warrants within the Halifax Portfolio represented 478% of the total average daily trades in [REDACTED] warrant contracts as at 12 June 2020 (column O) (this is expressed as the number 4.78 in the Derivatives Spreadsheet as explained at paragraph 4.1(r)(iii) above). This means that it may take around 5 days to sell the [REDACTED] warrants within the Halifax portfolio, assuming that Halifax was able to sell every warrant traded in the market over those days. It is highly unlikely that there are no other sellers, given that there are on average 6,272 daily trades in [REDACTED] warrants (column N). Also, the sale of the [REDACTED] warrants within the Halifax portfolio over a short period of time may have a diminishing impact on the price of the warrant.
- (b) At lines 175-198 of the Derivative Spreadsheet, there are 24 holdings of the same warrant series in [REDACTED]. Separately, each [REDACTED] holding represents 12% of average daily turnover in that warrant series (column O) (this is expressed as the number 0.12 as explained at paragraph 4.1(r)(iii) above). However, in aggregate the [REDACTED] holding represents 288 days in aggregate of average daily turnover in that warrant (12% x 24 holdings).

5.22 In my opinion, it will likely take longer than three days to sell the Relatively Illiquid Warrants and, in some cases, significantly more time (possibly one month or more). The reason for this is because there has been insufficient average daily trades in those warrants to enable a sale over three days or less. Furthermore, a warrant holding that represents more than 100% of average daily turnover is less likely to be sold at the current market price.

Question 5A(iii): How could the warrants that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

5.23 In my experience in trading on the ASX, the process for realising liquid warrants (that is, selling these warrants for cash) and the transaction costs involved in the process is largely the same as the process for realising liquid shares and the transaction costs involved in that process, which I describe above at paragraphs 4.41 (process) and 4.44 (costs).

5.24 In my opinion, the point of difference is that the theoretical price for warrants depends on a complex formula deriving from the expiry date of the warrant contract, the exercise price, the price and volatility of the underlying share (or other asset), and interest rates. This may affect the tightness of the bid / offer spread in the market, which is a transaction cost and which I describe above at paragraphs 4.15-4.16. My opinion is based on my experience in trading warrants and options on the ASX and my post-graduate studies.



- 5.25 As stated above at paragraphs 5.13(a) - 5.13(b), I consider that the Highly Liquid Warrants will likely be sold within one day and the Relatively Liquid Warrants will likely be sold within 1-3 days.

Question 5A(iv): How could the warrants that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.

- 5.26 In my experience in trading on the ASX, the process and costs for selling relatively illiquid warrants is the same as the process for selling relatively liquid warrants, which I describe at paragraphs 5.23-5.24.
- 5.27 In my experience, to realise relatively illiquid warrants a holder does not usually need to engage a specialist broker where the value of the warrant positions is not significant as buyers will likely enter the market when the price of warrants is at the low end of fair value. Also, derivative valuations tend to be a combination of price and volatility measures (such as interest rates, days to expiry of the derivative instrument and risk profile) relative to their underlying asset. This is highly mathematically based, whereas share valuations in illiquid companies tend to be highly subjective. Warrant issuers are generally required to ensure there is a market for the warrants they issue.

6. Contracts for difference

Background

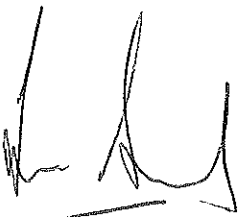
- 6.1 According to IG Markets Limited (**IG Markets**), a financial services company (<https://www.ig.com/au/cfd-trading/what-is-cfd-trading-and-how-does-it-work>),

"CFD trading is defined as 'the buying and selling of CFDs', with 'CFD' meaning 'contract for difference'. CFDs are a derivative product because they enable you to speculate on financial markets such as shares, forex, indices and commodities without having to take ownership of the underlying assets.

Instead, when you trade a CFD, you are agreeing to exchange the difference in the price of an asset from the point at which the contract is opened to when it is closed."

A copy of the IG Markets Article describing CFDs is at **Annexure K**.

- 6.2 Prior to my retirement, I had heard of IG Markets as a recognised provider of CFD trading. Their description of CFDs accords with my understanding of a CFD. I have not traded in CFDs, and my understanding of CFDs comes from generally working in the securities industry.
- 6.3 In paragraph 5.3 above, I describe the Derivative Spreadsheet, which indicates that there are 143 CFDs within the Halifax Portfolio. These are at lines 7-153 of the Derivative Spreadsheet. I make two further observations about the Derivative Spreadsheet as it applies to CFDs.
- 6.4 First, based on the combination of information that I have obtained from columns B (Symbol), C (Listing Exchange) and D (Description) which I used to obtain the Bloomberg Code (column J), I consider that the Symbol for CFDs corresponds to the identifying code for the asset underlying each CFD. For the CFDs within the



Halifax Portfolio, that underlying asset is a share. I have come to this view because the Bloomberg Code corresponding to the underlying asset for each CFD refers to "equity", which is another way of saying "shares".

6.5 Secondly, for CFDs, the Value column (column L) represents the value of the shares underlying each CFD, not the value of each CFD within the Halifax Portfolio. The value of the CFD is the difference between the price of the underlying share at the date the contract was entered into (**entry price**) and the current price of that share. For a long position (column H), the profit or loss on a CFD will be the extent to which the last sale price of the underlying share as at 12 June 2020 is, respectively, above or below the entry price. For a short position (column I), the profit or loss on a CFD will be the extent to which the last sale price of the underlying share as at 12 June 2020 is, respectively, below or above the entry price. I have not been provided with the entry prices for the CFDs within the Halifax Portfolio.

6.6 I do not consider that not having the entry prices for the CFDs within the Halifax Portfolio affects my answer to Question 5B because it is liquidity of the underlying share that determines the liquidity of the CFD and I have the average daily trades data for all of the shares underlying each CFD. The reason for this is that issuers of CFDs structure the CFD entry price to reflect the ability to buy or sell that equivalent quantity of underlying shares in the market – in other words, my understanding is that it is common practice to hedge the trade.


Question 5B(i): What factors affect the ease or difficulty with which and time within which the CFDs listed in the Derivative Spreadsheet can be realised?

6.7 In answering question 5B(i), I have drawn on my understanding of CFDs from working in the securities industry. As noted above at paragraph 6.2, I have not traded in CFDs. I have also drawn on my experience in trading shares, my post-graduate studies in applied finance and investments and the material listed in paragraph 2.12 because, for the reasons above at paragraph 6.6, the ease or difficulty with which and the time within which CFDs within the Halifax Portfolio can be realised depends on the ease or difficulty with which and the time within which the shares underlying those CFDs can be realised. Therefore, the factors that affect the ease or difficulty with which and the time within which CFDs within the Halifax Portfolio can be realised are those set out at paragraphs 4.8-4.23.

Question 5B(ii): Which of those CFDs (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.

6.8 As noted above at paragraph 6.3, the Derivative Spreadsheet contains 143 individual CFD positions (**CFD Positions**). That is, there are 143 separate entries of CFDs as an asset type (column A) in the Derivative Spreadsheet. The CFD Positions are at lines 7-153 of the Derivative Spreadsheet.

6.9 Based on the liquidity of the share underlying each CFD Position, I consider that all of the CFD positions relate to shares that are highly liquid in that the shares will likely take approximately one day to sell, the sale of which will have no noticeable impact on the share price (**Highly Liquid CFDs**). The shares underlying each CFD Position represent 30% or less of average daily turnover in that share (that is, where the number in Column O is 0.3 or less as explained in paragraph 4.1(r)(iii) above).

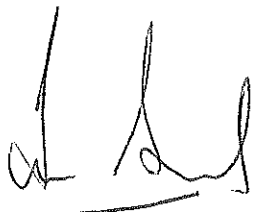


- 6.10 The percentage of average daily turnover for most of the shares underlying the CFDs within the Halifax Portfolio is recorded as 0.00 in the Derivative Spreadsheet. This is because of rounding and indicates that the volume of individual long and short positions (columns H and I) represents less than 1% of average daily trades in any of the underlying shares within the CFD portfolio.
- 6.11 As explained above at paragraphs 4.9-4.12, where there is an order to sell less than 30% of the average daily turnover in a company's shares, it is unlikely to have a material diminishing impact on the price of that share and it is likely that all the shares the subject of the order will be sold within a day.

Question 5B(iii): How could the CFDs that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

- 6.12 From my general understanding of how CFDs work, the process for realising CFDs – meaning, the process for closing a CFD trade – is for the investor to contact directly the issuer of those contracts and, for long contracts, for the investor to sell back to the issuer or, for short contracts, for the investor to buy back from the issuer.
- 6.13 I consider that the realisation of CFDs within the Halifax Portfolio would be immediate because they are highly liquid, as explained above at paragraphs 6.9-6.11. However, if the issuer is unable to meet their obligations under the CFDs, the process of realisation may be delayed.
- 6.14 In relation to costs, from my general understanding of how CFDs work:
- (a) There may be a brokerage fee for the issuer or introducing broker (that is, a third party between the issuer and the investor) in realising CFDs.
 - (b) I am not aware of government transaction fees or levies or other transaction fees imposed on the realisation of CFDs within Australia. I cannot comment on whether there are transaction fees imposed on the realisation of CFDs in other jurisdictions because I have no knowledge or expertise in this matter.
 - (c) There is a transaction cost described as "tightness". A last sale price for a share is not necessarily the price a shareholder will receive on sale. Selling a share down to the bid price may achieve a lower sale price than the previous last sale price posted. The price gap between the highest bid and the lowest offer is known as the "bid / offer spread". This gap will be narrowest for the most highly liquid shares. A transaction cost to be considered is the extent to which selling the shares in the Halifax portfolio will ultimately be traded below the last sale price. This cost is unquantifiable until a trade has occurred: see paragraphs 4.15-4.16. This cost would be expected to be larger in respect of CFDs than for the equivalent number of underlying shares because bid / offer spreads in CFDs are wider than those for their underlying shares as the CFD issuer takes a margin to compensate themselves for risk involved in a CFD trade.

Question 5B(iv): How could the CFDs that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.



6.15 I refer to my answer to Question 5B(iii) above in paragraphs 6.12-6.14 above.

7. Options

Background

7.1 According to the ASX Glossary, an option is

"a contract between two parties giving the taker (buyer) the right, but not the obligation, to buy or sell a security at a predetermined price on or before a predetermined date. To acquire this right the taker pays a premium to the writer (seller) of the contract."

7.2 There are two types of options: call options and put options. According to the ASX Glossary:

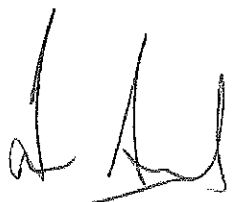
- (a) a call option "gives the holder the right, but not the obligation, to buy the underlying asset at the exercise price at or before a fixed expiry date";
- (b) a put option "giv[es] the holder the right, but not the obligation, to sell the underlying asset at the exercise price".

7.3 This definition accords with my understanding of options. When I was accredited to undertake derivatives trading in the 1990s to around 2000, I bought and sold options.

7.4 In paragraph 5.3 above, I describe the Derivative Spreadsheet, which shows that there are 33 options within the Halifax Portfolio. These are at lines 251 to 290 of the Derivative Spreadsheet. As noted above at paragraph 5.3(s)(v), I was unable to locate turnover data for the options within the Halifax Portfolio and so columns N and O for the options in the Derivative Spreadsheet are blank.

7.5 To illustrate how the Derivative Spreadsheet works in relation to call options I refer to line 254:

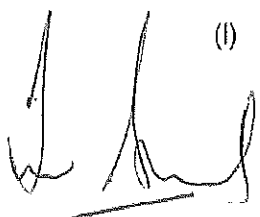
- (a) The reference in Column A to OPT indicates that the asset class of the investment is an option.
- (b) The reference in Column B to "[REDACTED]" is a reference to the symbol for the option issues.
- (c) Column C indicates that the option is listed and traded on the NYSE.
- (d) Column D indicates that (i) the option contract relates to shares in [REDACTED] and (ii) the contract expires on 15 January 2021 and gives the option holder the right (but not the obligation) to buy one [REDACTED] share at US\$165. The "C" in the description column indicates that the option is a call option.
- (e) Columns E (Security ID) and F (Security ID Type) are blank. As noted above at paragraphs 5.3(j)-5.3(k), I have not used columns E and F in answering the questions asked of me in relation to derivatives.
- (f) Column G identifies the multiplier as 100, indicating that one option contract corresponds to 100 underlying shares in [REDACTED]



- (g) Column H shows that there was 1 long option contract relating to [REDACTED] as at 29 May 2020.
- (h) Column I (short) is blank, indicating that the position held is not a short position.
- (i) Column J identifies the Bloomberg Code for the option, which is [REDACTED]
- (j) Column K records that the last sale price for one [REDACTED] option contract on 12 June 2020 was US\$0.83.
- (k) Column L records that the total value of the [REDACTED] option contract identified in line 254 as at 12 June 2020 was US\$83, which is the multiplier (column G) x long (column H) x Last Sale Price (column K).
- (l) For the reasons set out above at paragraph 7.4, columns M and N are blank.

7.6 To illustrate how the Derivative Spreadsheet works in relation to put options I refer to line 255:

- (a) The reference in Column A to OPT indicates that the asset class of the investment is an option.
- (b) The reference in Column B to [REDACTED] is a reference to the symbol for the option issues.
- (c) Column C indicates that the option is listed and traded on the NYSE.
- (d) Column D indicates that (i) the option contract relates to shares in [REDACTED] and (ii) the contract expires on 15 January 2021 and gives the option holder the right (but not the obligation) to sell one [REDACTED] share at US\$165. The "P" in the description column indicates that the option is a put option.
- (e) Columns E (Security ID) and F (Security ID Type) are blank. As noted above at paragraphs 5.3(j)-5.3(k), I have not used columns E and F in answering the questions asked of me in relation to derivatives.
- (f) Column G identifies the multiplier as 100, indicating that one option contract corresponds to 100 underlying shares in [REDACTED]
- (g) Column H (long) is blank, indicating that the position held is not a long position.
- (h) Column I shows that there was 1 short option contract relating to [REDACTED] as at 29 May 2020.
- (i) Column J identifies the Bloomberg Code for the option, which is [REDACTED]
- (j) Column K records that the last sale price for one [REDACTED] option contract on 12 June 2020 was US\$56.50.
- (k) Column L records that the total value of the [REDACTED] option contract identified in line 255 as at 12 June 2020 was US\$5,650, which is the multiplier (column G) x volume short (column I) x Last Sale Price (column K).
- (l) For the reasons set out above at paragraph 7.4, columns M and N are blank.



Question 5C(i): What factors affect the ease or difficulty with which and time within which the options listed in the Derivative Spreadsheet can be realised?

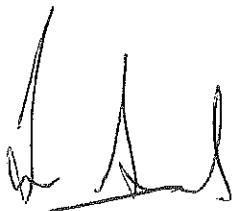
- 7.7 In answering question 5C(i), I have drawn on my experience in trading options until about 2000, discussed above at paragraphs 1.1-1.10, and on my post-graduate studies which have included learning about market dynamics of which liquidity is an integral part. Since around 2000, I have not given advice to institutional clients, in trading derivatives (including options) but to the best of my recollection I handled some institutional trades in derivatives (including options) on an execution-only basis.
- 7.8 In my opinion, the factors that affect the ease or difficulty with which and time within which the options listed in the Derivative Spreadsheet can be realised are the same as the factors that affect the realisation of warrants and shares, which I discuss at paragraphs 4.8 - 4.23 5.6-5.9. As with a warrant, the financial product underlying the options in the Halifax Portfolio is a share. I consider average daily turnover (as defined by the percentage of average daily turnover of options) to be the most important factor in realising a portfolio of options.
- 7.9 As with warrants, a distinguishing factor of options is that they have an expiry date, and, in my experience, trading activity in options tends to be most active and concentrated in the months immediately prior to the expiry of the relevant options contract: see paragraph 5.9.

Question 5C(ii): Which of those options (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.

- 7.10 As noted above at paragraph 7.4, the Derivative Spreadsheet contains 33 individual option positions (**Option Positions**). That is, there are 33 separate entries of options as an asset type (column A) in the Derivative Spreadsheet. The Option Positions are at lines 251 to 290 of the Derivative Spreadsheet and the total value of the options is A\$69,244.56. I have calculated this amount by adding up the AUD value of the Option Positions in the Derivative Spreadsheet (that is, the total of cells M252, M256, M265, M275 and M290).
- 7.11 I have not been able to reach a view on the liquidity of the Option Positions because I do not have the average trade data for these options: see above at paragraph 7.4. This means that I have been unable to calculate the percentage of average daily trades that each Option Position represents.

Question 5C(iii): How could the options that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

- 7.12 As noted above in paragraph 7.11, I have been unable to reach a view about the liquidity of the Option Positions. However, in my experience, at a general level the process for realising options and the transaction costs involved in that process are the same as the process and costs for realising warrants. I refer to paragraphs 5.23-5.25. Additionally, there are a number of proprietary trading firms who specialize in derivatives. As mentioned previously, the pricing of derivatives is based in mathematics, so it is reasonable to expect proprietary traders to find a price at which they are willing to buy or sell options, particularly those that are close to expiry and "at the money".



Question 5C(iv): How could the options that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.

7.13 I refer to paragraph 7.12 above.

8. Future options

Background

8.1 According to CME Group (**CME**), which is the merged former Chicago Mercantile Exchange and the former Chicago Board of Trade (<https://www.cmegroup.com/education/files/options-on-futures-brochure.pdf>) (**Futures Article**), a future options contract

"is the right, but not the obligation to buy or sell a particular future contract at a specific price on or before a certain expiration date".

A copy of the Futures Articles is at **Annexure J**.

8.2 I describe future contracts below at paragraph 9.1. From generally working in the securities industry, I understand that CME is the largest futures marketplace in the world. Their description of future options accords with my understanding of a future option. I have not traded in future options, and my understanding of future options comes from generally working in the securities industry.

8.3 In paragraph 5.3, I describe the Derivative Spreadsheet, which indicates that there is one future option within the Halifax Portfolio (**Halifax FOP**). This is at line 295 of the Derivative Spreadsheet. Column D (Description) states "15JUN20 98.5 P", which indicates that the future options contract expired on 15 June 2020. It follows that all rights under the future option relating to that future contract have ceased to exist.

Question 5D(i): What factors affect the ease or difficulty with which and time within which the future options listed in the Derivative Spreadsheet can be realised?

8.4 As the Halifax FOP has expired, it cannot be realised.

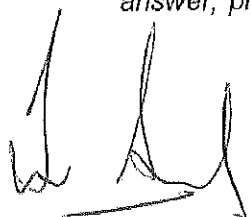
Question 5C(ii): Which of those future options (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.

8.5 As the Halifax FOP has expired, it has no value.

Question 5D(iii): How could the future options that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

8.6 As the Halifax FOP has expired, it cannot be realised.

Question 5D(iv): How could the future options that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the



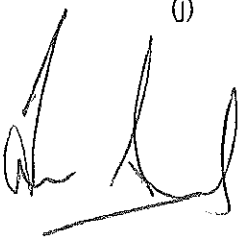
realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.

8.7 As the Halifax FOP has expired, it cannot be realised.

9. Futures

Background

- 9.1 Futures contracts are agreements between parties to buy or sell an asset at a fixed price at a fixed future date in time. Physical delivery of a commodity is often a feature of a futures contract. This description of futures is based on my general understanding of those contracts from working in the securities industry. I have not traded in futures.
- 9.2 In paragraph 5.3, I describe the Derivative Spreadsheet, which indicates that there is one future contract within the Halifax Portfolio (**Halifax Future**). This is at line 293 of the Derivative Spreadsheet. In line 293:
- (a) Column A says FUT, which indicates that the asset class of the investment is a future.
 - (b) Column B says SBH1 which is the symbol for the Halifax Future.
 - (c) Column C does not contain a listing exchange or trading venue for the future contract. However, I searched for "SB futures contract" in Google, which took me to the website of the Intercontinental Exchange (**ICE**), which is part of the NYSE (<https://www.theice.com/products/23/Sugar-No-11-Futures#:~:text=The%20Sugar%20No.,of%20origin%20of%20the%20sugar>) (**ICE HB Website**). Based on my search, I consider that the Halifax Future is listed and traded on ICE and that SB is the commodity code for sugar.
 - (d) Column D indicates that (i) the Halifax Future contract relates to SB – that is, sugar and (ii) the Halifax Future expires in [REDACTED]
 - (e) Columns E (Security ID) and F (Security ID Type) are blank. As noted above at paragraphs 5.3(j)-5.3(k), I have not used columns E and F in answering the questions asked of me in relation to derivatives.
 - (f) Column G identifies the multiplier as 112,000. Also, the ICE HB Website says that contract size is 112,000. In my view, the information in Column H and on the ICE HB Website indicates that each future contract covers 112,000 lb of sugar.
 - (g) Column H shows that there was 1 future contract relating to sugar as at 29 May 2020.
 - (h) Column I is blank, indicating that there were no short future contracts relating to sugar as at 29 May 2020.
 - (i) Column J records the Bloomberg Code for the Halifax Future, which is SBH1 Comdty.
 - (j) Column K records that the Last Sale Price for one contract on 12 June 2020 was US\$11.96. While this price is recorded in USD in the Derivative



Spreadsheet, the terms of the contract pricing are "[c]ents and hundredths of a cent per pound to two decimal places" according to the ICE HB Website. On the basis of the information on the ICE HB Website, I consider that the Last Sale Price for one contract on 12 June 2020 was US\$0.1196/lb. I have used US\$0.1196/lb to calculate the value of the Halifax Future in column L.

- (k) Column L records that the total value of the Halifax Future on 12 June 2020 was US\$13,395.20.
- (l) Column M records that the total value of the Halifax Future on 12 June 2020 was A\$21,294.36.
- (m) Column N records that there were on average 13,151 daily trades in the future sugar contract over the last 6 months – that is, from 12 December 2019 to 12 June 2020.
- (n) Column O records the percentage of average daily turnover for the Halifax Future as 0.00 in the Derivative Spreadsheet. This is because of rounding. This figure indicates that the Halifax Future represented less than 1% of the total average trades in the future contract in sugar as at 12 June 2020.

Question 5E(i): What factors affect the ease or difficulty with which and time within which the futures options listed in the Derivative Spreadsheet can be realised?


- 9.3 In answering question 5E(i), I have drawn on my understanding of futures from working in the securities industry. As noted above at paragraph 9.1, I have not traded in futures. However, I consider that average daily turnover (as defined by the percentage of average daily turnover of the Halifax Future recorded in Column O of the Derivative Spreadsheet) to be the most important factor in realising a portfolio of futures because it provides empirical evidence of trading volumes.

Question 5E(ii): Which of those futures (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.

- 9.4 In my opinion, the Halifax Future is highly liquid because, as at 12 June 2020, it represented less than 1% of the total average daily turnover in the future contract in sugar. For this reason, I consider that the Halifax Future could be realised within one trading day and the sale of the Halifax Future would likely have no noticeable impact on the commodity future price.

Question 5E(iii): How could the futures that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

- 9.5 From my general understanding of how futures work and assuming the Halifax Future is listed and traded on the ICE, the Halifax Future would be realised by selling it on the market through which it was purchased. The Halifax Future can be traded before the maturity date of March 2021. Also, the Halifax Future can be held until the maturity date. At the maturity date, the contract must be settled. On settlement, there is physical delivery of the commodity (that is, sugar) and the holder of the future contract would pay the value of the contract and for delivery. Delivery is to take place in accordance with the terms of the futures contract.



9.6 As explained above at paragraph 9.4, I consider that the Halifax Future could be realised within one trading day.

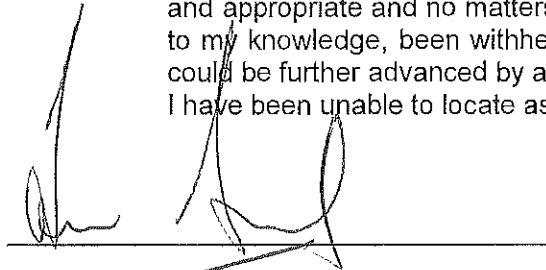
9.7 In relation to costs, from my general understanding of how futures work, the transaction costs involved would be similar to those involved in the sale of shares, which I describe at paragraph 4.44 above.

Question 5E(iv): How could the futures that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.

9.8 There are no illiquid futures within the Halifax Portfolio.

10. Declaration

10.1 In preparing this report, I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Court, though I consider my opinion could be further advanced by average trade data for the Option Positions, which I have been unable to locate as stated in paragraph 7.4.

A handwritten signature in black ink, appearing to read 'Ian Joseph Simmonds', is written over a horizontal line.

Ian Joseph Simmonds

Annexure A

IAN SIMMONDS

I have enjoyed a 40-year career in Institutional Stockbroking based in Sydney and London. Primarily, I have advised Institutional and Corporate clients in Australia, UK, Europe, US and Asia. While taking on ever-increasing management responsibilities (up to Managing Director level) I always maintained a large list of Institutional and Corporate clients requiring daily contact.

Qualifications:

Bachelor of Economics
University of Sydney 1977 – 1980

Post Graduate Diploma of Applied Finance and Investments
Securities Institute of Australia 1981 – 1985

Post Graduate Certificate in Financial Planning (C4)
Securities Institute of Australia 2000

PS146/RG146 Qualification to give Financial Advice
Kaplan Australia

ASX Responsible Executive
Australian Securities Exchange 2009

Work Experience:

The Elcot Fund
Non-Executive Director
2007 - present

Responsibilities:
Strategic input for a global investment fund based in London, with a broad investment mandate that includes direct equities, managed funds and private equity.

Ascot Securities
Head of Institutional Sales, Institutional Stockbroker
2016 – December 2019

Responsibilities:
Advising Institutional and Corporate Clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.

Olivetree Asia
MD, CEO and Institutional Stockbroker
2014 – 2016

Responsibilities:

Established the firm as a subsidiary of Olivetree Financial Group, based in London.
Gained all regulatory approvals (AFSL), staff, office space, technology partners, trading platforms and administrative processes.
Managing Director and CEO, responsible for all aspects of running the business.
Advising Institutional clients globally on Secondary Market strategies in ASX and Asian Listed Securities.

Ord Minnett
Director, Institutional Stockbroker
2010 – 2014

Responsibilities:

Managing Institutional Sales Team.
Advising Institutional and Corporate Clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.

Stonebridge Securities/Tricom Equities
Director, Joint Head of Institutional Equities, Institutional Stockbroker
2001 – 2010

Responsibilities:

Managing Institutional Sales Team.
Advising Institutional and Corporate Clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.
ASX Responsible Manager from 2009 - 2010

BBY Ltd
Executive Director, Head of Institutional Equities, Head of Equity Capital Markets,
Institutional Stockbroker
1993 – 2000

Responsibilities:

Executive Director responsible for strategic input into all areas of operations.
Managing Institutional Sales Team.
Advising Institutional and Corporate Clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.

James Capel Australia Ltd
Head of Institutional Equities, Institutional Stockbroker
1993

Responsibilities:

Managing Institutional Sales Team.

Advising Institutional and Corporate Clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.

Prudential-Bache Securities Australia Ltd/Potts West Trumbull (Sydney and London)
Executive Director, Head of Sydney Institutional Desk, Institutional Stockbroker
1987 – 1993

Responsibilities:

Executive Director responsible for strategic input into all areas of operations.

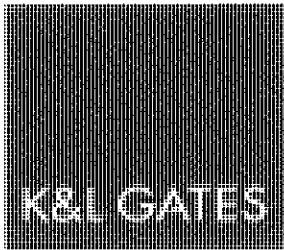
Managing Institutional Sales Team.

Advising Institutional and Corporate Clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.

JB Were & Son (Sydney and London)
Institutional Stockbroker
1980 - 1987

Responsibilities:

Advising Institutional clients globally on Secondary Market and Equity Capital Market strategies in ASX Listed Securities.



Annexure B

12 June 2020

Private and confidential subject to legal professional privilege

By email only: iansimmonds08@gmail.com

Ian Simmonds
N.I. Consulting Pty Ltd
25 Cowdroy Avenue
Camberay NSW 2062

Dear Ian

**In the matter of Halifax Investment Services Pty Ltd (In Liquidation)
Federal Court of Australia Proceeding No NSD 2191 of 2018 ("AU Proceedings")**

**In the matter of Halifax New Zealand Ltd (in liquidation)
High Court of New Zealand Proceeding No CIV-2019-404-2049 ("NZ Proceedings")**

("Joint Proceedings")

Letter of instruction

Background

1. Mr Jason Opperman and Mr Simon Correggia of K&L Gates in Sydney, Australia act for Morgan Kelly and Phil Quinlan (**Liquidators**), the joint and several liquidators of Halifax Investment Services Pty Ltd (In Liquidation) (**Halifax AU**). Messrs Kelly and Quinlan are also the joint and several liquidators of Halifax New Zealand Ltd (in liquidation) (**Halifax NZ**).
2. Mr Matt Kersey of Russell McVeagh in Auckland, New Zealand acts for Messrs Kelly and Quinlan in their capacities as liquidators of Halifax NZ including in the NZ Proceedings.
3. You are instructed to provide a written expert report (**Report**) in relation to the questions set out at page 5 of this letter to be used in the Joint Proceedings. If required, you are also instructed to give expert evidence in respect of your opinion at the hearing of the Joint Proceedings, which is listed before Justice Gleeson of the Federal Court of Australia and Justice Venning of the High Court of New Zealand for two weeks from 30 November 2020 until 11 December 2020.

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Contact: Simon Correggia
simon.correggia@klgates.com

T +61 2 9513 2355

Our ref: corregs.oppermj.7410175.00017

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4. We **enclose** the documents, referred to referred to below, on which your Report should be based. We also set out the factual assumptions on which your Report should be based.

Briefing Materials

5. Please find **enclosed** the following documents which you should consider in giving your expert opinion:
 - a. an excel spreadsheet titled "Open Positions Share Spreadsheet" (**Share Spreadsheet**); and
 - b. an excel spreadsheet titled "Open Positions Derivatives Spreadsheet" (**Derivative Spreadsheet**).

Assumptions

6. For the purpose of responding to the questions set out below, you are instructed to assume that the matters set out in this "Assumptions" section are true and correct.

Background

7. Halifax AU's business included dealing in financial products and making a market for foreign exchange contracts and derivatives.
8. Halifax NZ's business included acting as a broker for its clients in respect of various exchange-traded products, including stocks and warrants, and issuing derivatives in New Zealand.
9. Halifax AU and Halifax NZ are not market participants on any exchange. They each contracted with Interactive Brokers LLC to access and use the trading platform known as Trader Workstation or the IB Platform on their own behalf and to enable their clients to use the IB Platform.
10. The following types of financial products were available for trading on the IB Platform:
 - a. exchange-traded financial products (including stocks, warrants, futures and options), which are investments traded on a regulated exchange; and
 - b. "over-the-counter" (**OTC**) financial products (including OTC derivatives like contracts for difference and options), which are not listed on a regulated exchange. They are traded via private contracts between two parties.
11. The holdings of exchange-traded financial products and OTC financial products of Halifax AU and Halifax NZ on the IB Platform (**Halifax portfolio**) as at 29 May 2020 are set out in the Share Spreadsheet and the Derivative Spreadsheet. Specifically:
 - a. the individual holdings of shares within the Halifax portfolio as at 29 May 2020 are set out in the Share Spreadsheet; and
 - b. the individual holdings of warrants, contracts for difference, options, future options and futures within the Halifax portfolio as at 29 May 2020 are set out in the Derivative Spreadsheet.

12. The holdings of shares, warrants, contracts for difference, options, future options and futures within the Halifax portfolio are held by IB on behalf of Halifax AU or Halifax NZ. Halifax AU or Halifax NZ hold their interest in certain of these assets on behalf of their clients.

Share Spreadsheet

13. The Share Spreadsheet lists the shares within the Halifax portfolio according to their exchange or trading venue. For example, all shares listed on the Australian Securities Exchange (**ASX**) appear under the heading "Australian Securities Exchange" in row 217.
14. The Share Spreadsheet has the following columns:
- Column A is called "AssetClass". It indicates the type of financial product to which a row in the spreadsheet corresponds. In the Open Positions Share Spreadsheet, the asset class for all entries is "STK". "STK" means stocks (which is a term often interchangeable for shares);
 - Column B is called "Symbol". It indicates the identifying code of the share on IB, which usually corresponds to the identifying code of that share on the exchange or trading venue where that share is traded and/or listed;
 - Column C is called "ListingExchange". It identifies the exchange or trading venue where the share is traded and/or listed;
 - Column D is called "Description". It identifies the company from which the share derives its underlying value and sometimes describes the share itself;
 - Column E is called "SecurityID". It provides an identifying number for each for each individual investment. This is extracted from the IB Platform. Where such a number is not recorded in IB, the relevant cell in the Open Positions Share Spreadsheet is blank;
 - Column F is called "SecurityIDType". It identifies that the SecurityID in column E is an International Securities Identification Number for each individual investment;
 - Column G is called "Long". It identifies the number of shares that are held with a particular company;
 - Column H is called "Short". It identifies the number of units in each share type that have been acquired as a short position by an investor or as a hedge in the IB AU Prop Account. A short position is created where an investor sells a security with the intention of repurchasing it at a later fixed time at a lower price;
 - Column I is called "Current value (AUD)". It contains the total value of the relevant shares in Australian dollars, using the exchange rates on the IB Platform as at 29 May 2020; and
 - Column J is called "Value AUD". It records the total value in Australia Dollars of all shares on each respective exchange or trading venue.

Derivative Spreadsheet

15. The Derivative Spreadsheet has the following columns:
- a. Column A is called "AssetClass". It indicates the type of financial product to which a row in the spreadsheet corresponds. The "AssetClass" entries are:
 - (i) "CFD" which means contracts for difference;
 - (ii) "FOP" which means future options;
 - (iii) "FUT" which means futures;
 - (iv) "OPT" which means options;
 - (v) "WAR" which means warrants.
 - b. Column B is called "Symbol". It indicates the identifying code of the underlying asset on IB, which usually corresponds to the identifying code of that financial product on the exchange or trading venue where that financial product is traded and/or listed;
 - c. Column C is called "ListingExchange". It identifies the exchange or trading venue where the financial product is either traded and/or listed;
 - d. Column D is called "Description". It identifies the financial product. For example:
 - (i) in relation to warrants and options, column D shows the symbol for the company to which the warrant or option relates, the date at which the warrant or option expires, the price of that option or warrant, and whether it is a call or a put option;
 - (ii) In relation to CFDs, column D shows the underlying financial product from which the value of the contract is derived;
 - (iii) In relation to future options (line 199), column D shows the contract code, the date at which the future option expires, the exercise price, and whether it is a put or a call option;
 - (iv) In relation to futures (line 200), column D shows a future contract with an expiry date of March 2021;
 - e. Column E is called "SecurityID". It provides an identifying number for each for each individual investment. This is extracted from the IB Platform. Where such a number is not recorded in IB, the relevant cell in the Open Positions Derivatives Spreadsheet is blank;
 - f. Column F is called "SecurityIDType". It identifies that the SecurityID in column E is an International Securities Identification Number for each individual investment. Where such a number is not recorded in IB, the relevant cell in the Open Positions Derivatives Spreadsheet is blank;

- g. Column G is called "Multiplier". It identifies how many financial positions are held in each unit of the financial product that is traded and/or listed;
- h. Column H is called "Long". It identifies the quantity of positions held in respect to a derivative. For example:
 - (i) In relation to CFDs and warrants, column H identifies the quantity of positions that relate to the number of underlying financial products to which the CFD or warrant relates;
 - (ii) In relation to options, futures and future options, column H relates to the number of each of these products taking into account the multiplier. For example, a multiplier of 100 and a quantity of 5 means there are 500 options, futures or future options (as the case may be);
- i. Column I is called "Short". It identifies the number of units in each derivative that have been acquired as a short position by an investor or as a hedge in the IB AU Prop Account. A short position is created where an investor sells a security with the intention of repurchasing it at a later fixed time at a lower price. I note that there are no short positions in the IB Open Derivatives Spreadsheet; and
- j. Column J is called "Current value (AUD)". It contains the total market value of the relevant investment in Australian dollars and is obtained from the IB Platform as at 29 May 2020.

Questions

16. We set out below the questions that we request that you answer in your Report, to the extent that you are able. In answering the questions below, please provide reasons for your answers and identify any assumptions and limits in your expertise.

Question 1: What factors affect the ease or difficulty with which and time within which the shares listed in the Share Spreadsheet can be realised?

Question 2: Which of those shares (a) are relatively liquid; (b) are relatively illiquid; and (c) have no value (at the time of your assessment) at all? Please explain why certain shares are relatively liquid, relatively illiquid or have no value.

Question 3: How could the shares that are liquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation, approximately how long (within a range, if necessary) realisation would take and any limitations in the process of realisation.

Question 4: How could the shares that are relatively illiquid be realised? In your answer, please describe the process of realisation, identify any costs that may arise in the realisation and approximately how (within a range, if necessary) long realisation would take and any limitations in the process of realisation.

Question 5: Please answer questions 1-4 in relation to:

- (A) warrants listed in the Derivative Spreadsheet;

- (B) contracts for difference listed in the Derivative Spreadsheet;
- (C) options listed in the Derivative Spreadsheet;
- (D) future options listed in the Derivative Spreadsheet; and
- (E) futures listed in the Derivative Spreadsheet.

Your obligations and conduct as an expert witness

17. As an expert witness, you will be required to comply with:
 - a. r 23.13 of the Federal Court Rules (r 23.13), a copy of which is **enclosed at Schedule One** of this letter; and
 - b. the Federal Court of Australia Expert Evidence Practice Note (GPN-EXPT), including the *Harmonised Expert Witness Code of Conduct* and the *Concurrent Expert Evidence Guidelines* (together, the **Practice Note**), a copy of which is **enclosed at Schedule One** of this letter (**Expert Rules**).
18. We ask that you consider the Expert Rules carefully. You will note that the Practice Note sets out that you have an overriding duty to the Court to assist the Court on matters relevant to your area of expertise. Whilst you are retained by a party to the proceeding, you are, in preparing the expert report, required to be non-partisan and reflect the objectivity and independence you have brought to the task pursuant to your retainer as expert.
19. You will see from the Expert Rules that you must:
 - a. acknowledge that:
 - (i) you have read and complied with the Expert Rules;
 - (ii) you agree to be bound by the terms of the Expert Rules; and
 - (iii) the opinions you express in your report are based wholly or substantially on specialised knowledge arising from your training, study or experience;
 - b. identify the questions you were asked to address; and
 - c. sign the report and exhibit to it copies of all documents that record your instructions and documents and other material that you were asked to consider.
20. The Practice Note also requires you to include, inter alia, the following statement in your report:

'I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court.'

Contact

21. Please contact the writer on 02 9513 2435 or Simon Correggia on 0437 343 619 if you have any queries or require further information.

Yours sincerely

A handwritten signature in black ink, appearing to read 'JO', with a long horizontal line extending to the right.

Jason Opperman
Partner

enclosures:

Schedule One - Expert Rules

SCHEDULE ONE

FEDERAL COURT RULES 2011 - RULE 23.13

Contents of an expert report

- (1) An expert report must:
 - (a) be signed by the expert who prepared the report; and
 - (b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and
 - (c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and
 - (d) identify the questions that the expert was asked to address; and
 - (e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and
 - (f) set out separately from the factual findings or assumptions each of the expert's opinions; and
 - (g) set out the reasons for each of the expert's opinions; and
 - (ga) contain an acknowledgement that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c); and
 - (h) comply with the Practice Note.
- (2) Any subsequent expert report of the same expert on the same question need not contain the information in paragraphs (1)(b) and (c).



EXPERT EVIDENCE PRACTICE NOTE (GPN-EXPT)

General Practice Note

1. INTRODUCTION

- 1.1 This practice note, including the *Harmonised Expert Witness Code of Conduct* (“**Code**”) (see **Annexure A**) and the *Concurrent Expert Evidence Guidelines* (“**Concurrent Evidence Guidelines**”) (see **Annexure B**), applies to any proceeding involving the use of expert evidence and must be read together with:
- (a) the Central Practice Note (CPN-1), which sets out the fundamental principles concerning the National Court Framework (“**NCF**”) of the Federal Court and key principles of case management procedure;
 - (b) the Federal Court of Australia Act 1976 (Cth) (“**Federal Court Act**”);
 - (c) the *Evidence Act 1995* (Cth) (“**Evidence Act**”), including Part 3.3 of the Evidence Act;
 - (d) Part 23 of the *Federal Court Rules 2011* (Cth) (“**Federal Court Rules**”); and
 - (e) where applicable, the Survey Evidence Practice Note (GPN-SURV).
- 1.2 This practice note takes effect from the date it is issued and, to the extent practicable, applies to proceedings whether filed before, or after, the date of issuing.

2. APPROACH TO EXPERT EVIDENCE

- 2.1 An expert witness may be retained to give opinion evidence in the proceeding, or, in certain circumstances, to express an opinion that may be relied upon in alternative dispute resolution procedures such as mediation or a conference of experts. In some circumstances an expert may be appointed as an independent adviser to the Court.
- 2.2 The purpose of the use of expert evidence in proceedings, often in relation to complex subject matter, is for the Court to receive the benefit of the objective and impartial assessment of an issue from a witness with specialised knowledge (based on training, study or experience - see generally s 79 of the Evidence Act).
- 2.3 However, the use or admissibility of expert evidence remains subject to the overriding requirements that:
- (a) to be admissible in a proceeding, any such evidence must be relevant (s 56 of the Evidence Act); and
 - (b) even if relevant, any such evidence, may be refused to be admitted by the Court if its probative value is outweighed by other considerations such as the evidence

being unfairly prejudicial, misleading or will result in an undue waste of time (s 135 of the Evidence Act).

- 2.4 An expert witness' opinion evidence may have little or no value unless the assumptions adopted by the expert (ie. the facts or grounds relied upon) and his or her reasoning are expressly stated in any written report or oral evidence given.
- 2.5 The Court will ensure that, in the interests of justice, parties are given a reasonable opportunity to adduce and test relevant expert opinion evidence. However, the Court expects parties and any legal representatives acting on their behalf, when dealing with expert witnesses and expert evidence, to at all times comply with their duties associated with the overarching purpose in the Federal Court Act (see ss 37M and 37N).

3. INTERACTION WITH EXPERT WITNESSES

- 3.1 Parties and their legal representatives should never view an expert witness retained (or partly retained) by them as that party's advocate or "hired gun". Equally, they should never attempt to pressure or influence an expert into conforming his or her views with the party's interests.
- 3.2 A party or legal representative should be cautious not to have inappropriate communications when retaining or instructing an independent expert, or assisting an independent expert in the preparation of his or her evidence. However, it is important to note that there is no principle of law or practice and there is nothing in this practice note that obliges a party to embark on the costly task of engaging a "consulting expert" in order to avoid "contamination" of the expert who will give evidence. Indeed the Court would generally discourage such costly duplication.
- 3.3 Any witness retained by a party for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based in the specialised knowledge of the witness¹ should, at the earliest opportunity, be provided with:
 - (a) a copy of this practice note, including the Code (see Annexure A); and
 - (b) all relevant information (whether helpful or harmful to that party's case) so as to enable the expert to prepare a report of a truly independent nature.
- 3.4 Any questions or assumptions provided to an expert should be provided in an unbiased manner and in such a way that the expert is not confined to addressing selective, irrelevant or immaterial issues.

¹ Such a witness includes a "Court expert" as defined in r 23.01 of the Federal Court Rules. For the definition of "expert", "expert evidence" and "expert report" see the Dictionary, in Schedule 1 of the Federal Court Rules.

4. ROLE AND DUTIES OF THE EXPERT WITNESS

- 4.1 The role of the expert witness is to provide relevant and impartial evidence in his or her area of expertise. An expert should never mislead the Court or become an advocate for the cause of the party that has retained the expert.
- 4.2 It should be emphasised that there is nothing inherently wrong with experts disagreeing or failing to reach the same conclusion. The Court will, with the assistance of the evidence of the experts, reach its own conclusion.
- 4.3 However, experts should willingly be prepared to change their opinion or make concessions when it is necessary or appropriate to do so, even if doing so would be contrary to any previously held or expressed view of that expert.

Harmonised Expert Witness Code of Conduct

- 4.4 Every expert witness giving evidence in this Court must read the *Harmonised Expert Witness Code of Conduct* (attached in Annexure A) and agree to be bound by it.
- 4.5 The Code is not intended to address all aspects of an expert witness' duties, but is intended to facilitate the admission of opinion evidence, and to assist experts to understand in general terms what the Court expects of them. Additionally, it is expected that compliance with the Code will assist individual expert witnesses to avoid criticism (rightly or wrongly) that they lack objectivity or are partisan.

5. CONTENTS OF AN EXPERT'S REPORT AND RELATED MATERIAL

- 5.1 The contents of an expert's report must conform with the requirements set out in the Code (including clauses 3 to 5 of the Code).
- 5.2 In addition, the contents of such a report must also comply with r 23.13 of the Federal Court Rules. Given that the requirements of that rule significantly overlap with the requirements in the Code, an expert, unless otherwise directed by the Court, will be taken to have complied with the requirements of r 23.13 if that expert has complied with the requirements in the Code and has complied with the additional following requirements. The expert shall:

- (a) acknowledge in the report that:
 - (i) the expert has read and complied with this practice note and agrees to be bound by it; and
 - (ii) the expert's opinions are based wholly or substantially on specialised knowledge arising from the expert's training, study or experience;
- (b) identify in the report the questions that the expert was asked to address;
- (c) sign the report and attach or exhibit to it copies of:
 - (i) documents that record any instructions given to the expert; and

- (ii) documents and other materials that the expert has been instructed to consider.

5.3 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the other parties at the same time as the expert's report.

6. CASE MANAGEMENT CONSIDERATIONS

6.1 Parties intending to rely on expert evidence at trial are expected to consider between them and inform the Court at the earliest opportunity of their views on the following:

- (a) whether a party should adduce evidence from more than one expert in any single discipline;
- (b) whether a common expert is appropriate for all or any part of the evidence;
- (c) the nature and extent of expert reports, including any in reply;
- (d) the identity of each expert witness that a party intends to call, their area(s) of expertise and availability during the proposed hearing;
- (e) the issues that it is proposed each expert will address;
- (f) the arrangements for a conference of experts to prepare a joint-report (see Part 7 of this practice note);
- (g) whether the evidence is to be given concurrently and, if so, how (see Part 8 of this practice note); and
- (h) whether any of the evidence in chief can be given orally.

6.2 It will often be desirable, before any expert is retained, for the parties to attempt to agree on the question or questions proposed to be the subject of expert evidence as well as the relevant facts and assumptions. The Court may make orders to that effect where it considers it appropriate to do so.

7. CONFERENCE OF EXPERTS AND JOINT-REPORT

7.1 Parties, their legal representatives and experts should be familiar with aspects of the Code relating to conferences of experts and joint-reports (see clauses 6 and 7 of the Code attached in Annexure A).

7.2 In order to facilitate the proper understanding of issues arising in expert evidence and to manage expert evidence in accordance with the overarching purpose, the Court may require experts who are to give evidence or who have produced reports to meet for the purpose of identifying and addressing the issues not agreed between them with a view to reaching agreement where this is possible ("**conference of experts**"). In an appropriate case, the Court may appoint a registrar of the Court or some other suitably qualified person ("**Conference Facilitator**") to act as a facilitator at the conference of experts.

- 7.3 It is expected that where expert evidence may be relied on in any proceeding, at the earliest opportunity, parties will discuss and then inform the Court whether a conference of experts and/or a joint-report by the experts may be desirable to assist with or simplify the giving of expert evidence in the proceeding. The parties should discuss the necessary arrangements for any conference and/or joint-report. The arrangements discussed between the parties should address:
- (a) who should prepare any joint-report;
 - (b) whether a list of issues is needed to assist the experts in the conference and, if so, whether the Court, the parties or the experts should assist in preparing such a list;
 - (c) the agenda for the conference of experts; and
 - (d) arrangements for the provision, to the parties and the Court, of any joint-report or any other report as to the outcomes of the conference ("**conference report**").

Conference of Experts

- 7.4 The purpose of the conference of experts is for the experts to have a comprehensive discussion of issues relating to their field of expertise, with a view to identifying matters and issues in a proceeding about which the experts agree, partly agree or disagree and why. For this reason the conference is attended only by the experts and any Conference Facilitator. Unless the Court orders otherwise, the parties' lawyers will not attend the conference but will be provided with a copy of any conference report.
- 7.5 The Court may order that a conference of experts occur in a variety of circumstances, depending on the views of the judge and the parties and the needs of the case, including:
- (a) while a case is in mediation. When this occurs the Court may also order that the outcome of the conference or any document disclosing or summarising the experts' opinions be confidential to the parties while the mediation is occurring;
 - (b) before the experts have reached a final opinion on a relevant question or the facts involved in a case. When this occurs the Court may order that the parties exchange draft expert reports and that a conference report be prepared for the use of the experts in finalising their reports;
 - (c) after the experts' reports have been provided to the Court but before the hearing of the experts' evidence. When this occurs the Court may also order that a conference report be prepared (jointly or otherwise) to ensure the efficient hearing of the experts' evidence.
- 7.6 Subject to any other order or direction of the Court, the parties and their lawyers must not involve themselves in the conference of experts process. In particular, they must not seek to encourage an expert not to agree with another expert or otherwise seek to influence the outcome of the conference of experts. The experts should raise any queries they may have in relation to the process with the Conference Facilitator (if one has been appointed) or in

accordance with a protocol agreed between the lawyers prior to the conference of experts taking place (if no Conference Facilitator has been appointed).

- 7.7 Any list of issues prepared for the consideration of the experts as part of the conference of experts process should be prepared using non-tendentious language.
- 7.8 The timing and location of the conference of experts will be decided by the judge or a registrar who will take into account the location and availability of the experts and the Court's case management timetable. The conference may take place at the Court and will usually be conducted in-person. However, if not considered a hindrance to the process, the conference may also be conducted with the assistance of visual or audio technology (such as via the internet, video link and/or by telephone).
- 7.9 Experts should prepare for a conference of experts by ensuring that they are familiar with all of the material upon which they base their opinions. Where expert reports in draft or final form have been exchanged prior to the conference, experts should attend the conference familiar with the reports of the other experts. Prior to the conference, experts should also consider where they believe the differences of opinion lie between them and what processes and discussions may assist to identify and refine those areas of difference.

Joint-report

- 7.10 At the conclusion of the conference of experts, unless the Court considers it unnecessary to do so, it is expected that the experts will have narrowed the issues in respect of which they agree, partly agree or disagree in a joint-report. The joint-report should be clear, plain and concise and should summarise the views of the experts on the identified issues, including a succinct explanation for any differences of opinion, and otherwise be structured in the manner requested by the judge or registrar.
- 7.11 In some cases (and most particularly in some native title cases), depending on the nature, volume and complexity of the expert evidence a judge may direct a registrar to draft part, or all, of a conference report. If so, the registrar will usually provide the draft conference report to the relevant experts and seek their confirmation that the conference report accurately reflects the opinions of the experts expressed at the conference. Once that confirmation has been received the registrar will finalise the conference report and provide it to the intended recipient(s).

8. CONCURRENT EXPERT EVIDENCE

- 8.1 The Court may determine that it is appropriate, depending on the nature of the expert evidence and the proceeding generally, for experts to give some or all of their evidence concurrently at the final (or other) hearing.
- 8.2 Parties should familiarise themselves with the *Concurrent Expert Evidence Guidelines* (attached in Annexure B). The Concurrent Evidence Guidelines are not intended to be exhaustive but indicate the circumstances when the Court might consider it appropriate for

concurrent expert evidence to take place, outline how that process may be undertaken, and assist experts to understand in general terms what the Court expects of them.

- 8.3 If an order is made for concurrent expert evidence to be given at a hearing, any expert to give such evidence should be provided with the Concurrent Evidence Guidelines well in advance of the hearing and should be familiar with those guidelines before giving evidence.

9. FURTHER PRACTICE INFORMATION AND RESOURCES

- 9.1 Further information regarding Expert Evidence and Expert Witnesses is available on the Court's website.
- 9.2 Further information to assist litigants, including a range of helpful guides, is also available on the Court's website. This information may be particularly helpful for litigants who are representing themselves.

J L B ALLSOP
Chief Justice
25 October 2016

Annexure A

HARMONISED EXPERT WITNESS CODE OF CONDUCT²

APPLICATION OF CODE

1. This Code of Conduct applies to any expert witness engaged or appointed:
 - (a) to provide an expert's report for use as evidence in proceedings or proposed proceedings; or
 - (b) to give opinion evidence in proceedings or proposed proceedings.

GENERAL DUTIES TO THE COURT

2. An expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the Court impartially on matters relevant to the area of expertise of the witness.

CONTENT OF REPORT

3. Every report prepared by an expert witness for use in Court shall clearly state the opinion or opinions of the expert and shall state, specify or provide:
 - (a) the name and address of the expert;
 - (b) an acknowledgment that the expert has read this code and agrees to be bound by it;
 - (c) the qualifications of the expert to prepare the report;
 - (d) the assumptions and material facts on which each opinion expressed in the report is based [a letter of instructions may be annexed];
 - (e) the reasons for and any literature or other materials utilised in support of such opinion;
 - (f) (if applicable) that a particular question, issue or matter falls outside the expert's field of expertise;
 - (g) any examinations, tests or other investigations on which the expert has relied, identifying the person who carried them out and that person's qualifications;
 - (h) the extent to which any opinion which the expert has expressed involves the acceptance of another person's opinion, the identification of that other person and the opinion expressed by that other person;
 - (i) a declaration that the expert has made all the inquiries which the expert believes are desirable and appropriate (save for any matters identified explicitly in the report), and that no matters of significance which the expert regards as relevant have, to the

² Approved by the Council of Chief Justices' Rules Harmonisation Committee

knowledge of the expert, been withheld from the Court;

- (j) any qualifications on an opinion expressed in the report without which the report is or may be incomplete or inaccurate;
- (k) whether any opinion expressed in the report is not a concluded opinion because of insufficient research or insufficient data or for any other reason; and
- (l) where the report is lengthy or complex, a brief summary of the report at the beginning of the report.

SUPPLEMENTARY REPORT FOLLOWING CHANGE OF OPINION

- 4. Where an expert witness has provided to a party (or that party's legal representative) a report for use in Court, and the expert thereafter changes his or her opinion on a material matter, the expert shall forthwith provide to the party (or that party's legal representative) a supplementary report which shall state, specify or provide the information referred to in paragraphs (a), (d), (e), (g), (h), (i), (j), (k) and (l) of clause 3 of this code and, if applicable, paragraph (f) of that clause.
- 5. In any subsequent report (whether prepared in accordance with clause 4 or not) the expert may refer to material contained in the earlier report without repeating it.

DUTY TO COMPLY WITH THE COURT'S DIRECTIONS

- 6. If directed to do so by the Court, an expert witness shall:
 - (a) confer with any other expert witness;
 - (b) provide the Court with a joint-report specifying (as the case requires) matters agreed and matters not agreed and the reasons for the experts not agreeing; and
 - (c) abide in a timely way by any direction of the Court.

CONFERENCE OF EXPERTS

- 7. Each expert witness shall:
 - (a) exercise his or her independent judgment in relation to every conference in which the expert participates pursuant to a direction of the Court and in relation to each report thereafter provided, and shall not act on any instruction or request to withhold or avoid agreement; and
 - (b) endeavour to reach agreement with the other expert witness (or witnesses) on any issue in dispute between them, or failing agreement, endeavour to identify and clarify the basis of disagreement on the issues which are in dispute.

ANNEXURE B

CONCURRENT EXPERT EVIDENCE GUIDELINES

APPLICATION OF THE COURT'S GUIDELINES

1. The Court's Concurrent Expert Evidence Guidelines ("Concurrent Evidence Guidelines") are intended to inform parties, practitioners and experts of the Court's general approach to concurrent expert evidence, the circumstances in which the Court might consider expert witnesses giving evidence concurrently and, if so, the procedures by which their evidence may be taken.

OBJECTIVES OF CONCURRENT EXPERT EVIDENCE TECHNIQUE

2. The use of concurrent evidence for the giving of expert evidence at hearings as a case management technique³ will be utilised by the Court in appropriate circumstances (see r 23.15 of the *Federal Court Rules 2011* (Cth)). Not all cases will suit the process. For instance, in some patent cases, where the entire case revolves around conflicts within fields of expertise, concurrent evidence may not assist a judge. However, patent cases should not be excluded from concurrent expert evidence processes.
3. In many cases the use of concurrent expert evidence is a technique that can reduce the partisan or confrontational nature of conventional hearing processes and minimises the risk that experts become "opposing experts" rather than independent experts assisting the Court. It can elicit more precise and accurate expert evidence with greater input and assistance from the experts themselves.
4. When properly and flexibly applied, with efficiency and discipline during the hearing process, the technique may also allow the experts to more effectively focus on the critical points of disagreement between them, identify or resolve those issues more quickly, and narrow the issues in dispute. This can also allow for the key evidence to be given at the same time (rather than being spread across many days of hearing); permit the judge to assess an expert more readily, whilst allowing each party a genuine opportunity to put and test expert evidence. This can reduce the chance of the experts, lawyers and the judge misunderstanding the opinions being expressed by the experts.
5. It is essential that such a process has the full cooperation and support of all of the individuals involved, including the experts and counsel involved in the questioning process. Without that cooperation and support the process may fail in its objectives and even hinder the case management process.

³ Also known as the "hot tub" or as "expert panels".

CASE MANAGEMENT

6. Parties should expect that, the Court will give careful consideration to whether concurrent evidence is appropriate in circumstances where there is more than one expert witness having the same expertise who is to give evidence on the same or related topics. Whether experts should give evidence concurrently is a matter for the Court, and will depend on the circumstances of each individual case, including the character of the proceeding, the nature of the expert evidence, and the views of the parties.
7. Although this consideration may take place at any time, including the commencement of the hearing, if not raised earlier, parties should raise the issue of concurrent evidence at the first appropriate case management hearing, and no later than any pre-trial case management hearing, so that orders can be made in advance, if necessary. To that end, prior to the hearing at which expert evidence may be given concurrently, parties and their lawyers should confer and give general consideration as to:
 - (a) the agenda;
 - (b) the order and manner in which questions will be asked; and
 - (c) whether cross-examination will take place within the context of the concurrent evidence or after its conclusion.
8. At the same time, and before any hearing date is fixed, the identity of all experts proposed to be called and their areas of expertise is to be notified to the Court by all parties.
9. The lack of any concurrent evidence orders does not mean that the Court will not consider using concurrent evidence without prior notice to the parties, if appropriate.

CONFERENCE OF EXPERTS & JOINT-REPORT OR LIST OF ISSUES

10. The process of giving concurrent evidence at hearings may be assisted by the preparation of a joint-report or list of issues prepared as part of a conference of experts.
11. Parties should expect that, where concurrent evidence is appropriate, the Court may make orders requiring a conference of experts to take place or for documents such as a joint-report to be prepared to facilitate the concurrent expert evidence process at a hearing (see Part 7 of the Expert Evidence Practice Note).

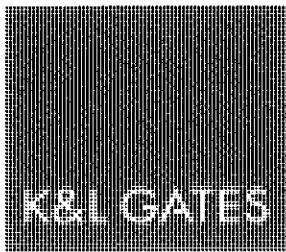
PROCEDURE AT HEARING

12. Concurrent expert evidence may be taken at any convenient time during the hearing, although it will often occur at the conclusion of both parties' lay evidence.
13. At the hearing itself, the way in which concurrent expert evidence is taken must be applied flexibly and having regard to the characteristics of the case and the nature of the evidence to be given.
14. Without intending to be prescriptive of the procedure, parties should expect that, when evidence is given by experts in concurrent session:

- (a) the judge will explain to the experts the procedure that will be followed and that the nature of the process may be different to their previous experiences of giving expert evidence;
 - (b) the experts will be grouped and called to give evidence together in their respective fields of expertise;
 - (c) the experts will take the oath or affirmation together, as appropriate;
 - (d) the experts will sit together with convenient access to their materials for their ease of reference, either in the witness box or in some other location in the courtroom, including (if necessary) at the bar table;
 - (e) each expert may be given the opportunity to provide a summary overview of their current opinions and explain what they consider to be the principal issues of disagreement between the experts, as they see them, in their own words;
 - (f) the judge will guide the process by which evidence is given, including, where appropriate:
 - (i) using any joint-report or list of issues as a guide for all the experts to be asked questions by the judge and counsel, about each issue on an issue-by-issue basis;
 - (ii) ensuring that each expert is given an adequate opportunity to deal with each issue and the exposition given by other experts including, where considered appropriate, each expert asking questions of other experts or supplementing the evidence given by other experts;
 - (iii) inviting legal representatives to identify the topics upon which they will cross-examine;
 - (iv) ensuring that legal representatives have an adequate opportunity to ask all experts questions about each issue. Legal representatives may also seek responses or contributions from one or more experts in response to the evidence given by a different expert; and
 - (v) allowing the experts an opportunity to summarise their views at the end of the process where opinions may have been changed or clarifications are needed.
15. The fact that the experts may have been provided with a list of issues for consideration does not confine the scope of any cross-examination of any expert. The process of cross-examination remains subject to the overall control of the judge.
 16. The concurrent session should allow for a sensible and orderly series of exchanges between expert and expert, and between expert and lawyer. Where appropriate, the judge may allow for more traditional cross-examination to be pursued by a legal representative on a particular issue exclusively with one expert. Where that occurs, other experts may be asked to comment on the evidence given.
 17. Where any issue involves only one expert, the party wishing to ask questions about that issue should let the judge know in advance so that consideration can be given to whether

arrangements should be made for that issue to be dealt with after the completion of the concurrent session. Otherwise, as far as practicable, questions (including in the form of cross-examination) will usually be dealt with in the concurrent session.

18. Throughout the concurrent evidence process the judge will ensure that the process is fair and effective (for the parties and the experts), balanced (including not permitting one expert to overwhelm or overshadow any other expert), and does not become a protracted or inefficient process.



Annexure C

17 June 2020

Private and confidential subject to legal professional privilege

By email only: iansimmonds08@gmail.com

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Our ref: corregs.oppermj.7410175.00017

Dear Ian

**In the matter of Halifax Investment Services Pty Ltd (In Liquidation)
Federal Court of Australia Proceeding No NSD 2191 of 2018 ("AU Proceedings")**

**In the matter of Halifax New Zealand Ltd (in liquidation)
High Court of New Zealand Proceeding No CIV-2019-404-2049 ("NZ Proceedings")**

("Joint Proceedings")

Addendum to Letter of instruction dated 12 June 2020

1. We refer to our letter to you dated 12 June 2020 regarding the Joint Proceedings and to the excel spreadsheet enclosed with that letter titled "Open Positions Share Spreadsheet".
2. As you have been previously instructed, we confirm that column "C" of the Open Positions Share Spreadsheet is called "ListingExchange". It identifies the exchange or trading venue where a particular share is traded and/or listed.
3. We note that the description in column "C" of the trading venue or listing exchange where some of the shares are traded and/or listed is referred to as "Value". You are instructed that the term "Value" in column "C" is used by Interactive Brokers, being the broker where our clients obtained the information in the Open Positions Share Spreadsheet, to describe shares that are de-listed and that all of the shares in the Open Positions Share Spreadsheet with the description "Value" in column "C" are de-listed shares.
4. Please contact the writer on 02 9513 2435 or Simon Correggia on 0437 343 619 if you have any queries or require further information.

Yours sincerely

A handwritten signature in black ink, appearing to be 'JO' with a long horizontal stroke extending to the right.

Jason Opperman
Partner

Annexure D

17 June 2020

Ian Simmonds
N.I. Consulting Pty Ltd

Private and confidential
Subject to legal professional privilege
By email

Email: iansimmonds08@gmail.com

Dear Ian

In the matter of Halifax Investment Services Pty Ltd (In Liquidation)
Federal Court of Australia Proceeding No NSD 2191 of 2018 ("AU Proceedings")

In the matter of Halifax New Zealand Ltd (in liquidation)
High Court of New Zealand Proceeding No CIV-2019-404-2049 ("NZ Proceedings")

("Joint Proceedings")

LETTER OF INSTRUCTION

1. We refer to the first and second letters from Mr Jason Opperman of K&L Gates to you dated 12 and 17 June 2020 (**attached**) instructing you to provide a written expert report (**Report**) in relation to the questions set out in that letter, to be used in the Joint Proceedings.
2. As Mr Opperman's letter states, we act for Morgan Kelly and Phil Quinlan (**Liquidators**), in their capacities as the joint and several liquidators of Halifax New Zealand Ltd (in liquidation) (**Halifax NZ**).
3. This letter instructs you to prepare the Report also for the Liquidators in their capacities as liquidators of Halifax NZ.
4. As an expert witness in the NZ Proceedings, you will be required to comply with:
 - (a) Rule 9.43 of the High Court Rules 2016 (NZ) (HCR 9.43), a copy of which is **enclosed** with this letter; and
 - (b) the High Court of New Zealand Code of Conduct for Expert Witnesses (Schedule 4 to the High Court Rules 2016 (NZ)) (**Code of Conduct**), a copy of which is **enclosed** with this letter,

(High Court Expert Rules).
5. We ask that you consider the High Court Expert Rules carefully. You will note that the Code of Conduct sets out that you have an overriding duty to the Court to assist the Court on matters relevant to your area of expertise. Whilst you are retained by a party to the proceeding, you are, in preparing the expert report,

Partners

Frederick Ward
Brendan Brown
Malcolm Crotty
Joe Windmeyer
Guy Lethbridge
John Powell
Ed Crook
Tim Clarke
Sarah Keene
David Hoare
Matthew Kersey
David Butler
Craig Shrive
Jeemle Budhia
Mel Fern Johnson
Daniel Jones
Polly Pope
Allison Arthur-Young
Christopher Curran
David Raudkivi
Tom Hunt
Kylie Dunn
Daniel Minihinnick
Troy Pilkington
Marika Eastwick-Field
Ian Beaumont
Joe Edwards
Benjamin Paterson
Emmeline Rushbrook
Anna Crosbie
David Weavers
Liz Blythe
Nathaniel Walker
William Irving
Kirsten Massey
Caleb Hensman
Cath Shirley-Brown

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1 of 2

required to be non-partisan and reflect the objectivity and independence you have brought to the task pursuant to your retainer as expert.

6. You will see from the High Court Expert Rules that in your evidence you must:
- (a) acknowledge that you have read the Code of Conduct and agree to comply with it;
 - (b) state your qualifications as an expert;
 - (c) state the issues of evidence that you address and that the evidence is within your area of expertise;
 - (d) state the facts and assumptions on which your opinions are based;
 - (e) state the reasons for the opinions given by you;
 - (f) specify any literature or other material used or relied on in support of the opinions expressed by you; and
 - (g) describe any examinations, tests, or other investigations on which you have relied and identify, and give details of the qualifications of, any person who carried them out.
7. Please contact us if you have any questions or require further information.

Yours faithfully
RUSSELL McVEAGH



Matt Kersey | Sam Jones
Partner | Solicitor

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sam.jones@russellmcveagh.com

9.43 Expert witness to comply with code of conduct

- (1) A party to a proceeding who engages an expert witness must give the expert witness a copy of the code of conduct set out in Schedule 4.
- (2) An expert witness must—
 - (a) state in any written statement of the proposed evidence of the witness served under rule 9.2 or 9.3, or at the time of giving any oral evidence, or in any affidavit containing the evidence of the expert witness, that the expert witness has read the code of conduct and agrees to comply with it;
 - (b) comply with the code of conduct in preparing any written statement of the proposed evidence of the witness to be served under rule 9.2 or 9.3 or in giving any oral or affidavit evidence in any proceeding.
- (3) The evidence of an expert witness who has not complied with subclause (2)(a) may be offered only with the leave of the court.

Compare: 1908 No 89 Schedule 2 r 330A

9.44 Court may direct conference of expert witnesses

- (1) The court may, on its own initiative or on the application of a party to a proceeding, direct expert witnesses to—
 - (a) confer on specified matters;
 - (b) confer in the absence of the legal advisers of the parties;
 - (c) try to reach agreement on matters in issue in the proceeding;
 - (d) prepare and sign a joint witness statement stating the matters on which the expert witnesses agree and the matters on which they do not agree, including the reasons for their disagreement;
 - (e) prepare the joint witness statement without the assistance of the legal advisers of the parties.
- (2) The court must not give a direction under subclause (1)(b) or (e) unless the parties agree.
- (3) The court may, on its own initiative or on the application of a party to the proceeding,—
 - (a) appoint an independent expert to convene and conduct the conference of expert witnesses;
 - (b) give any directions for convening and conducting the conference the court thinks just.
- (4) The court may not appoint an independent expert or give a direction under subclause (3) unless the parties agree.
- (5) Subject to any subsequent order of the court as to costs, the court may determine the remuneration of an independent expert and the party by whom it must be paid.

Schedule 4

Code of conduct for expert witnesses

r 9.43

Duty to the court

- 1 An expert witness has an overriding duty to assist the court impartially on relevant matters within the expert's area of expertise.
- 2 An expert witness is not an advocate for the party who engages the witness.
- 2A If an expert witness is engaged under a conditional fee agreement, the expert witness must disclose that fact to the court and the basis on which he or she will be paid.
- 2B In subclause 2A, **conditional fee agreement** has the same meaning as in rule 14.2(3), except that the reference to legal professional services must be read as if it were a reference to expert witness services.

Evidence of expert witness

- 3 In any evidence given by an expert witness, the expert witness must—
 - (a) acknowledge that the expert witness has read this code of conduct and agrees to comply with it;
 - (b) state the expert witness' qualifications as an expert;
 - (c) state the issues the evidence of the expert witness addresses and that the evidence is within the expert's area of expertise;
 - (d) state the facts and assumptions on which the opinions of the expert witness are based;
 - (e) state the reasons for the opinions given by the expert witness;
 - (f) specify any literature or other material used or relied on in support of the opinions expressed by the expert witness;
 - (g) describe any examinations, tests, or other investigations on which the expert witness has relied and identify, and give details of the qualifications of, any person who carried them out.
- 4 If an expert witness believes that his or her evidence or any part of it may be incomplete or inaccurate without some qualification, that qualification must be stated in his or her evidence.
- 5 If an expert witness believes that his or her opinion is not a concluded opinion because of insufficient research or data or for any other reason, this must be stated in his or her evidence.

Duty to confer

- 6 An expert witness must comply with any direction of the court to—
 - (a) confer with another expert witness;

- (b) try to reach agreement with the other expert witness on matters within the field of expertise of the expert witnesses;
 - (c) prepare and sign a joint witness statement stating the matters on which the expert witnesses agree and the matters on which they do not agree, including the reasons for their disagreement.
- 7 In conferring with another expert witness, the expert witness must exercise independent and professional judgment, and must not act on the instructions or directions of any person to withhold or avoid agreement.

Schedule 4 clause 2A: inserted, on 1 September 2017, by rule 28 of the High Court Rules 2016 Amendment Rules (No 2) 2017 (LI 2017/191).

Schedule 4 clause 2B: inserted, on 1 September 2017, by rule 28 of the High Court Rules 2016 Amendment Rules (No 2) 2017 (LI 2017/191).

Schedule 4 clause 7: replaced, on 1 December 2009, by rule 10 of the High Court Amendment Rules (No 2) 2009 (SR 2009/334).

This article appeared in the May 2014 ASX Investor Update email newsletter. To subscribe to this newsletter please register with the MyASX section or visit the About MyASX page for past editions and more details.

Service Temporarily Unavailable
A useful guide to what it is and how it is measured.



By Michael Kemp, Barefoot Blueprint

In July 1914 the world was bracing for war. Investors were selling their foreign assets and bringing capital back behind domestic borders. In response to an impending international sharemarket collapse, global exchanges were pulling down their shutters and suspending trade.

The New York Stock Exchange (NYSE) was the last major exchange to act. Aware of how grave the situation had become its governors called an emergency meeting on the morning of 31 July and decided, effective immediately, to close the trading floor for an indefinite period. (It remained closed for the next four months.)

What happened then was something the exchange's governors had not counted on. Behind the NYSE building is a narrow thoroughfare called New Street, where a fringe group of outside brokers had long gathered to buy and sell small parcels of shares. Suddenly, free from the ruling that had closed the principal exchange, business for the New Street brokers started to boom.

It was clear many investors feared the prospect of holding their shares for an indefinite period. To regurgitate the well-worn Warren Buffett quote: "*I buy on the assumption that they could close the market the next day and not open it for five years.*" The reality is the closure of the exchange would see the palms of many become very sweaty.

That the sharemarket provides a deep and reliable secondary market for the purchase and sale of shares is one of its great attractions. The term describing this feature is market liquidity. This article explores what market liquidity is, how it is measured and how important it is to the average investor.

What is market liquidity?

Sharemarket liquidity refers to the 'ease' by which shares can be traded, and there are two essential features in defining the word ease.

First, speed. A liquid stock is one that can be sold quickly. For this to happen there must always be willing buyers when sellers choose to sell.

Second, price. Liquidity also implies that a stock can be sold without materially affecting the market price. In other words, there must be sufficient demand to support the price during the course of the transaction.

Clearly, most things can be sold quickly if sellers are willing to accept a low price. But if a significant price adjustment is required to facilitate the sale, the market is not liquid.

We can bring these two factors together and define liquidity as: "*The ability to trade a substantial amount of a financial asset at close to current market prices.*"

That sounds fine, but how do we measure it?

Measuring market liquidity

The most useful measure of liquidity for any stock is its average daily trading volume. This varies from day to day so it is best to use an average. Yahoo Finance provides up-to-date averages on its web page. Look under "key statistics" for the company. Daily averages are shown for the previous 10 days and three months. If the two figures vary significantly, investigate the reason. One might be atypical.

Once the average is found, it is useful to compare this to the size of your own shareholding, be it actual or intended. If the trading volume is consistently much higher than your required trade volume, it should provide a degree of comfort.

Another liquidity measure commonly used is the share turnover ratio. Its two inputs are:

1. Average daily trading volume, as discussed above.
2. The float. The second input to the share turnover ratio represents the company's total number of outstanding shares minus those owned by insiders (such as the founding owner(s), the CEO, directors, etc.) and what the company is holding back (treasury stock). In other words, the float represents the shares available for public trade. Yahoo Finance provides this information also.

Let us calculate the share turnover ratio for two listed stocks, BHP Billiton and building materials company Embleton Limited. For this example the daily trading figure used is the average for the previous 30 days. Embleton had not traded over the previous 10 days!

Share turnover ratio (BHP) = 7,166 million/5,310 billion

= 0.135%

81

For Embleton:

Share turnover ratio (EMB) = 68/276.34 k

= .0246%

The share turnover ratio for BHP is higher than for Embleton, which is not a surprise. But given that BHP is the largest mining company in the world and Embleton is a \$14 million minnow, an assessment of relative liquidity cannot be made by reference to the ratio alone.

That is because company size is such an important factor in defining liquidity, and the share turnover ratio masks this metric. Large companies typically deliver high liquidity even when their turnover ratios are low.

Liquidity also carries a personal face. For example, the liquidity of listed company Hansen Technologies (with a recent average daily trading volume of 78,000 shares) might be fine for "Mum and Dad" investors but I am sure a very large investor would consider it illiquid.

Illustrating these points, and again comparing Embleton and BHP, the average daily trade value for Embleton (based on the previous 30 days) was an incredibly low \$440. The value of BHP's average daily trade was \$275 million. That is a massive 625,000 times the value in daily trade for BHP despite its share turnover ratio being just five times that of Embleton.

What the share turnover ratio is actually telling us

Having established that the share turnover ratio is of limited value to investors, it should be said that it is more useful to traders. Traders view it as a relative measure of the supply and demand relationship for a stock. The higher the turnover ratio, the more potential there is for price volatility (both up and down).

Does market liquidity really matter?

The answer is, it really depends on who you are and whether your game is investing or trading.

A commonly stated benefit of liquidity is that it allows the rapid exit from a stock when the share price falls. For traders who use a stop-loss (a pre-determined point at which you sell, to minimise losses), this advantage is clearly very relevant. But for investors it is less so. If the investment story remains appealing, true investors should be prepared to hold a stock even after the price drops. Even if the investment story has changed for the worse, my experience has been that the market price adjusts rapidly to reflect the news.

That means a so-called "quick" exit by most small investors is usually well behind the play. Which means the rapid exit benefit that liquidity is said to provide is not that useful and grossly overstated.

Liquidity discount

Given that most traders and investors place a value on liquidity, the question needs to be asked, do illiquid stocks typically trade at lower prices? Because they could present bargains for long-term investors if they do. While it appears that such discounts do exist, quantifying them is difficult.

It is a very interesting concept to explore, and perhaps it is why Warren Buffett turned his main focus away from the sharemarket years ago and became more interested in purchasing relatively illiquid non-listed companies instead.

The final word

If you are a trader, liquidity is important, both in formulating strategy and executing stop-loss orders.

If you are a Warren Buffett type who looks to buy for keeps, liquidity would appear to be less important. After all, investors are supposed to take the view that they are buying a part share in a business. And the reality is most businesses are not even listed on stock exchanges.

But few "investors" fit this mould. Most perceive liquidity to be important and for them I would recommend limiting their shareholding to a comfortable fraction of the daily trading volume. That is easy to do for stocks such as BHP and Woolworths. But keep an eye out when investing in the less-liquid smaller-cap stocks.

About the author

Michael Kemp is chief analyst at The Barefoot Blueprint.

From ASX

ASX Glossary helps new investors comprehend investment terms, and learn the "language of the sharemarket".

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Annexure F

What are shares?

Types of shares — source ASX website

shares

Part-ownership in a company

Types of shares

Shares may be one of the simplest financial products in which to invest but there are different types of shares traded on ASX with different characteristics.

It's important to understand these distinctions because the characteristics of different types of shares can significantly affect the way you decide to invest. The different types of shares include:

Ordinary shares

Most shares traded on ASX are 'ordinary' shares. Ordinary shares carry no special or preferred rights. Holders of ordinary shares will usually have the right to vote at a general meeting of the company, and to participate in any dividends or any distribution of assets on winding up of the company on the same basis as other ordinary shareholders.

Preference shares

Preference shares usually give their holder a priority or 'preference' over ordinary shareholders to payments of dividends or on winding up of the company. There are different kinds of preference shares with different rights and characteristics. Holders of preference shares usually have voting rights which are restricted to particular circumstances or particular resolutions, however this will depend on the terms of the shares.

Partly-paid shares

Partly-paid shares (also known as contributing shares) are issued without the company requiring payment of the full issue price. At a specified future date or dates, the company is entitled to call for all or part of the outstanding issue price, and the shareholder at the time the call is due is legally obliged to pay the call. (No liability companies are not required to specify the date or dates on which calls will be made, and the shareholder at the time the call is due may pay the call or forfeit the share.)

Partly-paid shares traded on ASX are usually identified by a five letter code consisting of the company code and a two letter suffix, generally CA-CZ (not including CP).

Generally, a holder of a partly paid share has the same rights as an ordinary shareholder to vote, to dividends and on winding up of the company, but those rights will be proportional to the amount paid on the share (except for a vote by show of hands, where a holder of a partly paid share has one vote, the same as any ordinary shareholder).

Retail investors are required to sign a client agreement with their broker before first trading in partly paid shares, to acknowledge that they understand the risks involved.

Warrants — Source ASX website

Investing / Trading in Warrants

Warrants are a form of derivative – that is, they derive their value from another 'thing' (underlying instrument). Some give holders the right to buy, or to sell the underlying instrument (eg. a share) to the warrant issuer for a particular price according to the terms of issue. Alternatively, others entitle holders to receive a cash payment relating to the value of the underlying instrument at a particular time (eg. index warrants).

Warrants may be issued over securities such as shares and Exchange Traded Funds (ETFs), a basket of different securities, a share price index, debt, currencies, or commodities.

What is an option? – source ASX website

What is an option? An option is a contract between two parties giving the taker (buyer) the right, but not the obligation, to buy or sell a security at a predetermined price on or before a predetermined date. To acquire this right the taker pays a premium to the writer (seller) of the contract.

For illustrative purposes, the term shares (or stock) is used throughout this booklet when referring to the underlying securities. When considering options over an index, the same concepts generally apply. From time to time options may be available over other types of securities. The standard number of shares covered by one option contract on ASX is 100. However, this may change due to adjustment events such as a new issue or a reorganisation of capital in the underlying share. All of the examples in this booklet assume 100 shares per contract and ignore brokerage and ASX fees. You will need to consider these when evaluating an option transaction. For options over an index, the contract value is based on a dollar value per point. Details can be checked in the contract specifications. There are two types of options available: call options and put options.

Call options Call options give the taker the right, but not the obligation, to buy the underlying shares at a predetermined price, on or before a predetermined date. Call option example Santos Limited (STO) shares have a last sale price of \$6.00. An available three month option would be an STO three month \$6.00 call. A taker of this contract has the right, but not the obligation, to buy 100 STO shares for \$6.00 per share at any time until the expiry*. For this right, the taker pays a premium (or purchase price) to the writer of the option. In order to take up this right to buy the STO shares at the specified price, the taker must exercise the option on or before expiry. On the other hand, the writer of this call option is obliged to deliver 100 STO shares at \$6.00 per share if the taker exercises the option. For accepting this obligation the writer receives and keeps the option premium whether the option is exercised or not. It is important to note that the taker is not obligated to exercise the option

call option/warrant

Option / warrant contract which gives the holder the right, but not the obligation, to buy the underlying asset at the exercise price at or before a fixed expiry date.

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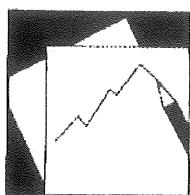
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put option / warrant

Option / warrant contract giving the holder the right, but not the obligation, to sell the underlying asset at the exercise price.

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IMF Working Paper

Measuring Liquidity in Financial Markets

Abdourahmane Sarr and Tonny Lybek

IMF Working Paper

Monetary and Exchange Affairs Department

Measuring Liquidity in Financial Markets

Prepared by Abdourahmane Sarr and Tonny Lybek¹

Authorized for distribution by Arne B. Petersen

December 2002

Abstract

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper provides an overview of indicators that can be used to illustrate and analyze liquidity developments in financial markets. The measures include bid-ask spreads, turnover ratios, and price impact measures. They gauge different aspects of market liquidity, namely tightness (costs), immediacy, depth, breadth, and resiliency. These measures are applied in selected foreign exchange, money, and capital markets to illustrate their operational usefulness. A number of measures must be considered because there is no single theoretically correct and universally accepted measure to determine a market's degree of liquidity and because market-specific factors and peculiarities must be considered.

JEL Classification Numbers: G1 and G15

Keywords: Measuring liquidity, financial markets

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I. INTRODUCTION

Liquid markets are generally perceived as desirable because of the multiple benefits they offer, including improved allocation and information efficiency. They (i) allow a central bank to use indirect monetary instruments and generally contribute to a more stable monetary transmission mechanism; (ii) permit financial institutions to accept larger asset-liability mismatches, both regarding maturity and currency, thus fostering more efficient crisis management by individual institutions, and reducing the risk of the central bank having to act as lender of last resort for solvent but illiquid credit institutions; and (iii) render financial assets more attractive to investors, who can transact in them more easily.² The latter benefit, however, may not be true for investors collectively. As Keynes noted (1936, p. 160): “For the fact that each individual investor flatters himself that his commitment is “liquid” (though this cannot be true for all investors collectively) calms his nerves and makes him much more willing to run a risk.” Therefore, recent crises in financial markets, in particular, have triggered studies on how to better judge the state of market liquidity and ideally to better predict and prevent systemic liquidity crises.³

This paper has two main purposes. First, it provides an overview of the many different concepts related to *liquid* financial markets. Second, it identifies some simple quantitative indicators that *Financial Sector Assessment Program* (FSAP) missions of the International Monetary Fund (IMF) and the World Bank can use to illustrate the changing degree of liquidity in financial markets over time.⁴ Finally, the paper also briefly discusses the possibility of creating a composite measure of the “liquidity stance” in financial markets. This latter task was prompted by analysts, such as Borio (2000), who reports that in the run-up to financial crises, markets often appear artificially liquid, but during periods of stress, liquidity tends to evaporate.

The microeconomic concept of liquidity is multifaceted. Market participants perceive a financial asset as liquid, if they quickly can sell large amounts of the asset without adversely affecting its price. Liquid financial assets are thus characterized by having small transaction costs; easy trading and timely settlement; and large trades having only limited impact on the market price. Most of the existing literature gauging liquidity has focused on different

² International Accounting Standard No. 39 (effective January 1, 2001) encourages the use of fair-value accounting, which, in practice, often means mark-to-market valuation, and thus presumes liquid markets.

³ The stock market crises in October 1987 and 1989, the Asian crises in 1997, the Russian debt moratorium in August 1998, and problems at Long-Term Capital Management Fund (LTCM) led the Committee on the Global Financial System to conduct several studies discussing the importance of liquid financial markets, including *Market Liquidity: Research Findings and Selected Policy Implications* (BIS, 1999) and *Structural Aspects of Market Liquidity from a Financial Stability Perspective* (BIS, 2001c).

⁴ Dziobek et al. (2000), for instance, discuss how to establish a framework for a systemic liquidity policy.

dimensions of liquidity of individual financial assets.⁵ It is generally concluded (Baker, 1996, p. 1) that there: "...is no single unambiguous, theoretically correct or universally accepted definition of liquidity." Moreover, the importance of some of the characteristics of liquid markets may change over time. For instance, during periods of stability, the perception of an asset's liquidity may primarily reflect transaction costs. During periods of stress and significantly changing fundamentals, prompt price discovery and adjustment to a new equilibrium becomes much more important.

Liquid markets tend to exhibit five characteristics: (i) tightness; (ii) immediacy; (iii) depth; (iv) breadth; and (v) resiliency. *Tightness* refers to low transaction costs, such as the difference between buy and sell prices, like the bid-ask spreads in quote-driven markets, as well as implicit costs. *Immediacy* represents the speed with which orders can be executed and, in this context also, settled, and thus reflects, among other things, the efficiency of the trading, clearing, and settlement systems. *Depth* refers to the existence of abundant orders, either actual or easily uncovered of potential buyers and sellers, both above and below the price at which a security now trades. *Breadth* means that orders are both numerous and large in volume with minimal impact on prices. Box 1 illustrates the difference between depth and breadth. *Resiliency* is a characteristic of markets in which new orders flow quickly to correct order imbalances, which tend to move prices away from what is warranted by fundamentals. These terms reflect different dimensions of the extent to which an asset quickly and without significant costs can be transformed into legal tender.

These terms, however, are also to some extent overlapping. Most of the available data do not fully correspond to these dimensions, which complicates their measurement. In addition, a number of qualitative factors must be considered, since they affect the above-mentioned dimensions of liquidity. They range from the microstructure of the market, the central bank's implementation of its monetary policy, to risks in the payment and securities clearance and settlement systems.

Indeed, understanding the microstructure of the market is important, when proxies, like bid-ask spreads and turnover ratios, are used as liquidity indicators. A market can be a physical location, an electronic or other platform that allows *potential* buyers and sellers to interact. Most academics have a neoclassical phantom world in mind with a Walrasian auctioneer performing a price *tâtonnement* process ensuring instantaneous trading at market clearing prices. In short, prices are a sufficient statistic. In the practitioner's world, however, trading may take place in various platforms (for instance, dealer or auction markets) at nonmarket clearing prices because of factors such as market illiquidity.

In a dealer market, trading is *quote driven*. Dealers quote bid and ask prices and may take positions. Therefore, it is often argued that dealers provide liquidity, since they provide a

⁵ See, for instance, Baker (1996), Bernstein (1987), Hasbrouck and Schwartz (1988), and Kyle (1985) for a discussion of these concepts.

Box 1. Illustration of Market Depth and Breadth

Size of existing or easily uncovered bids				
Market:	1	2	3	4
Bid price	Thin and Shallow	Thin but Deep	Broad but Shallow	Broad and Deep
\$50	100	100	500	500
\$49	200	200	500	500
\$48	0	300	0	700
\$47	0	300	0	900
\$46	0	300	0	1500

Source: Garbade (1982, p. 421)

Markets 3 and 4 are *broad* compared to markets 1 and 2 because larger volumes of orders (1000 units instead of 300) can be satisfied with no price impact (\$49-50). Market 4 is also *broad* than market 2 because the price impact of larger volume orders occurs at greater volumes. In market 4, 1000 units can be sold at \$49-50 whereas in market 2, the price concession goes as far as \$46 to sell the same units.

Markets 2 and 4 are *deeper* compared to markets 1 and 3 because trade interests exist up to \$46.

The examples also show that *deep* markets can compensate for *broad*er markets. Thus, because market 2 is deep, 1200 units can be sold by dividing the sale into smaller amounts. In the *broad* but *shallow* market 3, only 1000 units can be sold.

continuous market. However, since dealers usually try to square their positions or maintain a specified structural position toward the end of the day, they only "provide" liquidity by taking inventory positions as long they assume buyers and sellers will continue to emerge.⁶

In a pure auction market, potential buyers and sellers submit orders, and brokers or an electronic system will match them. Auction markets are thus *order* or *price driven* and may

⁶ A distinction is sometimes made between call markets and continuous markets. In a *call market*, trading takes place at specified times in an attempt to arrive at a single price when there are only few active transactors. It may also be used if trading is suspended during the day because of arrival of significant new information. It is generally contemplated that the call market mechanism may contribute to a more orderly market, although it may result in discretionary price shifts. In a *continuous market*, transactions can take place any time during opening hours.

be less continuous if there are few transactions. Market intermediaries in auction systems may also take inventory positions in order to facilitate liquidity (e.g., so-called specialists in widely traded securities). Most trading systems allow participants to submit limit-orders, which generally improve the liquidity. The intermediaries having direct access to the trading systems may cover their costs by charging a commission or they quote bid and ask prices to be paid by the ultimate buyers and sellers.

A distinction is also made between the *primary market*, where new issues are sold, and the *secondary market*, where those who have bought the issues at the primary market can resell them. The secondary market thus provides liquidity to those who have bought the securities.⁷ It is important to understand the reporting requirements of transactions in various markets before trading volumes can be used as a liquidity indicator.

While the paper focuses on measuring a financial market's liquidity, it is important to note that the concept of liquidity is also used to discuss other types of liquidity. A distinction can be made between: (i) asset liquidity; (ii) an asset's market liquidity; (iii) a financial market's liquidity; and (iv) the liquidity of a financial institution. An asset is liquid if it can easily be converted into legal tender, which per definition is fully liquid. Some financial claims, like demand deposits, are virtually perfectly liquid—as long as the credit institution is liquid—since they can be converted without cost or delay into money during normal circumstances, while the transformation of other claims into legal tender may involve brokers' commissions, settlement delays, etc. The emphasis here is on *transaction costs* and *immediacy*. The concept of an asset's market liquidity is broader. It is related to the *ease* with which, in the absence of new information altering an asset's fundamental price, *large volumes* of the asset can be disposed of *quickly* at a *reasonable price*.

A financial market's liquidity depends on the substitutability among the various assets traded in a particular market, and how liquid each of these assets are. If there are different issuers, particularly in the corporate bond markets and equities markets, credit risk can prevent substitutability and result in significant segmentation of the market. In spite of having the same issuer, individual assets may still have different characteristics, such as different maturities in the market for government securities, different voting rights for preference shares, etc. This aggregation problem renders difficult an attempt to apply measures to individual assets with the objective of measuring a market's liquidity.

Institutional liquidity, on the other hand, refers to how easily financial institutions can engage in financial transactions with a view to quickly cover mismatches between their assets and

⁷ It can be organized as an exchange or trading can take place over-the-counter (OTC). Sometimes the term *third market* is used where listed securities are traded OTC. The *fourth market* is where buyers and sellers, usually institutional investors, approach one another directly without any intermediaries. They do it to avoid fees and commissions, but instead they may encounter costs in their search for a counterpart.

liabilities, which may be measured by liquid asset ratios, etc., and to settle their obligations.⁸ The more liquid the assets in its portfolio are and the less liquid the liabilities are, the greater the flexibility in managing asset-liability mismatches and its ability to meet settlement obligations.⁹ Financial institutions' risk management systems increasingly rely on the assumption that their financial assets are liquid.

This paper identifies measures to gauge an asset's market liquidity with a view to assess if a financial market, or at a minimum some of its segments, can be characterized as liquid. With a few exemptions, such as Chordia et al. (2001), who study market liquidity, and Chordia et al. (2002), who analyze the correlation of liquidity measures between markets, most studies have investigated the liquidity of individual financial assets rather than a financial market's liquidity.

The rest of the paper is organized as follows. Section II classifies liquidity measures according to the dimension which they best measure. It also discusses factors that may affect their interpretation and ability to capture a given aspect of liquidity. Issues related to data availability to construct the measures are also briefly discussed. Section III applies the selected liquidity measures to the foreign exchange, money, and capital markets of a selected group of countries. Section IV lists some of the more important qualitative factors to consider when comparing the liquidity measures across markets and countries. Section V notes how liquidity measures during periods of stress may change. Section VI concludes the paper and briefly discusses how the measures presented could be used in the context of the FSAP.

II. SELECTED LIQUIDITY MEASURES

Liquidity measures can be classified into four categories: (i) transaction cost measures that capture *costs* of trading financial assets and trading frictions in secondary markets; (ii) volume-based measures that distinguish liquid markets by the volume of transactions compared to the price variability, primarily to measure *breadth* and *depth*; (iii) equilibrium price-based measures that try to capture orderly movements towards equilibrium prices to mainly measure *resiliency*; and (iv) market-impact measures that attempt to differentiate between price movements due the degree of liquidity from other factors, such as general market conditions or arrival of new information to measure both elements of *resiliency* and *speed of price discovery*. No single measure, however, unequivocally measures tightness, immediacy, depth, breadth, and resiliency.

⁸ Supervisors of financial institutions in low-income countries and emerging markets often require compliance with specific prudential ratios with a view to limiting liquidity risk, while supervisors in high-income countries increasingly rely on financial institutions' own risk-management systems (BIS, 2000).

⁹ Liquidity risk is, in this context, defined as the risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent, since it may be able to settle the required debit obligations at some unspecified time thereafter.

A. Transaction Cost Measures

A distinction can be made between explicit transaction costs, which relate to expenses such as order processing costs and taxes associated with trades, and implicit transaction (execution) costs. Because bid-ask spreads may capture nearly all of these costs, they are the most commonly used measure of transaction (execution) costs.

In dealer markets, the bid-ask spreads may reflect: (i) order-processing costs; (ii) asymmetric information costs; (iii) inventory-carrying costs; and (iv) oligopolistic market structure costs.¹⁰ Immediacy, for instance, is fostered by the existence of dealers who stand ready to buy and sell specific quantities of a financial instrument at the quoted bid and ask prices. This service entails inventory-carrying costs—depending on the dealers squaring their positions toward the end of the day—which they must recover in addition to their order processing costs. But dealers also incur a risk by standing ready to trade based on asymmetric information. They must charge a premium to compensate for potential losses in providing a continuous market. Such costs are smaller, if there are numerous participants willing to trade with the dealers, and thus revealing their asymmetric information. In addition, since immediacy is bought at a price, the latter is influenced by competition. Thus, a few dealers with oligopolistic power may have higher discretionary fees for immediacy.

High transaction costs reduce the demand for trades and therefore the number of potentially active participants in a market.¹¹ This could also lead to more fragmented markets as many transactions may take place within the market makers' spreads and not necessarily around the equilibrium price, which results in a shallow market. High spreads, or commissions in auction markets, also encourage transactors to seek potential counterparts in a trade outside the market makers' markets; as such trades might be worth the search costs. That is, transactions will take place in the so-called fourth market. In contrast, when transaction costs are small, transactors would prefer to use dealers in auction mechanisms to trade rather than incur direct search costs, including through brokers. This results in transactions that are

¹⁰ Each one of these costs is affected by numerous factors. They range from the trading mechanisms and disclosure of traded prices and quantities, which may affect both the level of information as well as the extent of asymmetric information in the market; inventory costs associated with labor and capital costs; to the clearing and settlement systems which affect order-processing costs and risks (see Section IV).

¹¹ Lower transaction costs, which often are associated with more liquid markets, generally allow more decentralization, diversification, and result in more transactions. These aspects will typically allow more of the various participants' information to be disseminated via the price mechanism. Prices will adjust quicker, ideally also smoother, and, in principle, tend to reduce excessive volatility due to arrival of new information and thus become more resilient. In short, the price vector is to a larger extent a sufficient statistic. Accordingly, lower transaction costs will ideally result in a more efficient resource allocation. However, some may argue that lower transaction costs also increase volatility and overshooting triggered by myopic self-fulfilling expectations, spurious information, or rigidities. Such volatility could be remedied by, for instance, a Tobin tax or trading pauses in case of excessive price changes. It is outside the scope of this paper to further explore this dichotomy, which really depends on the perception of speculation being either stabilizing or destabilizing.

more likely to take place around the equilibrium price of an asset leading to a more unified and deep market.

The reduction in the number of market participants due to high transaction costs also affects breadth and resiliency. Since breadth implies having numerous participants, high transactions costs may lead to thin markets. Similarly, since large transaction costs may deter trades, they reduce resiliency by preventing orders from flowing in promptly to correct order imbalances that tend to move prices away from their fundamental level. In other words, the elasticity of order flows is generally much lower when transaction costs are high. The infrequency of trades is also likely to result in a market with substantial price discontinuities. The effects of high transactions costs go full circle, since a smaller number of participants reduce economies of scale on inventory costs with second round effects on market makers' spreads.

The bid-ask spread can be measured as the absolute difference between bid and ask prices or as a percentage spread (equations 1.1 and 1.2 below). The percentage spread allows taking into account the fact that a given spread would be less costly the higher the prices, and it is easier to compare across markets. Dealers' uncertainty about the equilibrium price also leads to adjustments in their bid and ask prices.

$$(1.1) \quad S = (P_A - P_B) \quad \text{where } P_A \text{ is the ask price and } P_B \text{ the bid price} \quad \text{or}$$

$$(1.2) \quad S = (P_A - P_B) / ((P_A + P_B)/2)$$

The bid-ask spread of the market is generally calculated using the highest bid and lowest ask prices in the market for a reference period, or in practice the most recent quotation. However, if there are several bid and ask prices available from different dealers and particularly if they are not obligated to trade at the quoted prices, consideration should be given to ignoring the most extreme outliers. This market spread should be distinguished from individual dealers' spreads.

Other variants of the bid-ask spread can be calculated. Equations 1.1 and 1.2 above are calculated using quoted bid and ask prices. The bid-ask spread is sometimes calculated using weighted averages of actually executed trades over a period of time, since trades may not take place at quoted prices. In that case, the spread is called a *realized spread*.

In addition to the spread itself, the trade-size at which a dealer is committed to trade at quoted prices is also a useful indicator. All other things equal, the larger the trades that can be conducted at a quoted spread, the more depth and breadth the market has, but a large trade-size may also reduce the willingness to quote prices.¹²

¹² In Japan, for instance, it was found that the turnover increased significantly after the trade-size was reduced in the government securities markets.

Although not widespread, some of the high frequency databases now available occasionally include both bid and ask prices on a daily basis. However, both within the day, during the week and month, there may be patterns to take into account, thus monthly averages may not necessarily provide good indications of changes in the spread. Furthermore, on days when new important news are announced, the time it takes for the widened spread to reach “normal” levels can be an important indicator of resiliency.¹³ The financial asset with the shortest adjustment period is the most resilient.

B. Volume-Based Measures

Volume-based measures are most useful in measuring breadth (the existence of both numerous and large orders in volume with minimal transaction price impact). Markets that are deep tend to foster breadth since large orders can be divided into several smaller orders to minimize the impact on transaction prices.

Large numbers of trades are a valuable source of information for transactors and particularly dealers. They obtain information from order flows, and imbalances in this order flow give them information about the accuracy of their quoted prices. Changes in these quoted prices trigger balancing order flows, which would counter price movements that are not warranted by fundamentals (resiliency). This process allows dealers to have a continuous information source as to whether price changes are permanent or transitory. When markets lack breadth and depth, the absence of the continuous information source provided by numerous and frequent trades may result in price discontinuities and uncertainty about equilibrium prices. Even when there is uncertainty about equilibrium prices, but numerous orders from both the selling and buying sides of the market exist, transactors, and particularly dealers, may be able to execute orders without having to take risky inventory positions. Trading can also be enhanced if market makers can easily identify potential buyers and sellers, such as institutional investors with large portfolios.

Uncertainty about equilibrium prices may not, however, be a necessary outcome of a lack of breadth (orders are numerous and large in volume), and depth (wide range of orders), or higher transactions costs in a given market. Market participants may also infer equilibrium prices from the market of close substitutes, where price information is more complete. Thus, the existence of a deep and broad market for a close substitute may compensate for thinness, since they allow market makers to hedge position imbalances without waiting for balancing

¹³ Fleming and Remolona (1999), for instance, find an intraday trading pattern in the U.S. treasury market in the event of announcement of new information. Based on data from 250 trading days focusing on on-the-run issues, they find that “major macroeconomic announcements induces a sharp and nearly instantaneous price changes with a reduction in trading volume...” and “the bid-ask spread widens dramatically at announcement ...” The price volatility as well as the trading volume is highest early in the morning, as is the bid-ask spread, which apparently reflects that new information arrives during the night.

orders.¹⁴ However, many players have learned the hard way that assets perceived as being close substitutes may not turn out to be so in practice.

Trading volume is traditionally used to measure the existence of numerous market participants and transactions. The trading volume can be given more meaning by relating it to the outstanding volume of the asset being considered. The resulting turnover rate (equations 2.1 and 2.2 below) gives an indication of the number of times the outstanding volume of the asset changes hands.

$$(2.1) \quad V = \sum P_i \times Q_i \text{ where } V \text{ is dollar volume traded.}$$

P_i and Q_i are prices and quantities of the i trade during a specified period

$$(2.2) \quad Tn = V / (S * P) \text{ where } Tn \text{ is turnover rate.}$$

V is as defined in (2.1).

S is the outstanding stock of the asset

P is the average price of the i trades in (2.1).

While it is relatively easy to estimate turnover rates in exchange traded securities markets, it is more difficult to choose an appropriate basis against which to measure turnover rates in the typical OTC foreign exchange and money markets. In the latter cases, provided data are available, the absolute trading volume and the number of transactions, and thus the average trade size, may be better measures of the existence of numerous and large trades, that is, dimensions of market breadth.

Finally, the trading volume may shift significantly both during the day, week, and month depending on trading patterns, for instance around announcement of new information important for the pertinent asset. The volatility of the turnover should thus also be taken into consideration.

The Hui-Heubel Liquidity Ratio (equation 2.3 below), originally applied to the equity market, attempts to capture the other dimension of market breadth, which relates the volumes of trades to their impact on prices, and thus also to resiliency.

¹⁴ Garbade (1982, p. 500), for instance, notes that "[M]any investors, for example, view Treasury bills, short-term federal agency issues, bank CDs, and commercial paper as close substitutes.... However, ... yield premiums are fairly stable over short intervals of time, such as a few days and sometimes even weeks. Even though the markets in commercial paper, agency debts, and bank CDs are thinner than the market in Treasury bills, dealers in commercial paper, agency debt, and bank CDs do not suffer from a severe inability to estimate changes in equilibrium prices in their markets".

The L_{HH} can be calculated as an average of the 5-day periods in a sample (e.g., 3 months) to smooth volatility. Subject to data availability, the ratio could also be calculated on a daily basis to capture very short-term price movements. The lower the L_{HH} , the higher the liquidity of the asset. To be specific about the dimension of liquidity being captured, we would say that the market has more breadth when the L_{HH} is low.

$$(2.3) \quad L_{hh} = \frac{[(P_{max} - P_{min}) / P_{min}]}{[V / (S * \bar{P})]}$$

P_{max}	=	highest daily price over last 5 days
P_{min}	=	lowest daily price over last 5 days
V	=	total dollar volume traded last 5 days
S	=	number of instruments outstanding
\bar{P}	=	average closing price of the instrument over a 5-day period

The numerator in L_{HH} can simply be measured as the percentage change in the price of the asset over the 5 day period chosen. If those prices are not available, bid-ask prices could be used as a proxy to calculate the ratio, but then the information content also changes somewhat.

Conventional liquidity measures relate this price change to the simple volume traded in the denominator (V). The Hui-Heubel's liquidity ratio uses in the denominator the ratio of the traded volume to the outstanding volume of the asset (essentially the turnover rate).¹⁵ Depending on data availability, other measures of trading volume can be used in the denominator (e.g., number of securities traded). Liquidity ratios in general can also be expressed in terms of the value or number of units traded in the numerator to the percent change for a given period interval. In this case, the market has more breadth, the larger the number of trades to the percentage price change.

It can be argued that the impact of trading a large volume of an asset on price depends on whether the volume traded is a high proportion of the volume of the asset held in the market, which the Hui-Heubel measure would capture. Thus, if buyers or sellers suddenly want to trade a high proportion of the outstanding volume of an asset, a significant price change could occur because those trades may be indications that new information arrived in the market. The price movement should therefore not be assimilated with illiquidity. As a result, one of the criticisms of these liquidity ratios is the fact that the relationship between price movements and volumes is not proportional. In using the ratio to predict future relationships

¹⁵ The Hui-Heubel measure thus encompasses other volume based liquidity measures that capture price movements in relation to volumes traded only (e.g., conventional liquidity measures like the Martin-Index; see Baker, 1996, for a fuller discussion).

between the two variables, one may overestimate price changes on large volumes and underestimate them on small volumes. Furthermore, there is no distinction between transitory and permanent price changes.

C. Price-Based Measures

Bernstein (1987) noted that “measures of liquidity when no information is hitting a stock must be more relevant than measures of liquidity when new information leads to new equilibrium values...thus unrefined measures of liquidity may be nothing more than some kind of weighted average reflecting the frequency with which new information hits one stock as compared with another.” Ideally, there is thus a need for an underlying structural model to identify the equilibrium price, but given the difficulty in determining whether new information is indeed affecting the price of an instrument, Hasbrouck and Schwartz (1988) proposed the market efficiency coefficient to distinguish short-term from long-term price changes.

The Market-Efficiency Coefficient (MEC) exploits the fact that price movements are more continuous in liquid markets, even if new information is affecting equilibrium prices (equation 3.1 below). Thus for a given permanent price change, the transitory changes to that price should be minimal in resilient markets.

$$(3.1) \quad MEC = Var(R_i) / (T * Var(r_i))$$

$Var(R_i)$ = variance of the logarithm of long-period returns¹⁶

$Var(r_i)$ = variance of the logarithm of short-period returns

T = number of short periods in each longer period

The ratio would tend to be closer but slightly below one in more resilient markets, since a minimum of short term volatility should be expected. Indeed, prices of assets with low market resiliency may exhibit greater volatility (more transitory changes) between periods in which their equilibrium price is changing. Factors that foster excessive short-period volatility (overshooting) result in an MEC substantially below one. These factors include price rounding, spreads, and inaccurate price discovery. On the other hand, Bernstein (1987, p. 12) notes that factors such as market maker intervention, and inaccurate price determination

¹⁶ Logarithm returns are used to normalize variances and facilitate comparability, since returns and therefore variances could vary substantially between periods. The MEC can be calculated for sample periods (e.g., 30 days on a moving average basis).

Example: $[Var \ln(p_5/p_1) / T] / [Var \ln(p_5/p_4 * p_4/p_3 * p_3/p_2 * p_2/p_1)]$ where p_i denotes the price of the asset at period i and \ln denotes a logarithm to express price ratios as logarithm returns. Thus, for a sample period of 30 days, 5 day returns, daily returns, and their corresponding variances can be calculated to derive one MEC figure. Then, on a moving average basis (29 previous observations + 1 day, etc...) additional MEC values can be obtained for the available sample (e.g., one or several years).

involving partial adjustment to news, cause prices to adjust in relatively small, and positively correlated increments. This would dampen short-period price volatility relative to longer-period price volatility, and may cause the MECs to be above one.

Low price volatility, when a new equilibrium is being established, is also related to the concept of *orderly* markets.¹⁷ Orderly and resilient markets provide for greater price continuity, which is a desirable feature of liquid markets. It should however be noted that discontinuity in price movements in order to reach a new equilibrium price warranted by new information is a feature of information efficient markets.¹⁸ The MEC should not render an unfavorable verdict on liquidity and resiliency if it is calculated over a given period in which the equilibrium price changed discretely in response to new information and then stabilized quickly.

Indeed, it can be questioned if price continuity is synonymous to resiliency. Recall that resiliency is a characteristic of markets in which new orders flow quickly to correct order imbalances that tend to move prices away from what is warranted by fundamentals. In practice there may ex ante be quite a range of views, including by the central bank, on what is warranted by fundamentals, which ex post may turn out to be quite different. A dealer or day-trader, for example, wanting to square her positions toward the end of the day has a different time horizon than a transactor having a medium-term horizon in mind. Whatever the case may be, if market participants are mostly on one side of the market because of new fundamentals, the resulting order imbalance should lead to a price change. If pressures for a price change are countered by new orders flowing in, the phenomenon may produce more price continuity, but this price continuity should not be associated with market resiliency. It would rather be associated with an orderly market and possibly an information inefficient market. In this case, the MEC may be greater than one (as noted above), because the volatility over the long period could be higher than that of the shorter periods.

It is important to note that a market can become one sided and lead to a significant price change although unjustified by fundamentals. In this case, even if market makers are able to determine the equilibrium price of an asset based on fundamentals, cash and regulatory constraints (e.g., leverage limits) may prevent them from absorbing an order imbalance

¹⁷ Bernstein (1987, page 56): "An orderly market is one in which prices change smoothly rather than discontinuously. ... A fair market is one that helps to assure equilibrium prices by creating condition in which everyone has an equal opportunity to trade, both in terms of time and in terms of available information." Please note that lack of continuity may also be a feature of call auction markets where trading does not take place continuously.

¹⁸ For a discussion of information efficient markets see, for instance, Fama (1970 and 1991). A distinction is made between: (i) *weak efficiency*, where the market price includes all the information contained in historical prices; (ii) *semi-strong efficiency*, where the market price includes, in addition to information in historical prices, other published relevant information; and (iii) *strong efficiency*, where the market price reveals all pertinent information.

without a significant price change. Resiliency is thus lost, and liquidity evaporates in all its dimensions.¹⁹

The latter type of lost market liquidity should be distinguished from the one the paper has discussed so far. Wood and Wood (1985, p. 165-66) insightfully note that “even U.S. government securities are illiquid in the presence of widespread shortage of cash... General scramble for cash, or panic, leads to precipitate price falls... [in this case], nothing except cash is liquid.” They, like Keynes, also point out that liquidity perceived by an individual transactor is always greater than the liquidity if fully exploited by all transactors. If dealers are able to determine the equilibrium price of an asset, a single seller should not have difficulty selling that asset if she is acting more or less independently. On the other hand, if dealers are able to determine the correct price of an asset, but everyone else is selling, market liquidity is lacking. In the latter case, it is the perfectly liquid assets against which other assets’ liquidity are compared—namely cash—that is missing. Temporary injection of liquidity—cash—to support willingness to take open positions could in this case help market resiliency.²⁰

Trading systems in which trading in a financial instrument is stopped when order imbalances are high (so-called circuit breakers) tend to reduce price continuity. Circuit breakers do so by allowing prices to move discretely after the pause in trading. The pause in trading may be needed because the orderly movement of prices associated with price continuity, may prevent a discrete price movement to a new equilibrium price (Bernstein, 1987). Many market commentators, however, have mixed views on the merit of circuit breakers. However, the halting of trades may be needed to foster fair markets by allowing all market participants to attempt to determine whether fundamentally new information has altered an asset’s equilibrium price. In this case, one would say that the market has temporarily lost price continuity. However, when trading resumes at a new price among informed traders, the market may still be qualified as liquid by the definition given in the introduction of the paper. In other words, traders neutralizing small price deviations may no longer be around to help provide depth and breadth, but the market may still be liquid and resilient thanks to more informed traders, as the new information has already been absorbed. The MEC

¹⁹ Uncertainty about the value of an asset is part of the fundamentals, which should guide the estimated price, and may cause a one-sided market, although the estimated price may ex post turn out to be incorrect.

²⁰ Grossman and Miller (1988, p. 633) pointed out that during the stock market crash of 1987 “the Federal Reserve System was directly and indirectly encouraging banks to support dealer inventory positions... these infusions of buying power had pushed prices nearly back to their levels before the collapse and substantial market-making capacity was back in place.” Furthermore, the disaster at the World Trade Center (WTC) on September 11, 2001, affected a major telephone switch, and the primary and secondary sites of the largest clearer of government securities, which all were located close to the WTC. Discrepancies during the reconciliation of transactions in government securities increased significantly. The Federal Reserve Bank of New York injected additional liquidity (overnight lending reached a peak of US\$81 billion on September 14); settlement was extended from T+1 to T-5 in some cases; and opening hours of Fedwire were extended, which helped prevent systemic problems.

calculated over a long period covering a significant discrete price change may thus still be an appropriate measure of resiliency. However, it may not be true for all types of markets. Some argue that markets that are quote-driven generally provide more price continuity than markets that are order and call-driven, although it is debatable.

In addition to the MEC, vector auto regression econometric techniques, like impulse response functions, are also used to uncover the fact that the price discovery process is more timely and complete in liquid markets. Vector auto regression lags of price adjustments are shorter in liquid markets. As with other econometric techniques discussed below, operational ease argues against their use.

D. Market-Impact Measures

As noted above, liquidity ratios, such as the L_{HH} , generally do not distinguish between transitory price changes from permanent ones warranted by new information. When new information becomes available in the market, even small transaction volumes could be associated with large price movements. For instance, new information triggering a financial crisis may not result in large turnovers because transactors, as long as they are not cash constrained, may prefer to wait and see. To better capture the price movement mainly due to large volumes, i.e. breadth, the price movements due to significant new information should ideally be extracted.

A distinction is often made in the equity markets between systematic and unsystematic risk based on the capital asset pricing model (CAPM), which also provides an avenue to extract market movements (equation 4.1 and 4.2 below). The systematic effect relates to a risk that cannot be diversified because it affects all securities in a systematic fashion. The degree of this effect is called the "beta of the stock" to refer to the regression coefficient of a stock's return on that of the market. The higher the "beta," the higher the systematic risk of that stock. The unsystematic risk is the risk that is specific to the stock in question, once the market risk is removed. Hui and Heubel, using this approach, suggested calculating the Market-Adjusted Liquidity for equities.

$$(4.1) \quad R_i = \alpha + \beta R_m + u_i \text{ where}$$

R_i = daily return on the i th stock

R_m = daily market return (e.g., S&P index)

β = regression coefficient, represents systematic risk

u_i = regression residuals or specific risk.

The regression residual is then used to relate its variance to the volume traded:

$$(4.2) \quad u_i^2 = \gamma_1 + \gamma_2 V_i + e_i$$

u_i^2 = squared residuals from equation 4.1

V_i = daily percentage change in dollar volume traded

e_i = equation 4.2 residuals.

The market-adjusted liquidity uses the residual of a regression of the asset's return on the return of the market (thus purging it from its systematic risk) to determine the intrinsic liquidity of the asset.

The smaller γ_2 in equation 4.2 (above), the smaller is the impact of trading volume on the variability of the assets' price and therefore, the assets is more liquid. It should be noted that the lower the coefficient, the more breadth the market has. Note that the residuals of equation 4.1 could also have been used to calculate the L_{HH} discussed in the previous section.

It is also possible to distinguish between the market impact, that is the change in the zero-coupon yield curve, and the liquidity premium of government bonds. The main differences among government bonds are typically their maturity and their type (bullet bonds, serial bonds, etc.). Zero-coupon yield curves can be estimated to, ideally, better take into account the different timing of interest and principal.²¹ Based on these yield curves, it is possible to estimate the liquidity premium of a particular bond, as the difference between the market price of the bond and the estimated price using the zero-coupon yield curve. In practice, however, the spread between benchmark government bond and a government security with roughly the same duration, but traded less, is often used as a proxy for the liquidity premium. In the case of corporate bonds, the spread between the corporate bond and the benchmark government security reflects both the difference in credit risk and a liquidity premium.

Newer research using high frequency data and a combination of macroeconomic models and microstructure models, like order flows (Evans and Lyons, 2002) or news impact (Melvin and Yin, 2000), reportedly do produce exchange rate forecasts outperforming random walks. The difference in part reflects the market's liquidity (Galati and Ho, 2001). Foreign exchange markets are generally perceived as some of the most information efficient markets, in part because macroeconomic models using monthly data, rarely have outperformed random walk models.

Other econometric techniques

Other econometric techniques are used in some liquidity studies to separate the impact of anticipated trading volumes from those that are unanticipated and which may carry new information. The expected volumes are usually estimated by fitting an auto regressive moving average (ARMA) model of volumes traded. Actual volumes which deviate from the expected volumes as forecasted by the ARMA model are considered unexpected events, which are associated with new information flowing into the market. This distinction is used to explain the size of dealers' spreads. Thus, high expected volumes of trades reduce the dealers' spreads on account, for instance, of the economies of scale in their inventory costs discussed in section A. Unexpected volumes, however, will increase dealers' spreads by

²¹ See, for instance, Alonso et al. (1999) for an illustration of how to estimate liquidity premiums of individual government securities using a zero-coupon yield curve.

increasing the uncertainty premium associated with their trading on potentially asymmetric information.

More sophisticated econometric techniques are also used to take account of the fact that once price volatility starts, it will take some time for all market participants to come to agreement on equilibrium prices. This results in volatility persistence, which can be captured by autoregressive conditional heteroskedasticity (ARCH) and generalized autoregressive conditional heteroskedasticity (GARCH) type models. These models simply say that a given period volatility is dependent on the volatilities of previous periods.²²

Although more advanced econometric techniques have analytic appeal, they are not very operational. The computational burden may outweigh the benefits. Operationally, to make a statement about market breadth, it may be easier to analyze trading volumes and price volatility patterns over a long period using simple liquidity ratios such as the L_{HH} and turnover figures. In doing so, one should keep in mind that the inferences that would be made regarding statistical relationships between price volatility and volume would be less precise, although general trends could be uncovered. Price-based measures, which were discussed in the previous subsection, attempt to make a statement about the degree of an asset's liquidity by directly analyzing its price volatility. These measures avoid the issue of determining whether price movements are due to new information arriving in markets, thus they may actually be better measures of market resiliency.

III. APPLICATION OF LIQUIDITY MEASURES

This section analyzes various dimensions of liquidity in the foreign exchange, money, bond, and equity markets of a selected group of countries. While all measures cannot be applied in all markets because of lack of data (summarized in Box 2), several measures can be applied to compare the liquidity of different segments of a market, between markets, and between markets in different countries. Most of the data used in this section are publicly available information in the Bloomberg information system. The prices, however, are not firm, but merely indicative, and consequently we do not know how accurate they are. Additional data are typically available in central bank bulletins, publications issued by stock exchanges, dealer associations, etc.²³ Nevertheless, when these liquidity measures are used in the context of an FSAP, it is often necessary to request additional data from the authorities, particularly to ensure access to daily observations and volume figures.²⁴ Finally, there are several factors to keep in mind when applying the measures, as discussed in Section IV.

²² Campbell et al. (1997) provide an application of some of these techniques.

²³ The Japan Securities Dealers Association, for instance, issues an annual *Fact Book*, which provides useful information on the Japanese capital markets.

²⁴ See Appendix I for a stylized example of a data request to assess the liquidity in selected financial markets. In addition to the data, FSAP missions will ask market participants about their perception of market liquidity.

Box 2. Liquidity Measures and Data Availability

Measures	Typically OTC Markets		Typically Exchange Traded Markets ^{1/}	
	Foreign exchange Markets	Money Markets	Bond Markets	Equity Markets
Bid-ask spreads (mainly <i>tightness</i> supported by <i>breadth</i> and <i>depth</i>)	+++ data readily available	++ data available for selected instruments and maturities	+ data available for selected maturities or derivatives only	+ data available for individual securities and index derivatives only
Turnover ratios (mainly <i>breadth</i> supported by <i>depth</i> and <i>tightness</i>)	+ volume data rarely available, lack of denominator	+ data available for selected maturities, lack of denominator	+++ data often available for the market and individual securities	+++ data often available for the market and individual securities
Market-Efficiency Coefficient (MEC) (mainly <i>resiliency</i> supported by <i>faster price discovery</i> and <i>depth</i>)	+++ data readily available	+++ data available for selected maturities	++ data available for benchmarks and selected indexes	++ data available for individual securities and market indexes

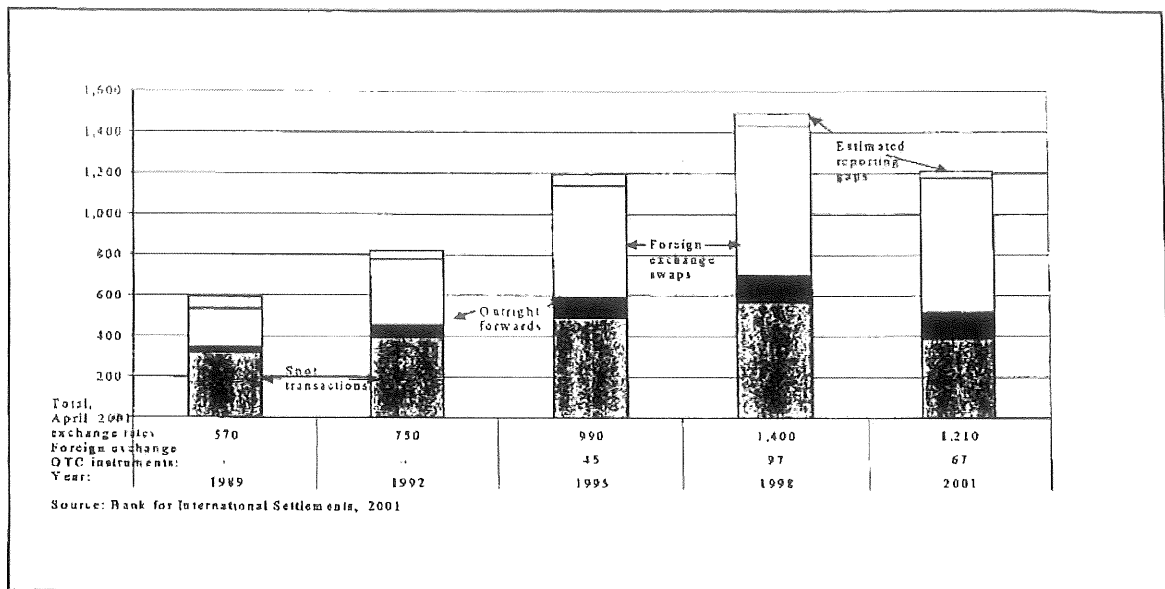
1/ In some securities markets, dealers account for a significant share of the turnover of listed securities. Bonds, for instance, are traded OTC in many markets

A. Foreign Exchange Markets

Foreign exchange markets are generally perceived as some of the most liquid and information efficient markets, in part because it is a relatively homogeneous product and the daily turnover is significant. The Bank for International Settlements (BIS) conducts a survey in April every third year, and estimated that in 2001 the *daily average foreign exchange turnover* (i.e., spot, outright forwards, and foreign exchange swaps) in 48 countries, covering 2,772 banks, amounted to around US\$1,210 billion, while the daily average turnover in OTC instruments amounted to US\$67 billion (Figure 1). These figures are adjusted for double counting of local and cross-border interdealer transactions but include BIS' estimations for reporting gaps. They are also adjusted for exchange rate developments during the period from 1989 to 2001. The decline in turnover from the survey in 1998 to 2001 should, according to the BIS, be seen in context of the introduction of the euro; the increased use of electronic broking, particularly in the spot markets; the consolidation in the banking industry; and, according to anecdotal information, the reduced activity of hedge funds. Most of the trading takes place vis-à-vis the U.S. dollar.²⁵

²⁵ In 2001, euro-U.S. dollar trading accounted for about 30 percent of the turnover, Japanese yen-U.S. dollar for about 20 percent, and pound sterling-U.S. dollar for 11 percent.

Figure 1. Global Foreign Exchange Market Turnover, 1989–2001
Daily averages in April (billions of U.S. dollars)



Except for such surveys, relatively few central banks do regularly publish information about the turnover in their respective foreign exchange markets. In addition, the lack of a proper base for the outstanding value of foreign exchange (K) prevents the calculation of liquidity ratios such as the Hui-Heubel ratio— $(\% \Delta P)/(V/K)$.²⁶ As a result, most liquidity measures for the foreign exchange markets focuses on bid-ask spreads (Tables 1 and 2) and exchange rate volatility used in the MEC.

Table 2 shows the bid-ask spreads in basis points for a selected group of countries during the period 1996–2000. The data shows that Canada has the market with the lowest transactions costs as measured by the bid-ask spreads. The spread has also remained fairly unchanged throughout the sample period. In comparison to the other countries, the Canadian foreign exchange market with lower transaction costs can thus be characterized as more favorable to market depth. This, however, depends on the degree of the accuracy of the information source. Accordingly, country and market comparisons can be misleading.

²⁶ A proxy for K (i.e., market capitalization in the equity market) could, for instance, be: (i) the sum of exports, imports, and capital transactions, depending on the degree of capital account liberalization; or (ii) the level of central bank reserves, perhaps including short-term net foreign assets of the banking system. In an environment with free capital movements, the potential transactions are almost infinite. Regarding the turnover, the turnover at organized futures exchanges, which often is published, could be used as a proxy.

Table 1. Average Bid-Offer Spreads of Spot and Forwards, October 11, 2001^{1/}

	Currency	Spot	1-month	2-month	3-month	6-month	9-month	1-year
(percent of price, basis points)								
China	CNY	0	3	4	4	6	7	8
Hong Kong SAR	HKD	1	2	2	2	2	3	3
Indonesia	IDR	43	130	139	164	231	303	371
India	INR	4	27	30	30	40	54	67
Korea	KRW	3	9	9	9	9	9	9
Philippines	PHP	8	22	24	25	34	46	57
Singapore	SGD	5	8	8	9	10	12	14
Thailand	THB	16	26	32	35	42	57	77
Taiwan Province of China	TWD	3	10	12	12	14	15	16
Argentina	ARS	2	35	55	59	300	329	181
Brazil	BRL	6	20	29	36	40	46	44
Chile	CLP	5	9	13	18	25	36	47
Colombia	COP	7	25	35	47	83	104	121
Mexico	MXN	14	16	17	18	23	22	24
Peru	PEN	2	13	24	31	55	89	101
Venezuela	VEB	13	73	135	182	261	360	429
Czech Republic	CZK	5	7	7	7	9	10	11
Hungary	HUF	2	6	10	13	20	28	32
Poland	PLN	8	10	11	12	14	17	17
Slovakia	SKK	5	8	10	12	19	25	32
Israel	ILS	27	29	31	32	36	43	43
Saudi Arabia	SAR	2	3	4	5	6	8	8
Turkey	TRL	86	289	467	621	988	1255	1447
South Africa	ZAR	10	13	14	15	20	21	24

Source: *Currency Forward Liquidity Statistics* provided by SalomonSmithBarney.

1/ Bear in mind that the spreads on one particular day of one dealer is only indicative and may deviate significantly from the average spreads over a longer period based on quotations from several dealers.

Other countries show more variability in their bid-ask spreads during the sample period. There also seem to be some correlation around the Asian crises in late 1997 and the Russian crisis in August 1998. Countries such as Mexico and South Africa show declining spreads since 1998. Korea, on the other hand, shows deterioration after 1998. This deterioration probably reflects the effect of exchange rate flexibility since foreign exchange risk is part of the transaction costs implicit in the bid-ask spreads. This also helps explain the increase in bid-ask spreads in Malaysia during the 1998 period (Figure 1 in Appendix II).

However, while Malaysia's bid-ask spreads have decreased with the return to an exchange rate peg, the MEC values in Table 3 show that resiliency seems to have deteriorated.²⁷ This deterioration is consistent with the fact that the lower bid-ask spreads have become more volatile in the short run.

²⁷ In Table 3, the exchange rate used to calculate the MEC is the mid-point between the ask and bid exchange rates. This allows calculating the MEC even in periods of fixed exchange rates.

Table 2. Bid-Ask Spreads (basis points^{1/}): Foreign Exchange Markets

	1993					1997					1998					1999					2000				
	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4
Canada	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Australia	0.07	0.07	0.06	0.06	0.07	0.07	0.07	0.06	0.06	0.06	0.07	0.10	0.09	0.08	0.09	0.09	0.08	0.09	0.07	0.14	0.13	0.13	0.12	0.16	0.11
Mexico	0.23	0.34	0.27	0.20	0.14	0.18	0.15	0.13	0.13	0.32	0.22	0.22	0.28	0.23	0.14	0.16	0.21	0.17	0.14	0.13	0.13	0.13	0.12	0.16	0.11
Korea	0.03	0.00	0.00	0.00	0.11	-0.02	0.00	0.00	0.00	-0.08	0.04	0.07	0.06	0.02	0.00	0.10	0.07	0.08	0.18	0.07	0.19	0.39	0.17	0.04	0.17
Singapore	0.06	0.08	0.09	0.08	0.09	0.07	0.07	0.06	0.08	0.08	0.12	0.18	0.13	0.10	0.09	0.05	0.06	0.05	0.05	0.05	0.04	0.04	0.08	0.04	0.04
Malaysia	0.06	0.08	0.05	0.05	0.06	0.06	0.04	0.04	0.11	0.15	0.36	0.49	0.40	0.46	0.07	0.08	0.11	0.04	0.04	0.13	0.03	0.05	0.02	0.02	0.02
South Africa	0.23	0.20	0.37	0.14	0.24	0.12	0.18	0.11	0.09	0.09	0.19	0.08	0.10	0.27	0.30	0.12	0.20	0.11	0.10	0.08	0.10	0.08	0.11	0.08	0.10
Indonesia	-0.03	0.01	0.01	-0.17	0.01	0.13	0.04	0.07	0.18	0.23	2.39	2.85	2.26	2.49	1.93	0.86	1.07	0.90	0.73	0.73	0.53	0.49	0.54	0.57	0.54
%ΔP	0.10	0.12	0.07	0.14	0.08	1.08	0.08	0.10	1.17	2.92	3.04	5.02	3.06	2.00	2.14	1.29	1.48	1.05	1.50	1.15	0.78	0.73	0.75	1.05	0.64
V	...	...	...	...	...	7.7E+03	8.3E+03	9.1E+03	8.0E+03	5.2E+03	1.3E+03	1.8E+03	1.4E+03	1.1E+03	8.8E+02	1.1E+03	9.7E+02	1.2E+03	1.3E+03	1.1E+03	1.4E+03	1.2E+03	1.6E+03	1.4E+03	...
%ΔP/V	...	...	...	...	...	7.8E-04	1.2E-05	1.0E-04	2.2E-04	2.7E-03	2.1E-03	2.3E-03	1.8E-03	2.9E-03	1.8E-03	9.9E-04	9.0E-04	1.1E-03	1.2E-03	7.3E-04	5.7E-04	4.8E-04	5.7E-04	8.5E-04	...

1/ Unless otherwise indicated

%ΔP Absolute value of daily percent changes in the exchange rate

V Value of monthly foreign exchange transactions

%ΔP/V Liquidity Ratio (Ratio of percent changes to the value of transactions)

Source: Bloomberg.

Table 3. Market Efficiency Coefficients: Foreign Exchange Markets

	1995				1997				1998				1999				2000			
	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4
Canada	0.74 (0.27)	0.77	0.65	0.66	0.91	0.90	0.92	0.89	0.92	0.86	0.80	0.92	0.81	0.84	0.76	0.73	0.67	0.63	0.84	0.76
Australia	0.77 (0.23)	0.71	0.66	0.87	0.81	0.73	0.67	0.63	0.84	0.76	0.79	0.61	0.50	1.10	0.92	0.89	1.44	0.95	0.84	0.75
Mexico	0.95 (0.39)	0.80	1.04	0.93	0.99	0.70	0.73	0.92	0.52	0.62	0.83	0.63	0.54	0.56	0.77	0.99	0.91	1.10	0.72	1.14
Korea	0.86 (0.41)	0.93	0.91	0.78	0.85	0.50	0.73	0.44	0.22	0.61	0.94	0.80	0.96	1.07	0.93	0.88	0.98	0.83	0.87	0.84
Singapore	0.64 (0.25)	0.30	0.91	0.66	0.59	0.63	0.51	0.66	0.76	0.60	0.88	0.84	0.99	0.71	0.97	0.74	0.53	0.97	0.54	0.91
Malaysia	0.71 (0.28)	0.43	0.67	0.67	0.96	0.95	0.83	0.70	1.02	1.25	0.81	1.10	0.68	0.69	0.77	0.35	0.22	0.35	0.50	0.31
Indonesia	0.71 (0.62)	0.61	0.65	0.49	1.04	0.88	0.54	0.70	1.02	1.22	1.03	0.89	0.95	1.14	1.15	0.91	0.64	0.81	0.99	1.20
South Africa	0.86 (0.36)	1.13	0.64	0.86	0.89	0.85	0.92	0.77	0.82	0.90	0.82	0.93	0.79	0.63	0.95	0.85	0.89	0.98	0.86	0.85

*Figures in parentheses are standard errors

Source: Bloomberg.

The MEC figures in Table 3 are mostly below one, as expected, with some cases of marked deterioration in resiliency such as Korea during 1997. The MEC for Korea averaged 0.50 in 1997, when the exchange rate moved from W 900 per US\$1 in August 1997 to over W1,600 per US\$1 by December 1997. This period was preceded by significant decreases in resiliency from the first to the third quarter of 1997, when the MEC reached its lowest value of 0.22 from 0.85 in the last quarter of 1996. The very low MEC suggests inadequate price discovery during this period leading to excessive short-term exchange rate volatility. The excessive short-term volatility, in turn, may reflect the lack of resiliency or orders quickly flowing in to correct imbalances that tend to move prices away from equilibrium, in part due to uncertainty regarding fundamentals.

Indonesia also experienced a sharp exchange rate adjustment in late 1997, but in contrast to Korea, the MEC values increased throughout 1997, from 0.54 in the first quarter to 1.22 in the last quarter. As noted earlier, large MEC values reflect dampening effects on short-term price movements (e.g., foreign exchange market intervention, or inaccurate price determination), which lead to correlated but low short-term price volatility. This results in longer-term volatility being larger than short-term volatility and thus MEC values larger than one. A large MEC may therefore be a leading indicator of an adjustment in the equilibrium price gradually taking place.

In sum, during the financial crises in 1997, in both Korea and Indonesia, significantly low or high MEC values seem to have preceded large exchange rate adjustments. This pattern can be contrasted with that observed in South Africa, where MEC values have consistently been around 0.80 and the exchange rate seems to have depreciated smoothly since 1995, which may in part reflect a freely floating exchange rate policy (Figure 1, Appendix II).

In Indonesia, the volume data of monthly foreign exchange transactions show that the value of foreign exchange transactions (V) has greatly decreased since 1997 (Figure 5 in Appendix II), but the conventional liquidity ratio ($|\% \Delta P|/V$) has improved significantly over the same period. This in part reflects reduced exchange rate volatility from 1997 to 2000 ($|\% \Delta P|$ and Figure 2 for Indonesia in Appendix II). This evidence suggests increased depth, which also is suggested by the bid-ask spreads that have decreased steadily from 1997 to 2000 (Figure 4 for Indonesia in Appendix II).

B. Money Markets

The money market consists of a number of different financial instruments with maturities up to one year. They typically include: (i) unsecured deposits/loans, which may be affected by credit risk; (ii) secured deposits/loans in form of repurchase agreements (where ownership changes) or with a collateral agreement (pledging); (iii) foreign exchange swaps; (iv) short-term central bank bills; (v) short-term government securities (treasury bills); and (vi) commercial paper. Derivatives, such as forward rate agreements (FRA), futures, and options may also be traded in the money market. Most of these instruments are standardized, but nonstandard instruments may be traded as well, like foreign exchange swaps with unusual maturities, etc. The central bank typically intervenes in the most "liquid" segments

of the money market with a view to influence the liquidity—reserve—conditions in the banking system or to observe an interest rate target in countries with well-developed financial markets and high degree of capital mobility. In addition to different instruments, there may also be different markets, for instance an electronic organized money market and an OTC market. Although arbitrage should reduce price differences among the various segments and markets to primarily reflect credit risk and the maturity structure, there may be significant market frictions.

Turnover figures are important, since they provide information about the composition of the money market and thus which segments better reveal the degree of liquidity in the money market. Central banks typically collect such information, but often daily information is not published. In small open economies without restrictions on capital movements, the foreign exchange market can indirectly be an important part of the money market. In the case of Denmark, for instance, foreign exchange swaps account for about 45 percent of the money market transactions. In addition to the absolute turnover, the volatility of the turnover is also important. It reflects a number of country specific issues, like averaging of required reserves, the location of the central government's deposits, and the functioning of the payment system.²⁸ In many countries, however, only money market rates and occasionally bid-ask spreads are readily available.

Table 4 shows quarterly averages of bid-ask spreads in Singapore, and Poland for overnight, 1-month, and 3-month maturities, respectively. The bid-ask spread varies from around 10 basis points to more than 100 basis points during periods of uncertainty, such as the fourth quarter of 1997 (the Asian crisis) and third quarter of 1998 (the Russian crisis), with Singapore relatively more affected by the Asian crisis than Poland by the Russian crisis. The volatility of the bid-ask spreads, which may be better inferred from the figures in Appendix III, shows that in Poland, the spread in selected segments of the interbank market is rather volatile, while in Singapore, the spreads have remained fairly constant after the effects of the Asian crises in 1997–98 were worn out.

In the United States, where the Federal Reserve Bank targets the Fed funds rate, the MEC shows that the long period Fed funds returns (5-day return) is less volatile than the daily returns, thus showing a low MEC (Table 5). According to Furfine (2001), who calculates intraday volatility, 76 percent of the change takes place during the day. The MECs are higher for longer maturities; but on average they are below one and they are generally also more

²⁸ In case the turnover observations are available with different frequency, the following approximation can be used to calculate annualized volatility:

$$\begin{aligned}\text{Annualized volatility} &= N \times \text{Periodic variance} \\ &\quad \text{where } N = \text{Number of periods in one year} \\ \text{Annualized volatility} &= 12 \times \text{Monthly variance} \\ &= 52 \times \text{Weekly variance} \\ &= 253 \times \text{Daily variance (253 to reflect number of business days per year)}\end{aligned}$$

Table 4. Bid-Ask Spreads: Money Markets

	Maturity	1987					1988					1989					2000				
		Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4
Singapore	Overnight	0.33 (1.00)	0.13	0.12	0.16	0.87	1.02 (1.36)	1.38	1.09	1.00	0.62	0.24 (0.11)	0.26	0.24	0.25	0.22	0.25 (0.04)	0.24	0.26	0.25	0.25
	1 Month	0.31 (0.43)	0.13	0.13	0.16	0.81	0.86 (0.90)	1.45	1.04	0.55	0.47	0.26 (0.05)	0.30	0.25	0.24	0.26	0.25 (0.02)	0.25	0.25	0.25	0.24
	3 Month	0.28 (0.38)	0.13	0.12	0.14	0.73	0.86 (0.63)	1.42	0.95	0.64	0.47	0.29 (0.07)	0.38	0.29	0.24	0.25	0.25 (0.02)	0.25	0.25	0.25	0.24
Poland	Overnight	0.53 (1.86)	0.46	0.84	1.09	1.32	0.64 (0.79)	0.70	0.50	0.67	0.69	0.70 (1.25)	0.35	0.20	0.37	1.92	1.21 (1.52)	1.49	1.26	1.26	0.86
	1 Month	0.64 (0.35)	0.62	0.61	1.12	0.98	0.73 (0.35)	1.06	0.62	0.71	0.50	0.66 (0.84)	0.33	0.17	0.20	1.66	0.42 (0.21)	0.54	0.34	0.34	0.43
	3 Month	0.98 (0.38)	0.74	0.65	1.37	1.14	1.02 (0.30)	1.15	0.84	1.01	1.05	0.80 (0.73)	0.64	0.26	0.42	1.92	0.63 (0.25)	0.78	0.52	0.44	0.39

*Figures in parentheses are standard errors
Source: Bloomberg

Table 5. Market Efficiency Coefficients: Money Markets

Country	Maturity	1995				1994				1997				1999				2000			
		Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4
USA	Overnight	0.30	0.20	0.25	0.30	0.25	0.39	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	1 Month	0.34	0.24	0.28	0.32	0.28	0.38	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	3 Month	0.37	0.27	0.31	0.35	0.31	0.40	0.29	0.25	0.28	0.33	0.31	0.21	0.22	0.25	0.32	0.25	0.22	0.25	0.31	0.35
	6 Month	0.40	0.30	0.34	0.38	0.34	0.43	0.32	0.28	0.31	0.36	0.34	0.24	0.25	0.28	0.33	0.26	0.23	0.26	0.32	0.36
	12 Month	0.43	0.33	0.37	0.41	0.37	0.46	0.35	0.31	0.34	0.39	0.37	0.27	0.28	0.31	0.36	0.29	0.26	0.29	0.34	0.39
Australia	Overnight	0.30	0.20	0.25	0.30	0.25	0.39	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	1 Month	0.34	0.24	0.28	0.32	0.28	0.38	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	3 Month	0.37	0.27	0.31	0.35	0.31	0.40	0.29	0.25	0.28	0.33	0.31	0.21	0.22	0.25	0.32	0.25	0.22	0.25	0.31	0.35
	6 Month	0.40	0.30	0.34	0.38	0.34	0.43	0.32	0.28	0.31	0.36	0.34	0.24	0.25	0.28	0.33	0.26	0.23	0.26	0.32	0.36
	12 Month	0.43	0.33	0.37	0.41	0.37	0.46	0.35	0.31	0.34	0.39	0.37	0.27	0.28	0.31	0.36	0.29	0.26	0.29	0.34	0.39
Canada	Overnight	0.30	0.20	0.25	0.30	0.25	0.39	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	1 Month	0.34	0.24	0.28	0.32	0.28	0.38	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	3 Month	0.37	0.27	0.31	0.35	0.31	0.40	0.29	0.25	0.28	0.33	0.31	0.21	0.22	0.25	0.32	0.25	0.22	0.25	0.31	0.35
	6 Month	0.40	0.30	0.34	0.38	0.34	0.43	0.32	0.28	0.31	0.36	0.34	0.24	0.25	0.28	0.33	0.26	0.23	0.26	0.32	0.36
	12 Month	0.43	0.33	0.37	0.41	0.37	0.46	0.35	0.31	0.34	0.39	0.37	0.27	0.28	0.31	0.36	0.29	0.26	0.29	0.34	0.39
Singapore	Overnight	0.30	0.20	0.25	0.30	0.25	0.39	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	1 Month	0.34	0.24	0.28	0.32	0.28	0.38	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	3 Month	0.37	0.27	0.31	0.35	0.31	0.40	0.29	0.25	0.28	0.33	0.31	0.21	0.22	0.25	0.32	0.25	0.22	0.25	0.31	0.35
	6 Month	0.40	0.30	0.34	0.38	0.34	0.43	0.32	0.28	0.31	0.36	0.34	0.24	0.25	0.28	0.33	0.26	0.23	0.26	0.32	0.36
	12 Month	0.43	0.33	0.37	0.41	0.37	0.46	0.35	0.31	0.34	0.39	0.37	0.27	0.28	0.31	0.36	0.29	0.26	0.29	0.34	0.39
Korea	Overnight	0.30	0.20	0.25	0.30	0.25	0.39	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	1 Month	0.34	0.24	0.28	0.32	0.28	0.38	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	3 Month	0.37	0.27	0.31	0.35	0.31	0.40	0.29	0.25	0.28	0.33	0.31	0.21	0.22	0.25	0.32	0.25	0.22	0.25	0.31	0.35
	6 Month	0.40	0.30	0.34	0.38	0.34	0.43	0.32	0.28	0.31	0.36	0.34	0.24	0.25	0.28	0.33	0.26	0.23	0.26	0.32	0.36
	12 Month	0.43	0.33	0.37	0.41	0.37	0.46	0.35	0.31	0.34	0.39	0.37	0.27	0.28	0.31	0.36	0.29	0.26	0.29	0.34	0.39
Japan	Overnight	0.30	0.20	0.25	0.30	0.25	0.39	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	1 Month	0.34	0.24	0.28	0.32	0.28	0.38	0.27	0.23	0.26	0.31	0.29	0.19	0.20	0.24	0.31	0.23	0.20	0.22	0.28	0.32
	3 Month	0.37	0.27	0.31	0.35	0.31	0.40	0.29	0.25	0.28	0.33	0.31	0.21	0.22	0.25	0.32	0.25	0.22	0.25	0.31	0.35
	6 Month	0.40	0.30	0.34	0.38	0.34	0.43	0.32	0.28	0.31	0.36	0.34	0.24	0.25	0.28	0.33	0.26	0.23	0.26	0.32	0.36
	12 Month	0.43	0.33	0.37	0.41	0.37	0.46	0.35	0.31	0.34	0.39	0.37	0.27	0.28	0.31	0.36	0.29	0.26	0.29	0.34	0.39

* Figures in parentheses are standard errors

Source: Bloomberg

volatile than the MEC for the Fed funds rate. Higher interest rate volatility is sometimes used as an indicator of illiquid markets, but in the case of money markets, it should also be seen in context with the way the central bank intervenes.²⁹ Appendix III shows that the correlation among the different segments of the money market is far from obvious, although there appears to be some correlation using bid-ask spreads in the case of Singapore.

C. Bond Markets

The bond markets can be classified according to issuer, i.e., government securities, mortgage-backed bonds, and corporate bonds. The secondary market for government securities is generally perceived as being the most liquid of the various bond markets. Government securities often play a special role as collateral and benchmarks for pricing of other securities, and as safe haven because of limited credit risk and the fact that the outstanding amounts often are quite large. In recent years, some countries have concentrated their public debt on fewer maturities but larger issues of each maturity with a view to promote the liquidity—often in light of standardized derivatives—rather than tailor the securities to the preferences of specific investors. A few issuers—sometimes when creating benchmarks—occasionally guarantee to buy back at a discount, thus ensuring the securities remain liquid. Finally, a transparent and credible public debt policy is conducive to creating liquid public debt markets.

Turnover ratios vary significantly among countries. Inoue (1999) conducted in 1997 a survey among the G-10 countries, and found the turnover ratio varied from almost 34 in France to 2½ in the Netherlands. The different turnover ratios are, for instance, affected by prudential regulation that may limit the amount of securities truly being available for trading; the extent to which the central bank uses government securities to conduct open market operations; if intraday liquidity for the payment system is provided in form of repurchase agreements or in form of pledging; etc. In emerging markets, it is not unusual to have turnover ratios below one. Then, the number of trades per day becomes a useful indicator. In countries where dealers are required to report to the stock exchange or where securities are dematerialized and the central depository collects information on final ownership, turnover information is sometimes available, while it is much more difficult to attain such information in other countries, in part because dealers usually consider such information a business secret.

Bid-ask spreads for government securities are only available for individual securities and derivatives. In the United States, the spreads in derivative markets are often smaller than in the cash market according to Fleming (2001). They are occasionally used as a proxy for how

²⁹ Cohen (2000) found that in six out of nine large industrialized countries, using daily data for the period covering 1990–98, there was a significant positive relationship between the variance of the overnight rate and two or more longer interbank rates. Thus, targeting the overnight rate may also result in lower volatility for other rates. He also found that the transmission of volatility in overnight rates to longer maturities is smaller in countries without reserve requirements. In principle, averaging of required reserves should function as a buffer, but it also depends on how frequently the central bank intervenes. In case of required reserves, the volatility will typically increase toward the end of the maintenance period.

liquid the market for government securities really is, in part because the spread gives an indication of the hedging costs. Newly issued “on-the-run” benchmark securities typically have a lower spread than off-the-run securities, which are less traded. Accordingly, spreads are more useful as indicators of liquidity for different segments rather than for the whole market.

In the United States, the spreads of inter-dealer brokers are rather modest. The bid-ask spread for treasury bills has a median of 0.5 basis points with a range of 0–2 basis points (Fleming and Sarkar, 1999). According to Table 6, the yield-spread often increases with the maturity of the security, in part reflecting the inventory costs. On the other hand, long-term interest rates may be more stable than short-term interest rates, reflecting long-term expectations, and there may be higher turnover in longer securities, which contribute to a lower spread. Furthermore, the spread is often measured on the interest rate instead of the price. The same change in basis points of the interest spread is much larger than a similar change in the spread of the price because of the larger duration of longer bonds.³⁰ This may also help explain the fact that in Singapore the spreads are lower for longer securities (Table 7). The spreads in thinner emerging markets are typically larger.³¹ But it is important to acknowledge that the spread is only a proxy and does not include all the costs of a securities transaction and varies significantly across markets.

Table 8 shows the MEC for government securities with selected maturities in Australia, Canada, Singapore, and India during the period 1996–2000. There are significant differences between the different segments in each bond market and between countries, as also illustrated in the figures in Appendix IV.^{32 33}

³⁰ For interest bearing securities it is important to note a difference between return (which is used for equities) and the effective interest rate. The difference on the variance is illustrated by the following formula:

$$\text{Price volatility} = \frac{\text{Yield}}{\text{Volatility}} \times \frac{\text{Yield}}{(\text{decimal})} \times \text{Modified duration}$$

³¹ Mohanty (2002) reports that spreads in the Philippines range from 25 to 50 basis points.

³² Volatility is occasionally used when spreads are not readily available, since they both reveal uncertainty. Figures in Appendix IV show interest rate volatility (not price volatility).

³³ Covariance of interest rate volatilities may be used to analyze international contagion. Dahlquist et al. (2000), for instance, analyze the volatility spillovers from the bond market in the United States and Germany into the Swedish bond market during the 1993–98 period. The Swedish bond market appears to more quickly incorporate news from Germany than from the United States.

Table 6. Selected Liquidity Indicators for Government Securities Markets in G-10 Countries ^{1/}

Spreads:	Canada		Belgium		France		Germany		Japan		Netherlands		Sweden		Switzerland		U.K.		U.S.A.	
	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off
Fixed coupon, 2 years	2	...	n.a.	n.a.	4	n.a.	4	n.a.	5	n.a.	...	n.a.	4	n.a.	...	n.a.	3	...	1.6	n.a.
5 years	5	13 ^{2/}	n.a.	n.a.	5	6	4	4	9 ^{2/}	11 ^{2/}	n.a.	n.a.	9	n.a.	...	n.a.	4	4	1.6	6.3
10 years	5	16 ^{3/}	5	7	10	6	4	5	7	7	n.a.	n.a.	15	n.a.	10	10	4	4	3.1	6.3
30 years	10	19 ^{4/}	n.a.	n.a.	24	10	10	10	16 ^{5/}	19 ^{6/}	n.a.	n.a.	27 ^{7/}	n.a.	25	n.a.	8	12	3.1	12.5
Index-linked, 10 years	25	...	...	n.a.	...	...	...	...	...	...	...	...	39	n.a.	...	...	15	...	6.3	n.a.
Tick size ^{8/}		0.1		1		1-2 ^{9/}		1		3-4 ^{9/}		1		2-11 ^{9/}		1		3.1		0.8-3.1
Turnover indicators																				
Turnover rate (a/b)																				
Yearly trading (U.S. million) (a)		21.9		4.1		33.8		n.a.		6.9		2.6		32.7		3.6		7.0		22.0
Outstanding (U.S. million) (b)		6,243		947		18,634 ^{10/}		n.a.		13,282		450 ^{10/}		3,626		125 ^{10/}		3,222		75,901
Outstanding volume, percent of GDP		285		232		551		563		1,919		176		111		35		458		3,457
Average issue size (U.S. billion)		185		28		n.a.		n.a.		18,453		...		1137		90		3,294		27,928
Yearly trading volume in futures market (c)																				
Cash futures ratio (a)/(c)		33.7		33.8		n.a.		n.a.		0.7		...		3.2		1.4		1.0		2.7
Market structure: Customers ^{9/}		D		D ^{10/}		D ^{10/}		D ^{10/}		D ^{10/}		A and D		D		A and D		D		D
Interdealer ^{9/}		D		D		D		...		A and D		A		n.a.		...		D		D
Memorandum items																				
Holdings of nonresidents (percent)		25.0		23.0		12.9		n.a.		10.0		24.0		19.5		n.a.		14.4		36.9

Source: Reproduced after Inoue (1999).

1/ Excluding Italy.

2/ For 6-year bonds.

3/ For 20-year bonds.

4/ For 22-year bonds.

5/ The figure is the mid-point of a range.

6/ Tick size is shown in ten-thousandths of the face value of 100 currency units of each country. In many cases the tick size is the same for customers and interdealers.

7/ Some or all securities are quoted in yield terms with the tick size is converted.

8/ The figures may include trading other than outright transactions.

9/ D means dealer market and A means auction-agency market.

10/ Auction-agency markets exists.

Table 7. Bid-Ask Spreads (Percent): Bond Markets

Country	Maturity	1999					2000				
		Avg	Q1	Q2	Q3	Q4	Avg	Q1	Q2	Q3	Q4
Singapore	3 Month	0.05% (0.01)	0.05%	0.05%	0.05%	0.05%	0.06% (0.02)	0.05%	0.05%	0.05%	0.08%
	12 Month	0.05% (0.00)	0.05%	0.05%	0.05%	0.05%	0.05% (0.00)	0.05%	0.05%	0.05%	0.05%
	5 Year	0.01% (0.01)	0.01%	0.01%	0.01%	0.01%	0.01% (0.01)	0.01%	0.01%	0.01%	0.02%
	10 Year	0.01% (0.01)	0.01%	0.01%	0.01%	0.00%	0.01% (0.00)	0.01%	0.01%	0.01%	0.01%
Malaysia	3 Year	0.22% (0.13)	0.12%	0.12%	0.30%	0.31%	0.18% (0.11)	0.29%	0.20%	0.15%	0.12%
	5 Year	0.21% (0.13)	0.13%	0.20%	0.21%	0.29%	0.23% (0.10)	0.30%	0.23%	0.21%	0.19%
	10 Year	0.18% (0.23)	0.08%	0.10%	0.32%	0.24%	0.26% (0.08)	0.29%	0.30%	0.24%	0.20%

*Figures in parentheses are standard errors
Source: Bloomberg

D. Equity Markets

The use of stock market indexes is useful, but they remain a proxy for the stock market, since they only cover the most important stocks.³⁴ Table 9 shows liquidity measures for equity markets in the United States (Nasdaq), Mexico (Mexbol), Korea (KOSPI), Malaysia (KLCT) and Indonesia (JCI). To visualize trends in the liquidity measures, the data in Tables 9 and 10 should be reviewed in conjunction with the associated charts labeled Figures 1–10 for each country in Appendix V, referred to in parentheses below.

The U.S. data—that is, the Nasdaq—reveal that the volatility of the equity price index as measured by the absolute value of the daily percent changes ($|\% \Delta P|$, Figure 2) has increased over 1996–2000. However, conventional liquidity ratios relating price changes to the number of units traded ($|\% \Delta P|/N$, Figure 5) and the value of transactions ($|\% \Delta P|/V$, Figure 8), have not changed over the period. This reflects the increase in both the number of units traded (N , Figure 4) and the turnover (V , Figure 7), as price variability increased during the same period. The relative constancy of the conventional liquidity ratios in the face of increased price volatility can be interpreted as an increase in market depth. Thus, more transactions and their associated volume can be traded with minimal impact on average prices.³⁵

This increased depth contrasts with the trend of the more refined liquidity ratio relating price impact to the turnover rate ($|\% \Delta P|/(V/K)$ and Figure 10). This measure shows an upward trend in the face of increased turnover rate (V/K). This upward trend suggests evidence of reduced breadth indicating that large value trades impact on prices.

Finally, the market efficiency coefficient, Figure 3, has decreased from 1.12 to 0.82 over 1996–2000 suggesting improved resiliency. The improvement hypothesis relies on the fact that values of the MEC greater than 1 result from aspects of market operations that tend to stabilize prices inefficiently while factors that induce excessive short term volatility lead to an MEC substantially below 1 (see the discussion of the MEC in Section II. C). Thus, since the transition of the MEC from 1.12 to 0.82 did not result from the average of extreme MEC values, resiliency may have improved.

For Mexico, the volatility of the equity price index ($|\% \Delta P|$, Figure 2) has also increased over 1996–2000, but in contrast to the U.S., the conventional liquidity ratios ($|\% \Delta P|/N$, Figure 5 and $|\% \Delta P|/V$, Figure 8), have slightly increased. This is because the number of units traded

³⁴ Shah and Thomas (1998), for instance, discuss the impact of including illiquid securities in a market index.

³⁵ Care should be taken when analyzing volumes of transactions. Atkins and Dyl (1997) and Dyl and Anderson (2002), for instance, find that the volume at NASDAQ, which is a dealer market, may over report trades by public investors. When stocks are moved from NASDAQ to New York Stock Exchange (NYSE), which is an auction market, reported trading volume typically drops by about 38 percent (Dyl and Anderson, 2002) or previously 50 percent (Atkins and Dyl (1997).

Table 9. Liquidity Measures: Equity Markets^{1/}

	$|\% \Delta P|$	$|\% \Delta P|/N$	$|\% \Delta P|/V$	$|\% \Delta P|/T_n$	MEC	N	V	$T_n=V/K$	K
U.S									
1996	0.74	1.44E-03	1.43E-09	...	1.12	5.2E+02	1.30E+04	...	...
1997	0.88	1.41E-03	1.39E-09	8.69E-02	0.85	6.3E+02	1.82E+04	1.1E+01	1.74E+06
1998	1.22	1.73E-03	1.72E-09	1.05E-01	0.99	7.2E+02	2.25E+04	1.2E+01	1.98E+06
1999	1.40	1.51E-03	1.51E-09	1.04E-01	0.85	9.7E+02	4.24E+04	1.4E+01	3.12E+06
2000	2.43	1.49E-03	1.48E-09	1.60E-01	0.82	1.6E+03	8.04E+04	1.5E+01	5.40E+06
Mexico									
1996	0.92	1.33E-02	8.89E-01	3.62E-05	1.10	8.5E+01	1.08E+03	2.4E-03	4.32E+05
1997	1.08	1.47E-02	6.88E-01	3.78E-05	1.08	7.4E+01	1.55E+03	2.7E-03	5.64E+05
1998	1.62	2.82E-02	1.58E+00	1.02E-04	1.07	6.0E+01	1.09E+03	2.0E-03	5.56E+05
1999	1.46	2.35E-02	1.21E+00	7.42E-05	1.03	6.8E+01	1.31E+03	1.8E-03	7.39E+05
2000	1.71	2.42E-02	1.14E+00	8.55E-05	1.04	8.0E+01	1.57E+03	1.5E-03	1.04E+06
Korea									
1996	0.87	3.57E-02	1.96E-03	4.47E+00	1.09	2.7E+01	4.83E+05	2.5E-01	1.46E+08
1997	1.50	2.76E-02	2.90E-03	2.92E+00	1.21	4.2E+01	5.51E+05	5.2E-01	1.15E+08
1998	2.18	2.76E-02	4.06E-03	4.55E+00	1.06	1.0E+02	6.91E+05	2.5E-01	7.93E+07
1999	1.93	7.55E-03	6.74E-04	4.64E+00	0.97	2.8E+02	3.48E+06	2.4E-01	4.10E+08
2000	2.20	7.75E-03	9.29E-04	2.23E+00	0.83	3.1E+02	2.60E+06	1.0E+00	2.53E+08
Malaysia									
1996	0.59	1.21E-02	3.15E-01	1.85E+02	0.88	5.2E+01	1.84E+03	3E-03	3.95E+05
1997	1.53	1.81E-02	1.42E+00	3.63E+02	1.12	9.0E+01	1.65E+03	4.9E-03	3.25E+05
1998	2.37	2.90E-02	6.78E+00	1.09E+03	1.03	8.7E+01	4.68E+02	2.4E-03	1.83E+05
1999	1.26	1.70E-02	2.49E+00	6.19E+02	1.03	9.7E+01	8.70E+02	2.6E-03	2.72E+05
2000	1.05	2.05E-02	1.92E+00	6.33E+02	1.20	7.0E+01	7.15E+02	2.5E-03	3.45E+05
Indonesia									
1996	0.72	5.93E-03	3.59E-03	7.04E+05	1.09	1.2E+02	2.02E+02	1.0E-06	1.96E+08
1997	1.28	4.04E-03	3.33E-03	6.52E+05	1.26	3.2E+02	3.85E+02	2.0E-06	1.96E+08
1998	2.20	5.87E-03	5.44E-03	1.15E+06	1.07	3.7E+02	4.03E+02	1.9E-06	2.12E+08
1999	1.59	2.09E-03	2.65E-03	4.60E+05	1.13	7.6E+02	6.00E+02	3.5E-06	1.73E+08
2000	1.14	1.98E-03	2.19E-03	5.23E+05	1.03	5.8E+02	5.22E+02	2.2E-06	2.39E+08

Source: Bloomberg.

1/ All figures are averages of daily values

$|\% \Delta P|$	Absolute value of daily percent changes in the index
N	Number of securities transacted daily
V	Value of daily transactions
K	Daily Market capitalization
$T_n=V/K$	Turnover rate
$|\% \Delta P|/N$	Liquidity Ratio (Ratio of price changes to the number of units traded)
$|\% \Delta P|/V$	Liquidity Ratio (Ratio of price changes to the value of trades)
$|\% \Delta P|/T_n$	Liquidity Ratio (Ratio of price changes to the turnover rate: 5 day moving average)
MEC	Market Efficiency Coefficient

(N, Figure 4) and the turnover (V, Figure 7) have not experienced the same increase as in the U.S. The increase in price volatility with a relative constancy in the number of units traded, therefore, suggests a reduction in market depth. Trends in the Mexican liquidity ratio relating price impact to the turnover rate ($|\% \Delta P|/(V/K)$ and Figure 10) suggest that market breadth has decreased. Decreasing turnover rates have been associated with increasing price impact over 1996–2000, suggesting that large trades impact prices. Furthermore, the MEC values for Mexico (Figure 3) have consistently been above one, though on a slightly declining trend, reflecting inefficiency and lack of resiliency as discussed earlier.

The Korea equity market is an interesting case for which liquidity conditions seem to have improved in all dimensions over 1996–2000. Conventional liquidity ratios ($|\% \Delta P|/N$ and Figure 5) and ($|\% \Delta P|/V$ and Figure 8), have all declined despite increased volatility in the equity price index ($|\% \Delta P|$, Figure 2) during the period. This reflects increases in both the number of units traded (N, Figure 4) and the turnover (V, Figure 7). As in the U.S. case, this suggests increased market depth since numerous trades can be executed with minimum average price impact.

Market depth has also helped the increasing turnover rate (V/K , Figure 9) has been associated with a declining price impact ($|\% \Delta P|/(V/K)$). This latter observation suggests that the increase in depth, has helped breadth to reduce the impact of large trades. As illustrated in the introduction of the paper (see Box 1), depth can compensate for the lack of breadth, since large transaction volumes can be executed in the market in smaller batches. This compensating effect does not seem to have occurred in the U.S. case, discussed above, where the increased market depth did not coincide with a reduction in overall breadth.

Finally, the MEC values for Korea (Figure 3) also show a transition from 1.09 in 1996 to 0.83 in 2000 reflecting increased efficiency and resiliency. Table 10 also shows a reduction in the standard deviation of the Korea MEC indicating that the value of 0.83 is not the result of averages of extreme MEC values.

IV. FACTORS AFFECTING ASSET AND MARKET LIQUIDITY

The measures discussed in Sections II and III to assess tightness, immediacy, depth, breadth, and resiliency are affected by a number of market specific factors, which make them difficult to compare across countries and even across markets in the same country. These factors mainly affect transaction costs, either directly or indirectly in the form of externalities, such as transparency and risks, for instance, by influencing the information content in prices. Although some of these factors may have a predominant role in some of the markets, they may have ramifications on other markets as well. The more important ones are briefly mentioned in this section and summarized in Box 3 (below).

Table 10. Market Efficiency Coefficients: Equity Markets

	1996					1997					1998					1999					2000				
	Ave	Q1	Q2	Q3	Q4	Ave	Q1	Q2	Q3	Q4	Ave	Q1	Q2	Q3	Q4	Ave	Q1	Q2	Q3	Q4	Ave	Q1	Q2	Q3	Q4
U.S.	1.12 (0.70)	1.00	1.33	1.02	1.05	0.85 (0.23)	0.75	1.05	0.83	0.75	0.99 (0.37)	1.04	0.82	1.01	1.11	0.85 (0.23)	0.70	0.83	0.92	0.92	0.82 (0.22)	0.72	0.94	0.98	0.64
Australia	0.85 (0.27)	0.82	1.06	0.95	0.55	0.86 (0.31)	0.81	0.69	0.61	1.12	0.97 (0.33)	0.75	0.99	1.17	0.98	0.83 (0.20)	0.86	0.77	0.73	0.95	0.91 (0.37)	0.75	0.83	1.23	0.94
Mexico	1.16 (0.33)	0.88	1.33	0.92	1.28	1.08 (0.31)	1.24	0.89	1.17	1.00	1.07 (0.35)	1.23	0.88	1.13	1.01	1.03 (0.29)	1.08	0.93	1.22	0.91	1.04 (0.30)	1.02	1.09	1.13	0.91
Korea	1.09 (0.34)	1.04	0.92	1.33	1.05	1.21 (0.33)	1.15	1.22	1.54	0.93	1.06 (0.27)	1.14	0.99	1.04	1.06	0.97 (0.26)	1.02	0.90	0.95	1.02	0.83 (0.24)	0.68	0.88	1.04	0.73
Singapore	1.05 (0.32)	0.79	0.94	1.34	1.13	1.25 (0.45)	1.17	1.38	1.10	1.36	1.06 (0.29)	1.18	1.13	0.91	1.04	1.12 (0.29)	0.85	1.03	1.32	1.24	1.04 (0.65)	0.58	1.22	1.58	0.75
Malaysia	0.80 (0.20)	0.82	0.80	0.85	1.04	1.13 (0.32)	0.88	1.16	1.16	1.24	1.03 (0.37)	1.18	1.08	0.85	1.00	1.03 (0.34)	0.92	1.03	1.04	1.14	1.20 (0.49)	1.52	0.90	1.03	1.37
Indonesia	1.09 (0.19)	0.95	0.91	1.34	1.14	1.26 (0.47)	1.11	1.43	1.33	1.16	1.07 (0.39)	1.14	0.69	1.25	1.18	1.13 (0.33)	1.07	1.28	1.03	1.23	1.03 (0.27)	0.95	1.15	0.87	1.17

* Figures in parentheses are standard errors

U.S. : Nasdaq CCNY index

Mexico : MEXBOL index

Korea : KOSPI index

Singapore : STI index

Malaysia : KLCI index

Indonesia : JCI index

Source: Bloomberg.

Box 3. Factors Affecting Asset and Market Liquidity

Macro Structure: Affecting the number and types of market participants as well as their expectations.

1. Vulnerabilities:

Internal vulnerabilities: fiscal imbalances, public debt policies, financial sector vulnerabilities, etc.

External vulnerabilities: current account imbalances, capital controls, etc.

2. Monetary policy:

Operational target(s) of the central bank.

Design of monetary instruments: averaging of required reserves, standing facilities, lender-of-last resort.

Central bank's day-to-day management of liquidity—reserves—in the banking system: coordination with government, frequency of interventions, etc.

Banking system's ability to recycle liquidity within the banking system: structure of the banking system, credit risk, etc.

3. Legislative framework: Bankruptcy legislation, cross border transactions, etc.

Institutional Micro Structure:

1. Product design: credit risk, maturity, substitutability, and use of derivatives.

2. Market participants:

Issuers: types of issuers, their issuing policies, legislative requirements to issuers (securities legislation, etc.), share of issue actually available for trading, etc.

Buyers: types of potential participants (capital controls), their heterogeneity, prudential regulation affecting behavior (e.g., liquidity requirements creating a captive market for government securities, hedging requirements and practices (e.g., value-at-risk (VAR) models, delta-hedging) etc.

3. Trading systems:

Market structure:

a. *periodic trading* at discrete intervals (call trading) or *continuous trading* during a specified period.

b. *dealer markets/market makers* (generally quote driven) or *agency/auction markets* (generally order-matching or order driven).

c. *electronic trading* or *floor trading*.

Trading system: licensing of dealers and brokers, capital requirements, cross-listings, etc.

Trading rules: tick-size; limit orders; bloc trading; short-selling; stop-loss orders; stop-buy orders; stop-loss rules; rules for margin transactions; circuit breakers; etc.

Trading transparency: availability of pre-trade and post-trade information to dealers and cash customers.

4. Clearing and settlement of transactions:

Payment systems: risks (legal risks, finality, payment-versus-payment (PVP)), costs, and convenience.

Clearing and settlement of financial instruments: risks (finality (T+3 or less), delivery-versus-payment (DVP)), costs, and convenience.

5. Regulatory and accounting framework:

Different financial instruments: their use as collateral (repo, pledging), etc.

Accounting framework: historical cost or fair-value accounting (mark-to-market may affect willingness to trade).

Taxation: withholding taxes, capital gains taxation, special transaction taxes, etc.

The institutional macro structure and macroeconomic policies constitute the framework affecting financial markets' ability to equilibrate supply and demand at low costs, even under stressful conditions without unduly inducing price swings. The legislative framework, including capital controls, governs the types and number of market participants.

Monetary policy is particularly important since it anchors financial markets. The operational targets of monetary policy, design of monetary policy instruments (averaging of required reserves, etc.), the central bank's day-to-day operations (robustness of liquidity forecasts, frequency of interventions, etc.) as well as the money market's ability to recycle reserve

money influence not just the money market, but also affect the foreign exchange markets as well as the market for government securities.

The design of the trading systems can affect the degree of liquidity in the market place, while the optimal design depends on a number of specific factors.³⁶ A distinction is sometimes made between: (i) periodic trading at discrete intervals and continuous trading; (ii) dealer markets and agency/auction markets, as previously noted; and (iii) floor and electronic trading. Assuming the flow of new information arrives continuously, there will be more volatility having discrete trading, while volatility will be higher with continuous trading if there are relatively few trades having a relatively large impact on the price. Foreign exchange markets, money markets, and the market for treasury bills are often dealer markets, while bonds and equities are more often traded at an exchange, although these securities also often are traded OTC. Floor trading is increasingly being substituted by electronic trading, which tends to be less expensive, more transparent, and operationally more efficient.³⁷ There are a number of other design features of various trading systems that may affect the liquidity of the financial instruments, including tick-size,³⁸ use of limit orders,³⁹ rules for bloc trading, stop loss rules, rules for short-selling, etc.

Prudential regulation may be an important factor affecting the activity in the various markets. A case in point is the fact that banks in some countries are subject to liquid asset requirements that forces them to buy government securities, which creates a captive market and thus reduces the incentives to trade them.⁴⁰ Moreover, accounting rules—although mark-to-market valuation is increasingly used—can impede trading activity since realization of losses or gains may influence certain participants' behavior. Furthermore, the design of the payment systems and settlement of securities can help reduce costs and risks and ensure prompt settlement of transaction, which contribute to greater liquidity in financial markets.⁴¹

³⁶ For an overview of micro structure of markets, see, for instance, O'Hara (2000 and 1995) and Dattels (1997).

³⁷ Regarding improved transparency, Shah (2000) reports that the spread in the Indian interbank money market in 1998 was significantly reduced when India's National Stock Exchange began to polling dealers in the OTC money market and computed reference rates.

³⁸ MacKinnon (1999) found that a reduction of the tick-size at the Toronto Stock Exchange increased liquidity in form of higher turnover.

³⁹ Ahn et al. (2001) investigate how limit orders provide liquidity in order driven markets, using the Stock Exchange of Hong Kong as an example.

⁴⁰ Liquid asset requirements frequently serve monetary policy objectives rather than prudential objectives.

⁴¹ The rules may themselves contribute to the turnover of certain financial assets. For instance, if the central bank use repurchase agreements to provide intraday liquidity in a real-time gross settlement system, where the change of ownership of the security may be recorded as a sale, instead of providing daylight credit against

V. LIQUIDITY DURING PERIODS OF STRESS

Financial markets appear to behave quite differently during periods of stress compared to periods characterized by stability. With a continuous flow of new information, the spread as well as turnover is fairly constant and the price adjusts smoothly. During periods of stress, the positive correlation between volumes and volatility found in many empirical studies (Karpoff, 1987; Bcssembinder and Seguin, 1993; among others) may no longer exist. The liquidity measures may reveal conflicting information, making them difficult to interpret. Breedon (2000), for instance, distinguishes between two types of stress events. First, high volatility and high turnover, which generally is good for market makers, since they can increase the spread, but easily unload their positions and read incoming trades and quotes with relatively little risk thus allowing higher effective spreads. Cohen and Shin (2002), analyzing the U. S. treasury securities market, find that during periods of high price volatility, positive effects of past order flows on current prices are reinforced. Secondly, stress may happen during periods of high volatility and low turnover, which is bad for market makers, since they cannot easily unload their positions. The reaction being to increase the spread or not quote at all. After the initial Indonesian crisis in 1997, the rupiah market went through such a period, as discussed in Section III. A.^{42 43} Moreover, transaction costs, which may be important during normal circumstances, may become minute compared to expected losses or gains of a trade during periods of stress. In short, illiquidity is a symptom rather than a cause.

Furthermore, the market structure may also change during periods of stress. O'Hara (2000), for instance, notes that during periods of stress there seems to be a tendency to move from electronic matching systems to dealer systems in the foreign exchange markets. Finally, stress in one market may quickly affect other markets and even other countries, although appropriately designed clearing and settlement systems can help reduce systemic risk.

pledged securities, where ownership is not changed. See BIS (2001b and d) for good practices for designing payment systems and securities settlement systems with a view to reduce systemic risk and ensure efficiency.

⁴² Galati (2000) looks at the relationship between trading volumes, volatility, and bid-ask spreads in selected foreign exchange markets using daily observations of the Colombian peso, the Mexican peso, the Brazilian real, the Indian rupee, the Indonesian rupiah, the Israeli new sheqel, and the South African rand vis-à-vis the U.S. dollar covering the period January 1998 to June 1999, thus including the Russian crisis in August 1998. He confirms the positive correlation between volumes and volatility with the exception of the Mexican peso and the real, bearing in mind the turbulence during the pertinent period. He suggests that the relationship may actually be negative during periods of stress.

⁴³ Manganelli (2002) analyzes a sample of ten stocks at the New York Stock Exchange during the period January 1998 to June 1999, and finds that the perceived positive correlations between volume and price are only correct for frequently traded stocks. Impulse-response functions indicate that more frequently traded stocks are faster to reach their full information equilibrium, thus suggesting positive correlation between turnover and resiliency.

In view of the many factors affecting liquidity during periods of stress, liquidity measures based on trading volume and bid-ask spreads may need to be seen in context while the MEC may still reflect resiliency.

VI. CONCLUSION

Market liquidity is a multifaceted concept. Many of the various dimensions of the characteristics of market liquidity—tightness, immediacy, depth, breadth, and resiliency—can be covered by traditional liquidity measures, such as bid-ask spreads, turnover ratios, and selected price-based indicators (summarized in Box 2). However, these indicators are not complete, and they may send mixing signals, particularly during a crisis. Furthermore, they must be seen in context with numerous market specific factors (summarized in Box 3). This makes weighting and normalization of the various measures with a view to create one single measure to reveal the “liquidity stance” very challenging, if not impossible.

In addition to asking various market participants about the liquidity in different markets, an FSAP team also will usually analyze the more objective liquidity measures, such as bid-ask spreads, trading volumes, liquidity ratios, and market efficient coefficients. Changes in these indicators over time are particularly enlightening. If the underlying fundamentals causing these changes are not fully understood, the various liquidity measures can indeed become leading indicators. This appeared to be the case when the MEC was applied to selected foreign exchange markets. Although selected liquidity measures do contribute useful objective information, this paper also showed the practical difficulties, not least the lack of reliable data and the amount of time needed to prepare and analyze available data.

Illiquid markets are a symptom rather than a cause of inadequate market functioning, although they may amplify financial crises. The only sustainable solution to foster liquid financial markets is to pursue sound and transparent economic policies with appropriately designed trading, clearing, and settlement systems, as well as appropriate intervention policies of the central bank, which can help contain systemic risk.

EXAMPLE OF DATA REQUEST FOR AN FSAP MISSIONS

Markets: Describe the number and nature of financial markets (provide copy of pertinent rules and regulations) and list the instruments traded.

Foreign exchange market: local currency versus U.S. dollar (spot, forwards, and derivatives, if any).

Money market

- CDs with different maturities
- Repos (including and excluding repos for intraday liquidity to support an RTGS system)
- Treasury bills with up to one year maturity in local and foreign exchange
- Central bank bills with maturity up to one year in local and foreign exchange
- Commercial paper, if any
- Derivatives, futures, options, FRA, etc.

Government securities market:

- Notes (1-, 2-, and 5-year), both benchmarks and off-the-runs/indexes if available
- Bonds (10-, 15-, and 30-year), both benchmarks and off-the-runs/indexes if available
- Futures and other derivatives, if available

Equities: the number of listed companies and total market capitalization

- Ten most traded equities
- Derivatives, futures on indexes, etc.

Data: provide data on respective markets the last three years, if available.

Frequency: Daily

Price:

- Bid and ask prices/interest rates if available
- Minimum and maximum prices/interest rates during the day (or period of observation) if relevant
- Average prices/interest rates, where relevant
- Closing prices/interest rates, where relevant
- Market indicators (market index if available)

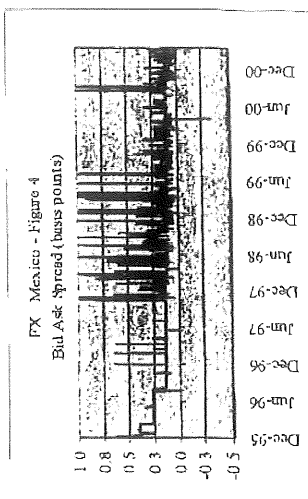
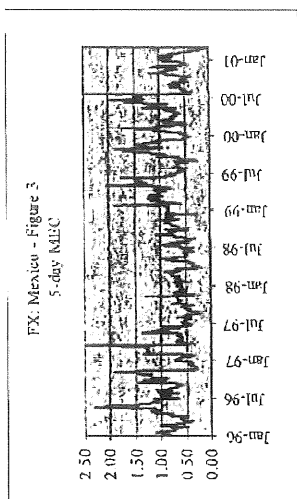
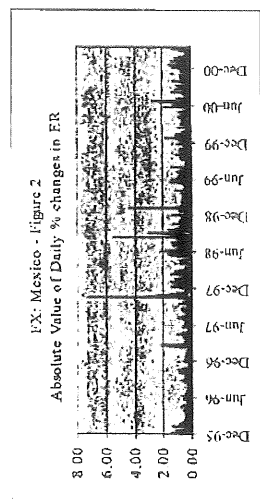
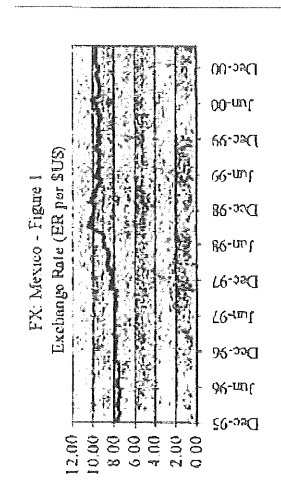
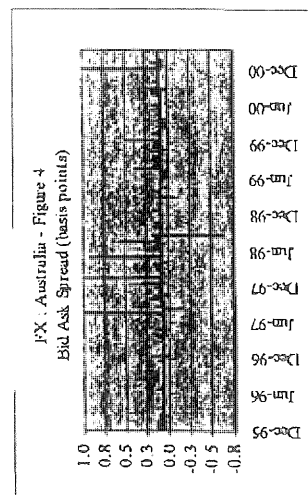
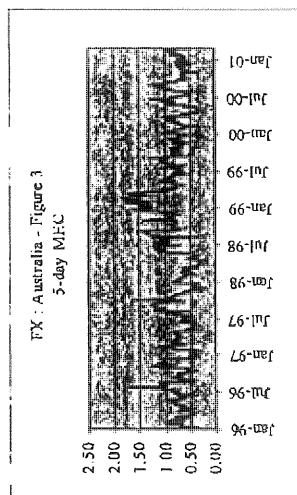
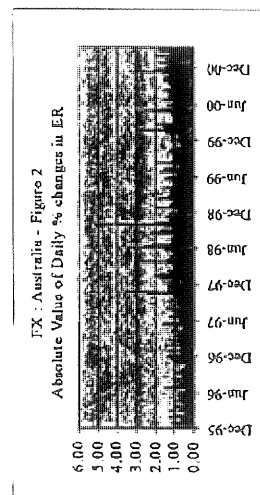
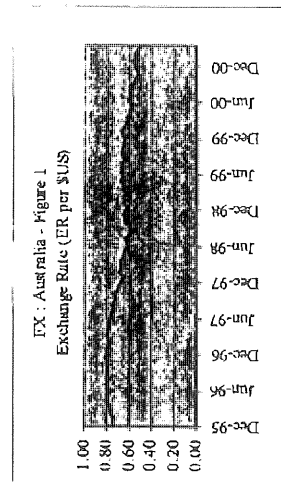
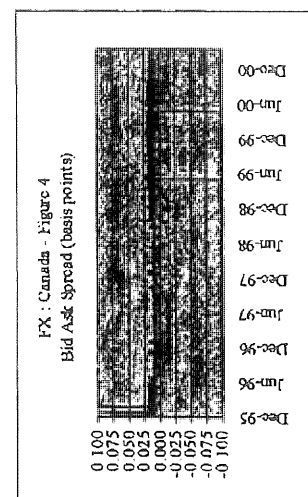
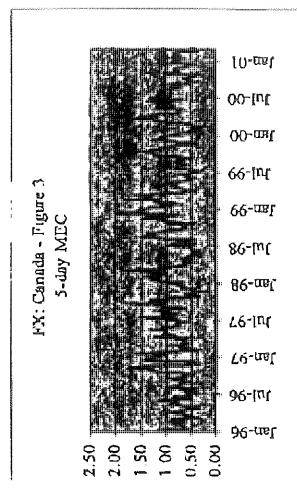
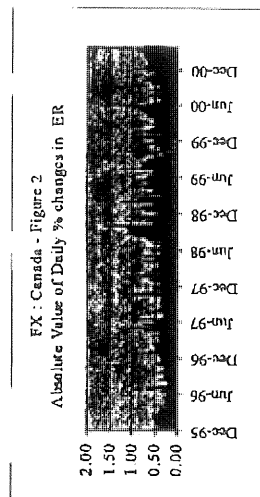
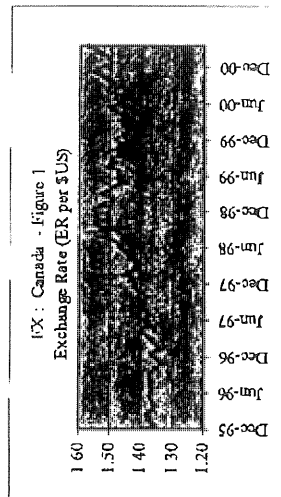
Turnover:

- Turnover during period (value per day or month)
- Average number of trades during day

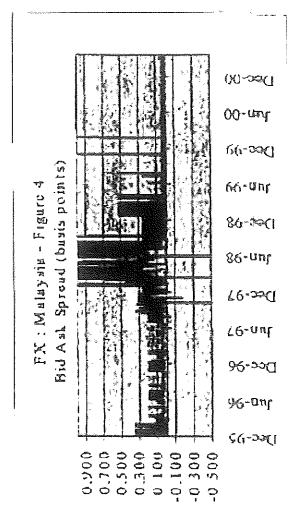
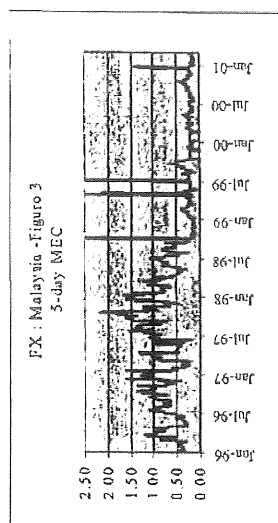
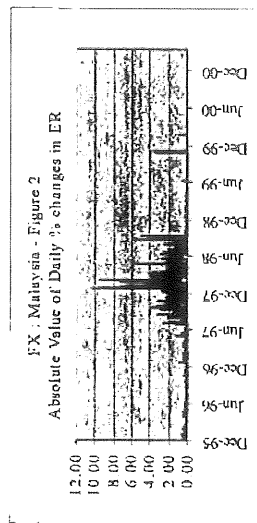
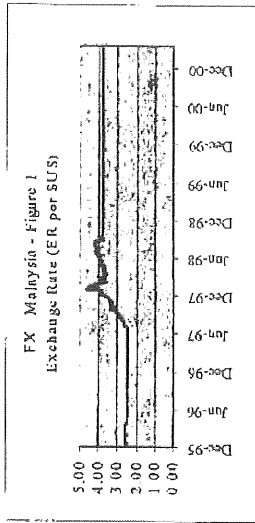
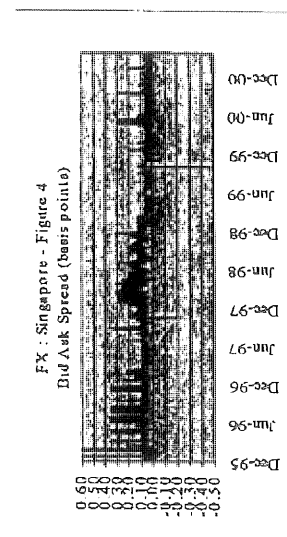
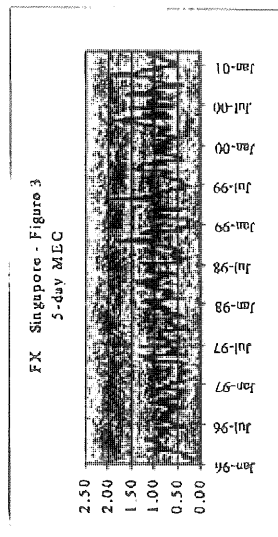
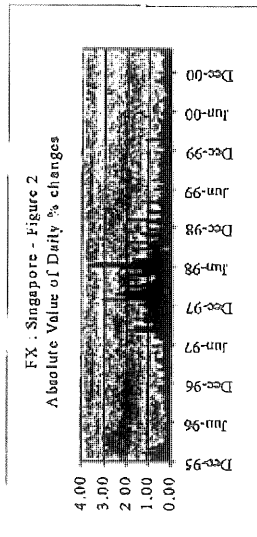
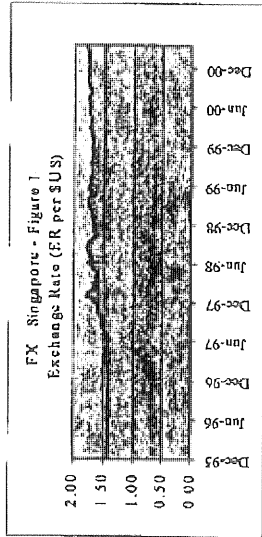
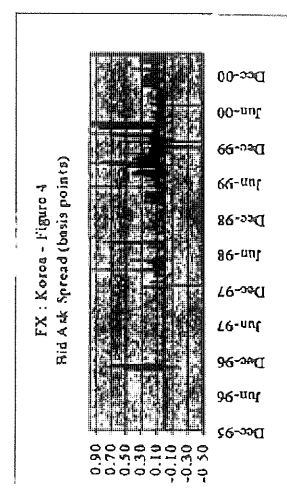
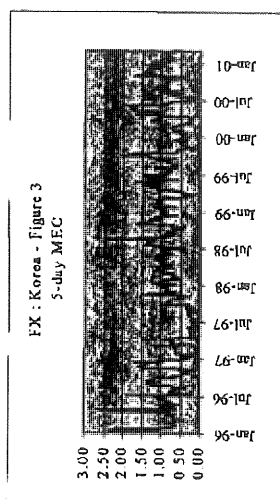
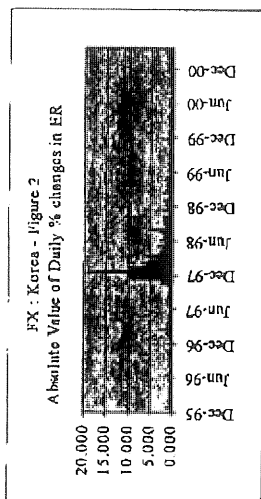
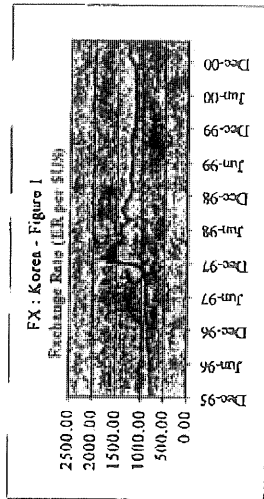
Outstanding value:

- Value at market price of pertinent most traded issues
- Value at market price of total market

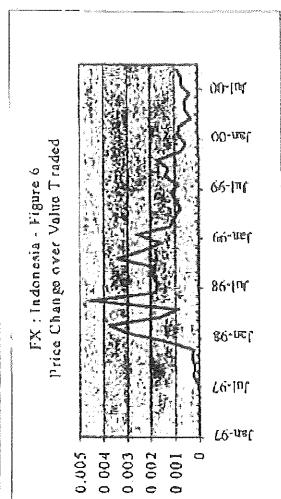
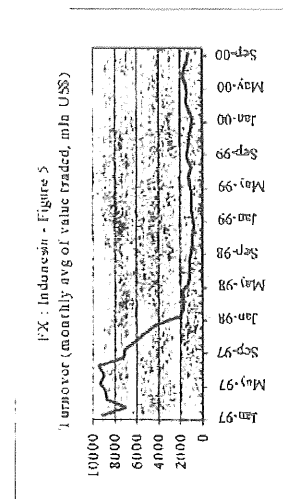
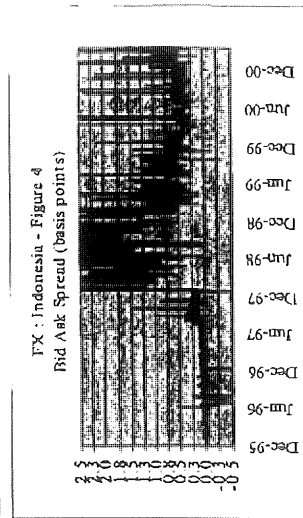
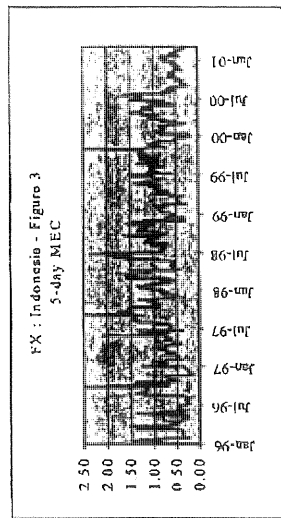
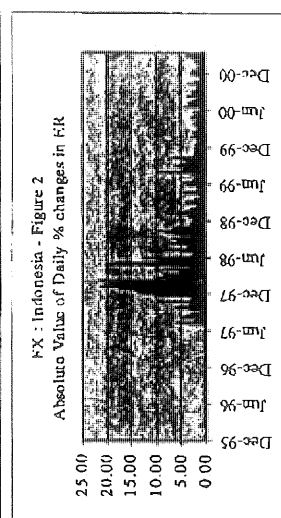
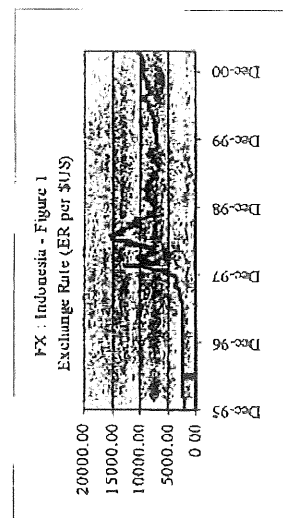
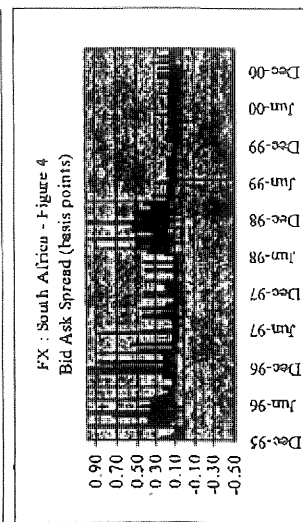
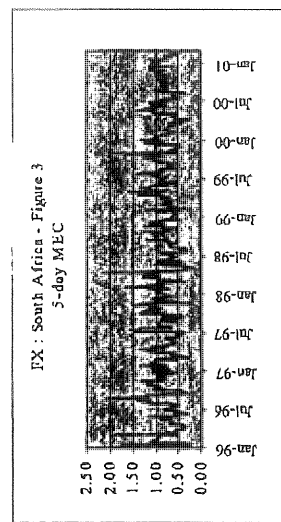
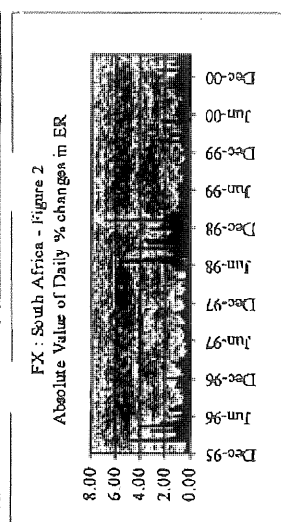
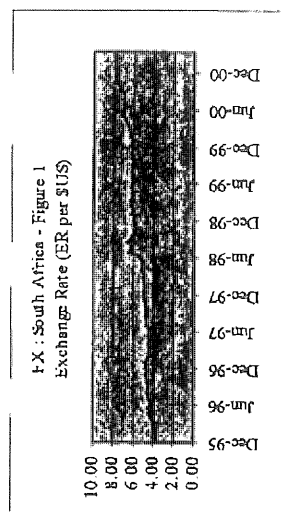
FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED FOREIGN EXCHANGE MARKETS



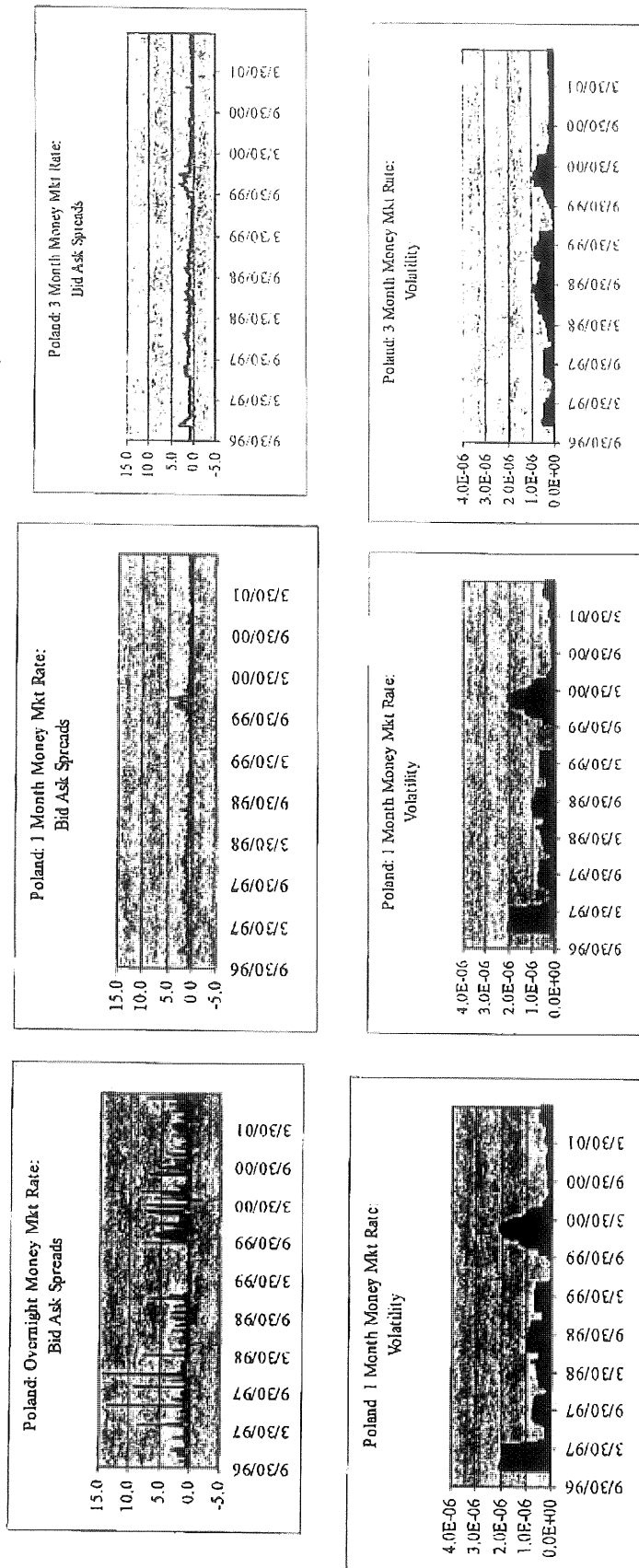
FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED FOREIGN EXCHANGE MARKETS



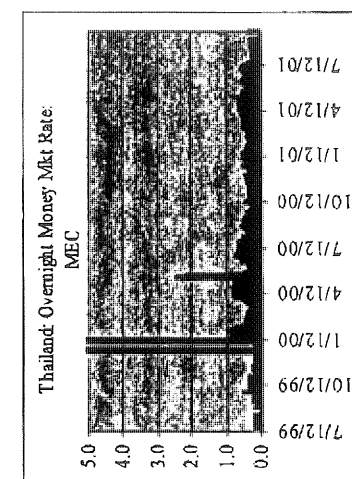
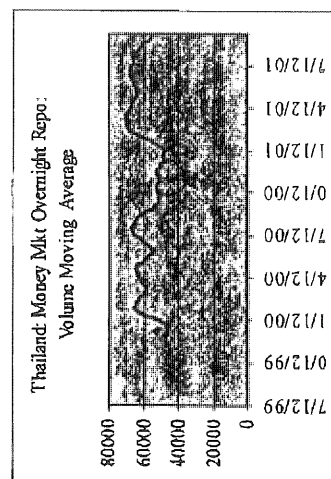
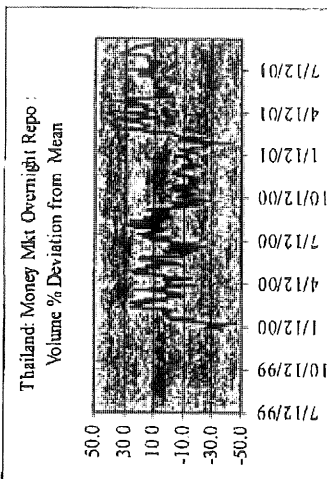
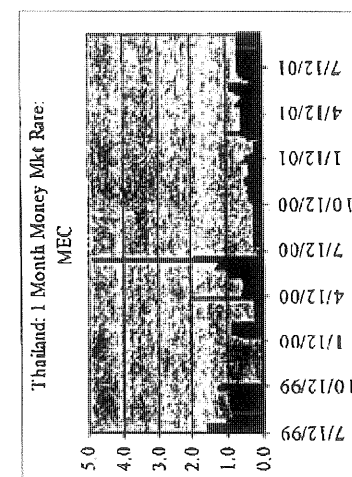
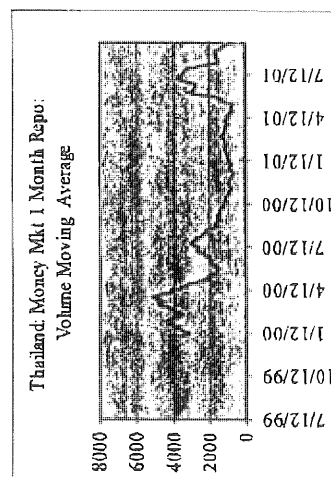
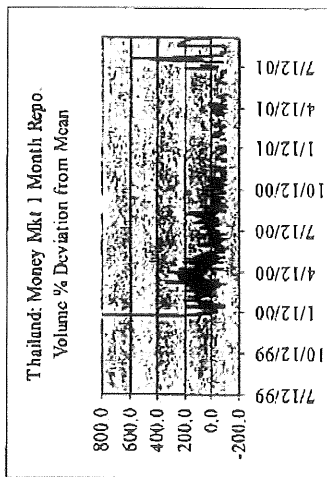
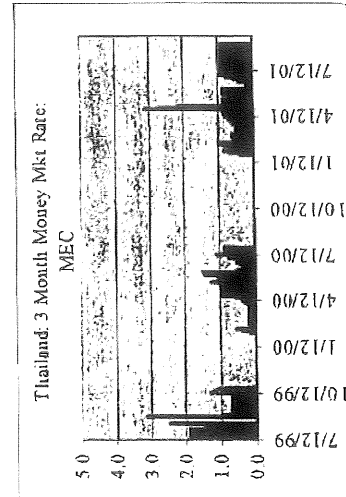
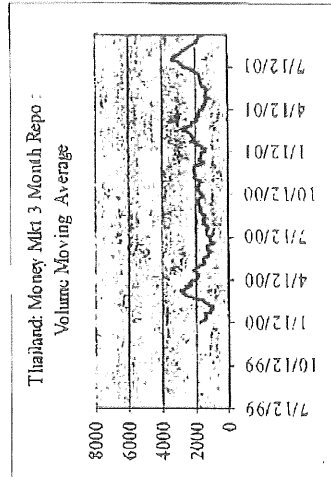
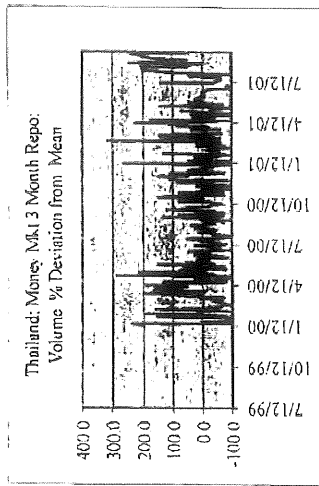
FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED FOREIGN EXCHANGE MARKETS



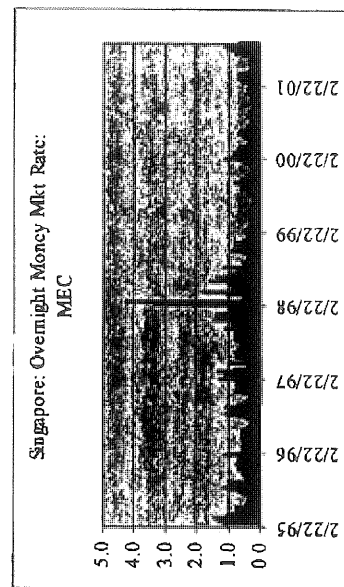
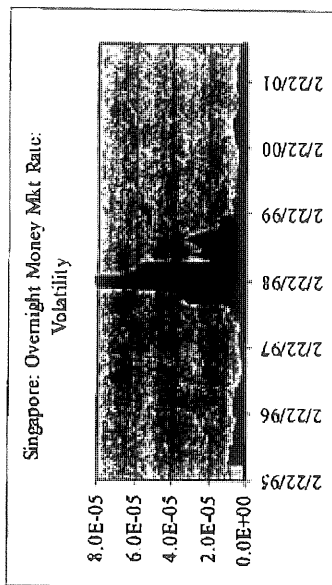
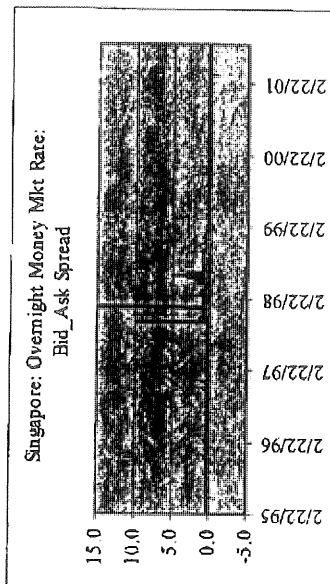
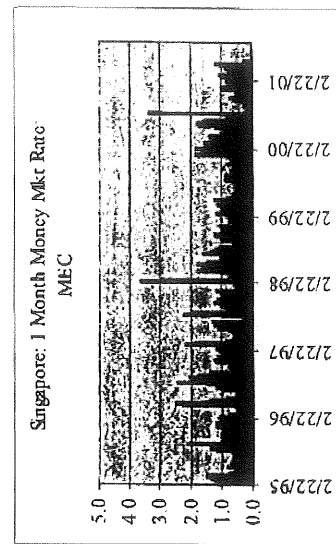
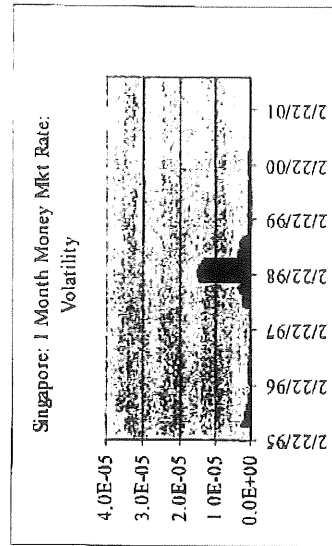
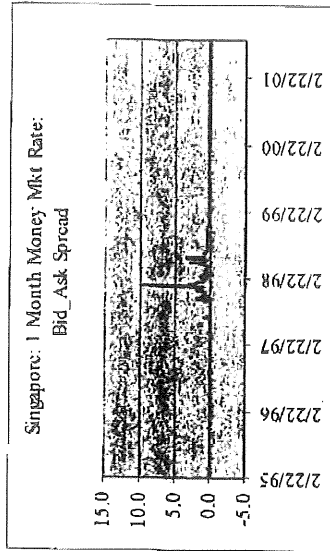
FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED MONEY MARKETS



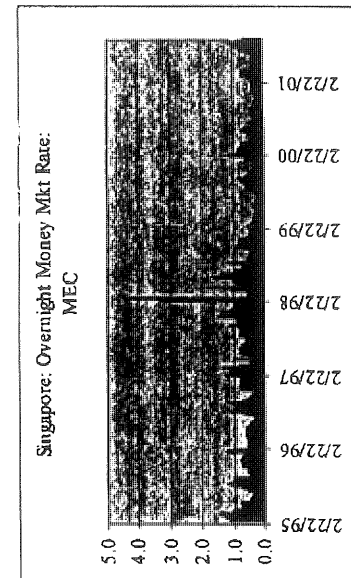
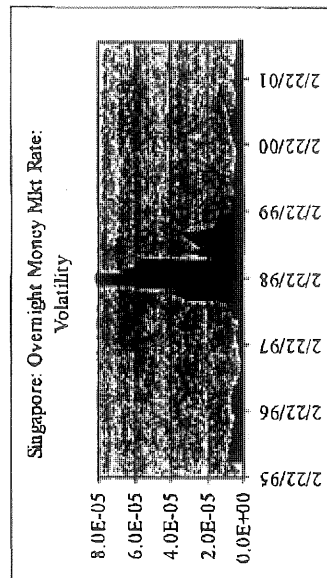
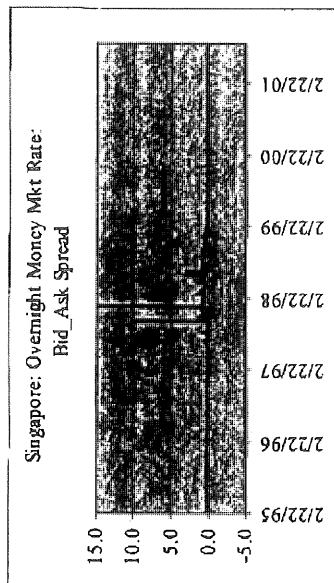
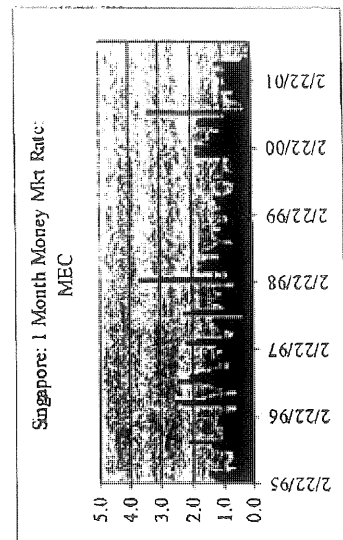
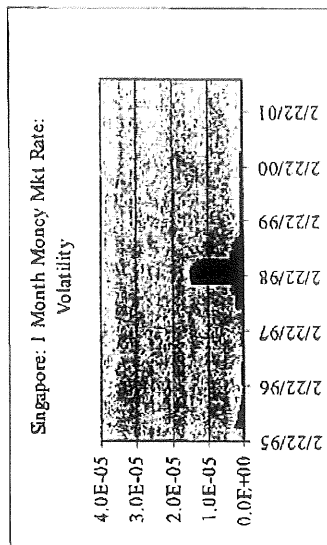
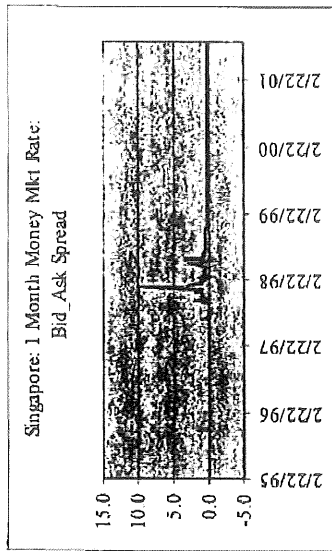
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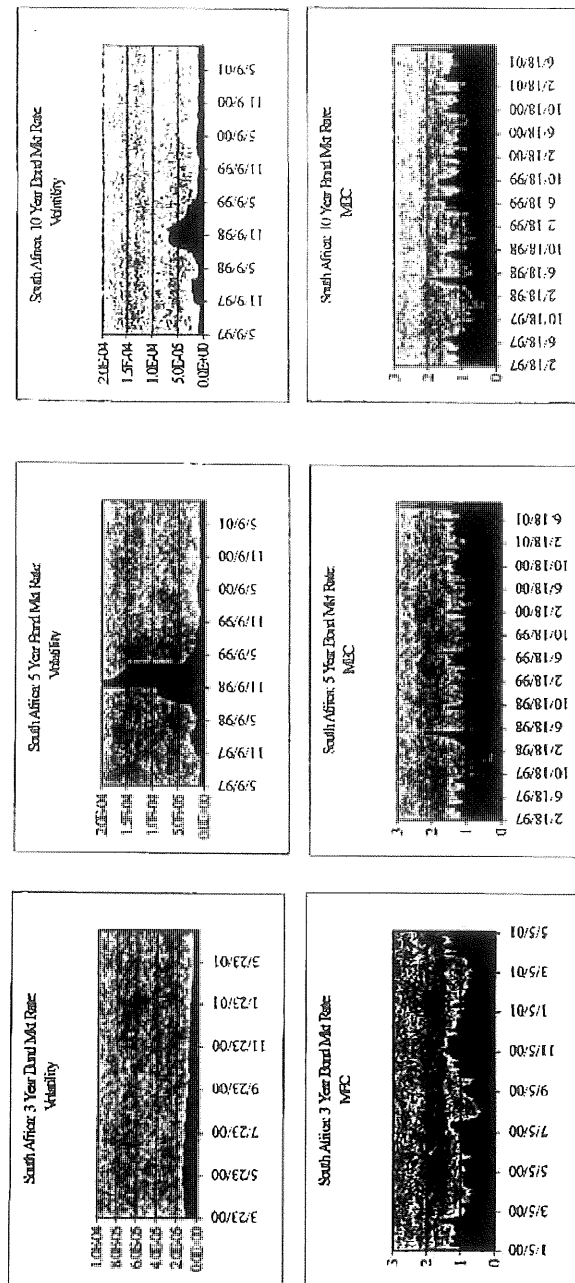


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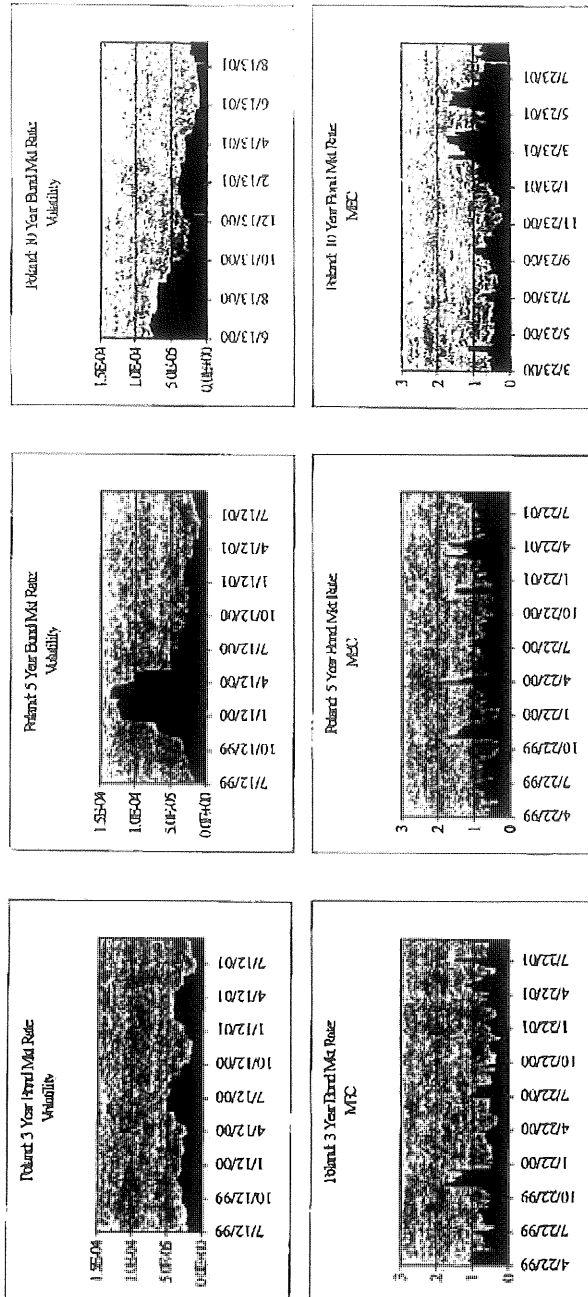


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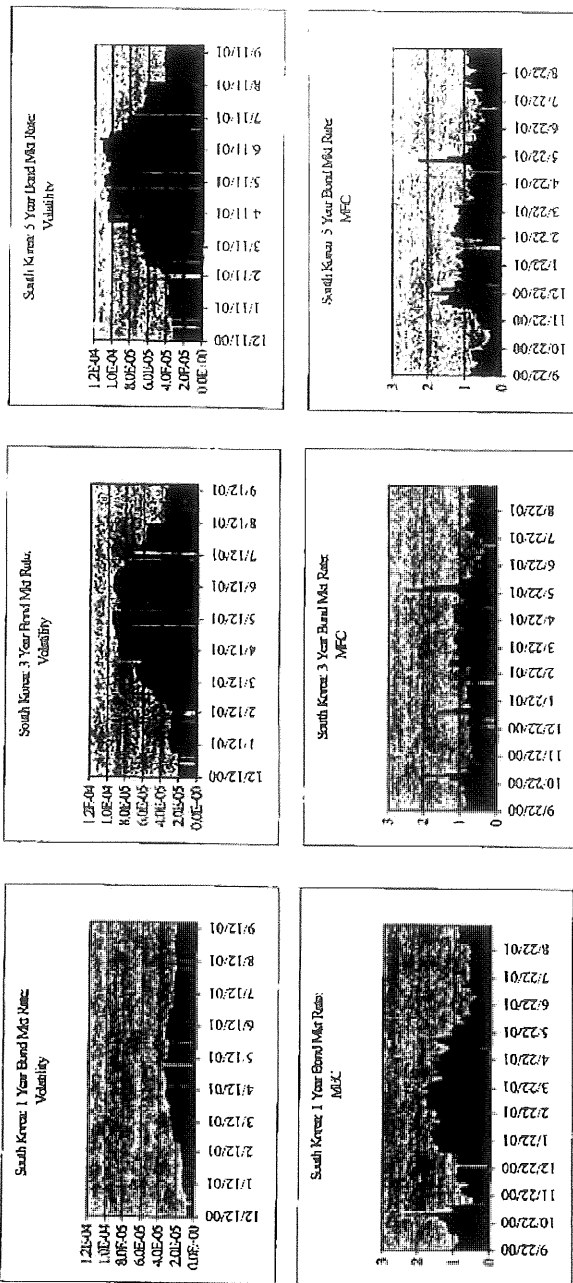
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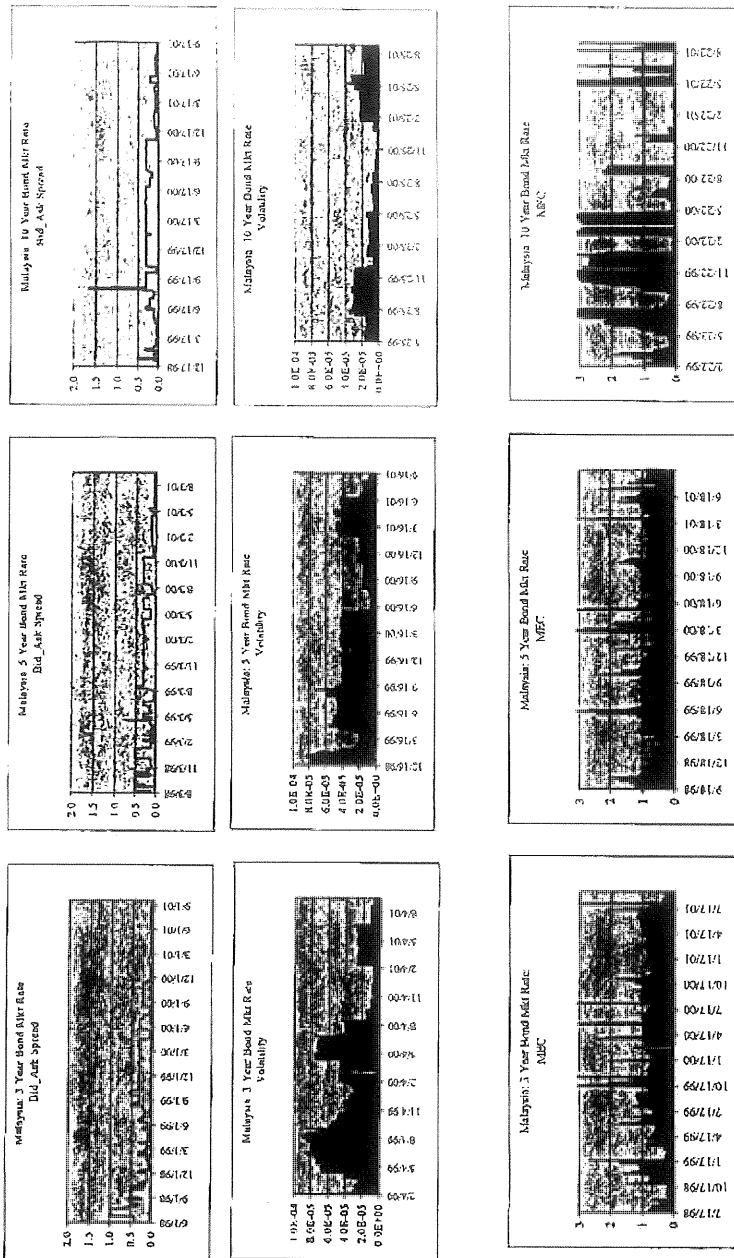
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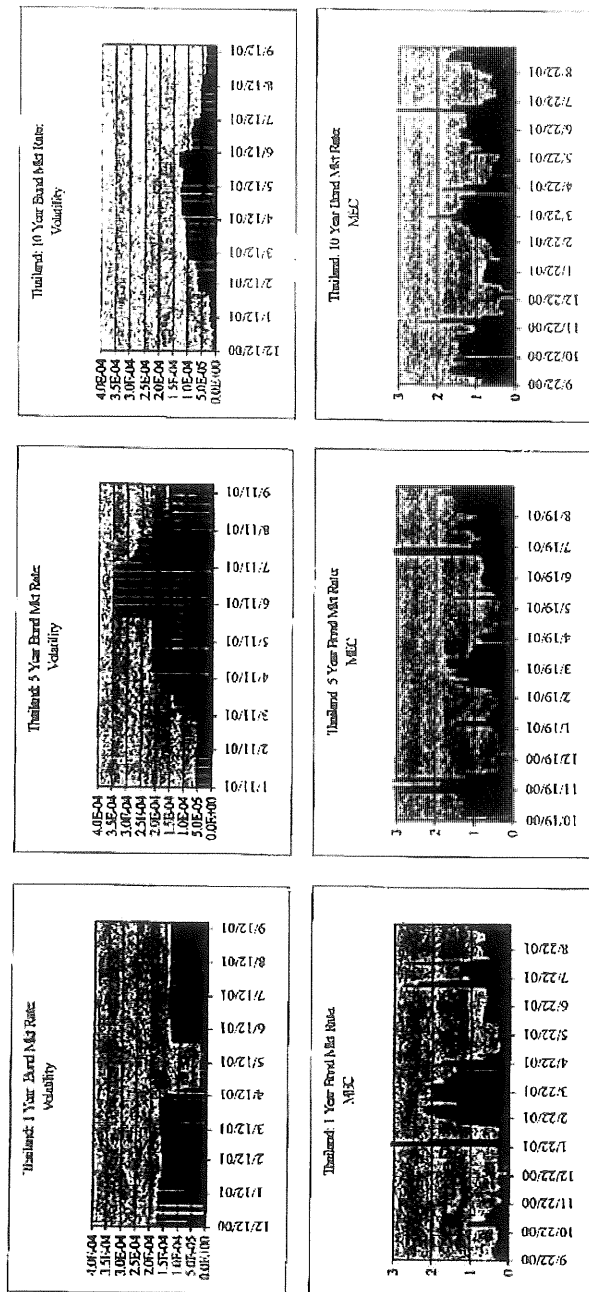
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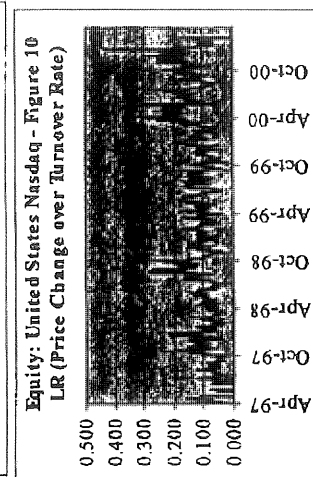
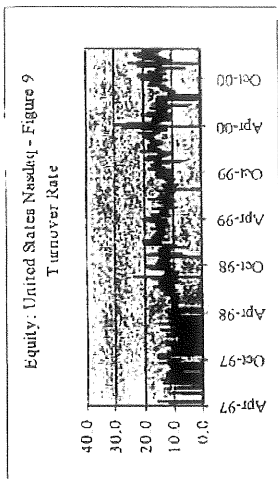
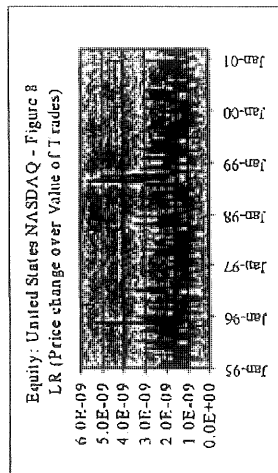
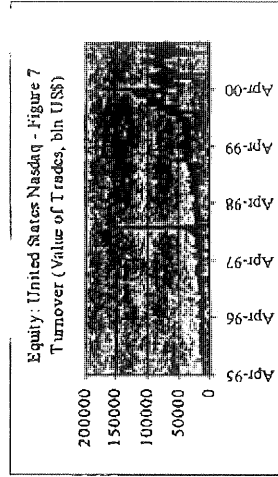
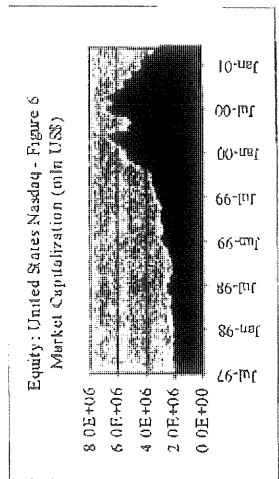
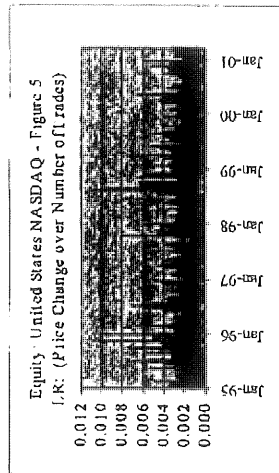
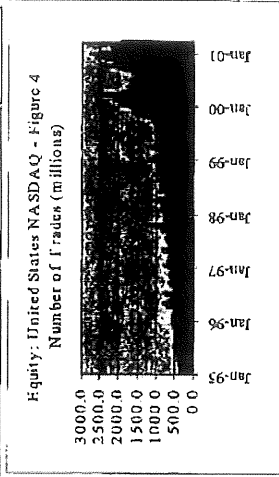
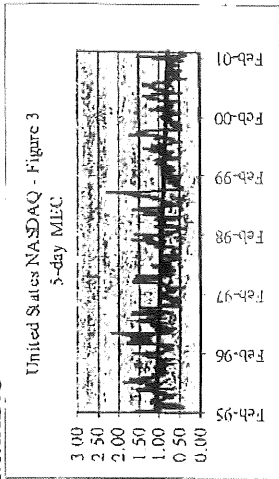
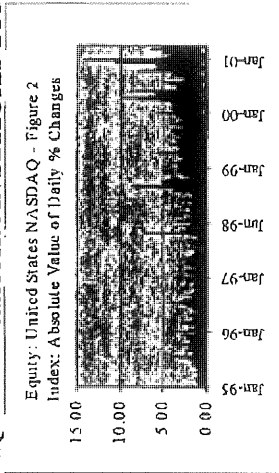
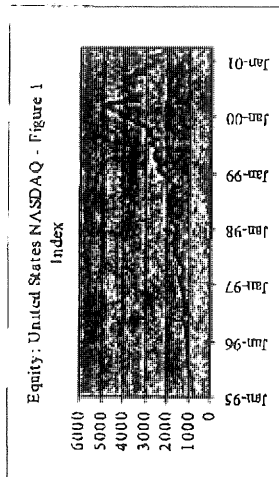


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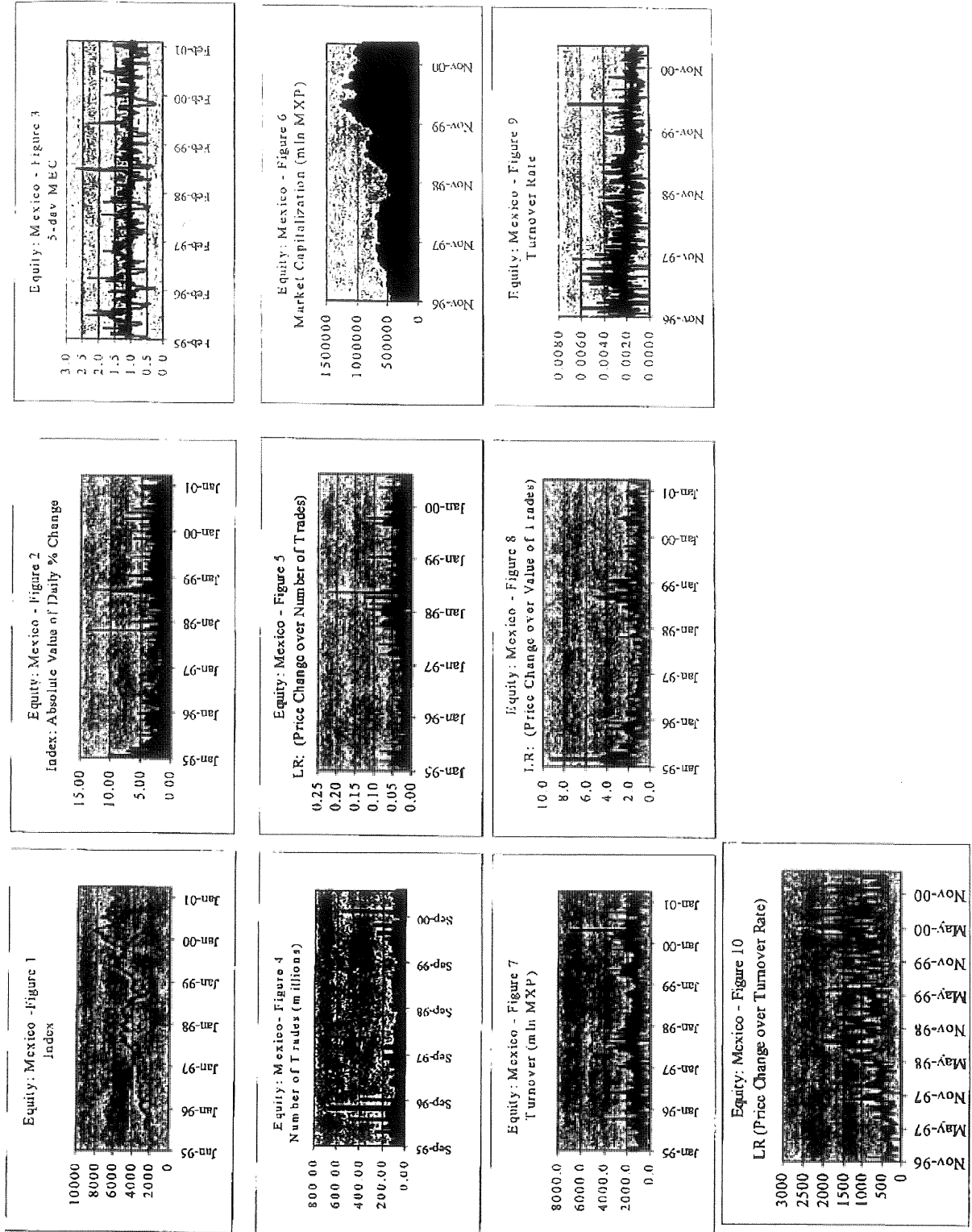


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FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED STOCK MARKETS

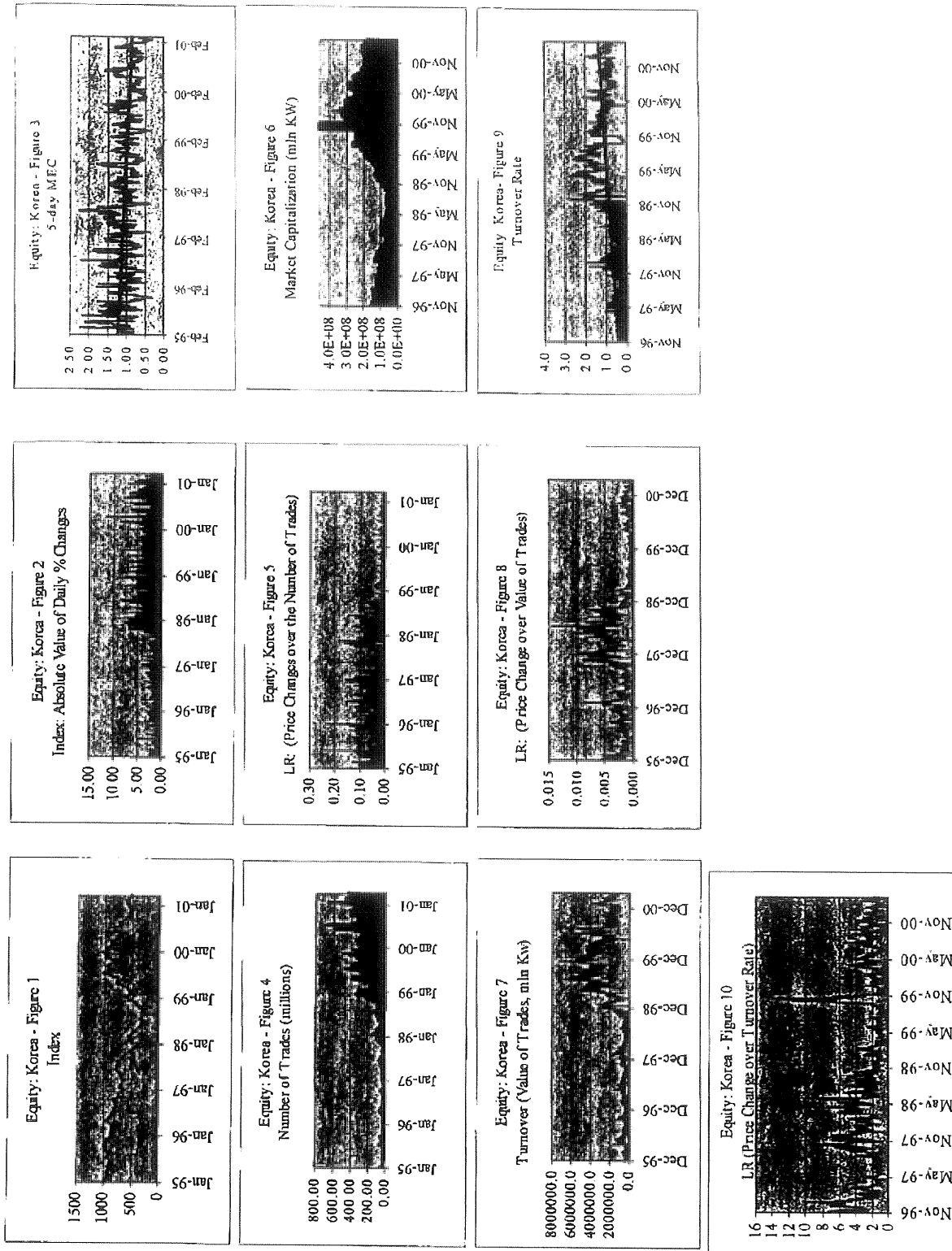


FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED STOCK MARKETS



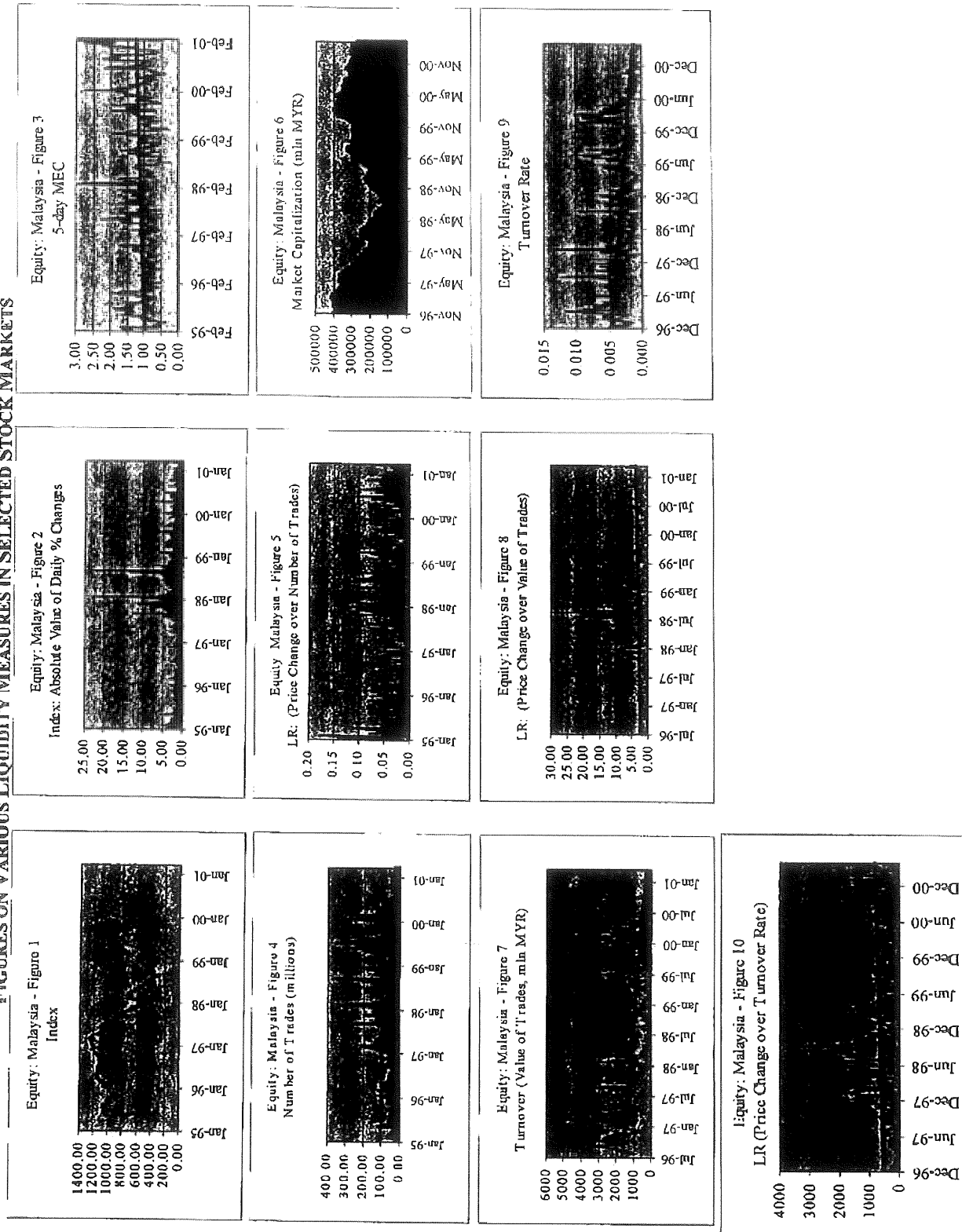
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FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED STOCK MARKETS



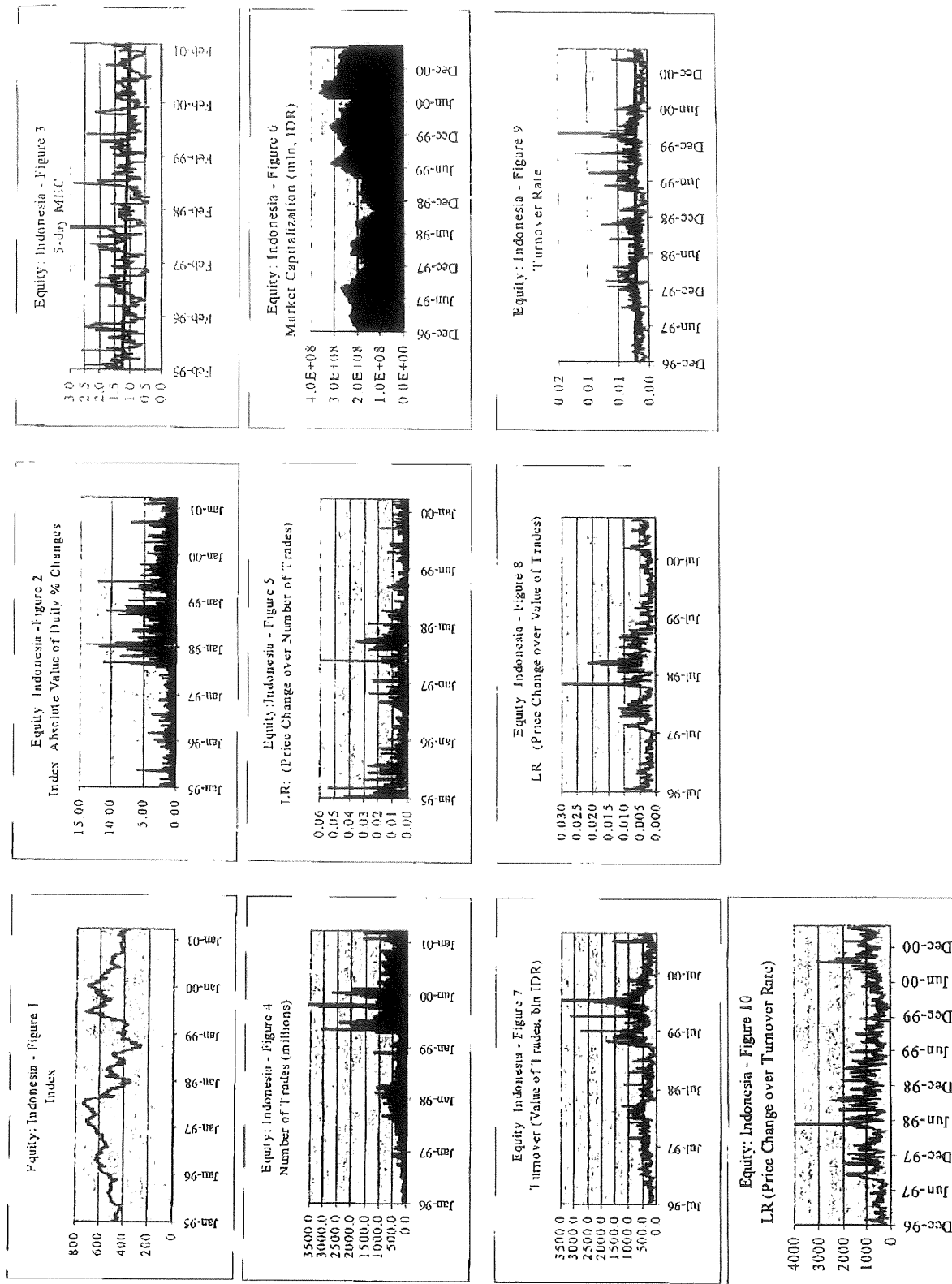
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FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED STOCK MARKETS



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FIGURES ON VARIOUS LIQUIDITY MEASURES IN SELECTED STOCK MARKETS



Source: Bloomberg.

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Annexure H

What does over the counter (OTC) mean?

OTC stands for over-the-counter. In trading terms, over-the-counter means trading through decentralised dealer networks. A decentralised market is simply a market structure consisting of various technical devices. This structure allows investors to create a marketplace without a central location. The opposite of OTC trading is exchange trading, which takes place via a centralised exchange.

An example of OTC trading is a security, currency, or other financial product being bought through a dealer, either by telephone or electronically. Business is typically conducted by telephone, email and dedicated computer networks. The OTC market is arranged through brokers and dealers who negotiate directly. An advantage of the OTC market is that non-standard quantities of stock can be traded.

The OTC market often includes smaller securities. It consists of stocks that do not need to meet market capitalisation requirements. OTC markets could also involve companies that cannot keep their stock above a certain price per share, or who are in bankruptcy filings. These types of companies are not able to trade on an

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These are not the only types of companies on the OTC market, however. Larger, established companies normally tend to choose an exchange to list and trade their securities on. But well known, large companies trade OTC too. For example, Allianz, BASF and Roche and Danone are traded on the OTCQX market.

OTC markets

The over-the-counter market is a network of companies which serve as a market maker for certain inexpensive and low-traded stocks such as penny stocks. Stocks which trade on an exchange are called listed stocks, whereas stocks which are traded over the counter are referred to as unlisted stocks.

Although there are differences between OTC and major exchanges, investors shouldn't experience any major variations when trading. A financial exchange is a regulated, standardised market and is therefore considered safer. It may also be seen as enabling faster transactions.

What are the risks of OTC trading?

The OTC markets have experienced improvements in recent years. This results in higher liquidity and better information. Electronic quotation and trading have enhanced the OTC market. However, OTC markets are still characterised by a number of risks that may be less prevalent in formal exchanges.

Regulations

Investors may, however, experience additional risk when trading OTC. While brokers and dealers operating in the US OTC markets are regulated by the Financial Industry Regulatory Authority (FINRA), exchanges are subject to more stringent regulation than OTC markets.

Transparency

OTC prices are not disclosed publicly until after the trade is complete. Therefore, a trade can be executed between two parties via an OTC market without others being aware of the price point of the transaction. This lack of transparency could cause investors to encounter adverse conditions. Comparatively, trading on an exchange is carried out in a publicly transparent manner. This can give some investors added assurance and confidence in their transactions. How securities are traded plays a critical role in price determination and stability.

Volatility

Another factor with OTC stocks is that they can be quite volatile and unpredictable. They can also be subject to market manipulation, so risk management techniques are recommended when trading. A stop-loss order will automatically close a position once it moves a certain number of points against the trader. A limit will close a position once it moves a certain number of points in favour of the trader. For both types of orders, traders can set triggers at predetermined price levels so they can define their profit and loss amounts in advance.

What can I trade over the counter?

OTC markets and exchange markets are the two standard ways of organising financial markets. Stock trades must take place either through an exchange, or via the OTC market. However, some stocks trade on both an exchange and OTC.

Debt securities and other financial instruments, such as derivatives, are traded over the counter. Equities are also traded on the OTC market. Particular instruments such as bonds do not trade on a formal exchange – these also trade OTC by investment banks. OTC systems are used to trade unlisted stocks, examples of which include the OTCQX, OTCQB, and the OTC Pink marketplaces (previously the OTC Bulletin Board and Pink Sheets) in the US. These provide an electronic service which gives traders the latest quotes, prices and volume information.

OTC Markets Group

The OTC Markets Group is an essential part of the OTC market. It's a network of over 100 broker-dealers with headquarters in New York. The group prices and trades a vast range of securities on the OTC markets platform. The OTC Markets Group provides price and liquidity information for almost 10,000 OTC securities. It operates many of the better known networks, such as the OTCQX Best Market, OTCQB Venture Market and Pink Open Market.

Benefits of OTC markets

The OTC market also consists of shares of companies that do not wish to meet strict exchange requirements. Some businesses do not want to pay the cost the exchanges charge. The NYSE has a schedule of fees and charges for its exchange services. Administrative fees can go up to \$250,000 a year. Their listing fees can go up to \$150,000, depending on the size of the company. Various other charges may also exist.

OTC transactions are free from exchange fees. The OTC market helps companies and institutions promote equity or financial instruments that wouldn't meet the requirements of regulated well-established exchanges.

The OTC market can be split into two categories. The customer market, where dealers trade with their clients, and the inter-dealer market, where dealers trade amongst each other. The price a dealer quotes can differ depending on who they are interacting with.

Moving from an OTC market to a major exchange

A publicly-traded company can have its shares freely traded on a stock exchange, or through over-the-counter markets. OTC markets form a quote system between companies that buy and sell stocks away from the exchange. To some investors, companies that trade OTC are classified as 'riskier' investments. This comes back to the lack of public information on these businesses, as well as there being no minimum quantitative listing standards.

Many institutional investors have by-laws that prevent them from investing in companies that trade OTC. Retail investors are usually asked to sign a waiver from their broker or dealer stating they understand the risks associated with OTC traded stocks. Even online brokerages have restrictions when it comes to OTC stocks. This can be a big disadvantage for a small company seeking liquidity.

At some point, a company may decide it wants to move from an OTC market to a formal exchange. Formal exchanges include NASDAQ or the New York Stock Exchange (NYSE).

Benefits of moving to a major exchange

Transferring to a bigger, official exchange can be advantageous. A major exchange like NASDAQ offers increased visibility and liquidity. Making the switch can be favourable to a company's financing efforts. An organisation can increase its visibility with institutional investors. Companies moving to a major exchange can also expect to see an increase in volume and stock price.

Requirements

So how does a company make the jump to a major exchange? It must meet the new exchange's financial and regulatory requirements. These include price per share, corporate profits, revenue, total value, trading volume and reporting requirements. Reports are filed and can be viewed by the public. Shareholders and the markets must be kept informed on a regular basis in a transparent manner.

The NYSE requires all its listed companies to have 1.1 million publicly held shares. These must be held by a minimum of 2,200 shareholders and the minimum share price must be \$4.00. It also asks for an average monthly trading volume of 100,000 shares.

The transition process

The company transitioning from OTC to a major exchange must be approved for listing by the relevant exchange. A completed application is necessary, along with various financial statements. This can include complete statements of shares outstanding and capital resources. A press release may have to be issued to notify shareholders of the decision. The fact that a company meets the quantitative initial listing standards does not always mean it will be approved for listing. The NYSE, for example, may deny a listing or apply more stringent criteria.

Once a company is listed with an exchange, providing it continues to meet the criteria, it will usually stay with that exchange for life. However, companies can also apply to move from one exchange to another. If accepted, the organisation will usually be asked to notify its previous exchange, in writing, of its intention to move. Despite the elaborate procedure of a stock being newly listed on an exchange, a new initial public offering (IPO) is not carried out. Rather, the stock simply goes from being traded on the OTC market, to being traded on the exchange.

Following the move, a company's stock symbol may change. Stocks that move from the OTC to NASDAQ often keep their symbol. This is because the OTC and NASDAQ both allow up to five letters. In contrast, NYSE regulations limit a stock's symbol to three letters.

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Long Position (Long) Annexure I

By JAMES CHEN | Updated Mar 20, 2020

What Is Long Position (Long)?

A long position—also known as simply long—is the buying of a stock, commodity, or currency with the expectation that it will rise in value. Holding a long position is a bullish view. A long position is the opposite of a short position (short).

OPTIONS

FUTURES



CME Group Options on Futures

Annexure J

As the world's leading and most diverse derivatives marketplace, CME Group is where the world comes to manage risk. CME Group exchanges offer the widest range of global benchmark products across all major asset classes, including futures and options based on interest rates, equity indexes, foreign exchange, energy, agricultural commodities, metals, weather and real estate. CME Group brings buyers and sellers together through its CME Globex® electronic trading platform and its trading facilities in New York and Chicago. CME Group also operates CME Clearing, one of the world's leading central counterparty clearing providers, which offers clearing and settlement services across asset classes for exchange-traded contracts and over-the-counter derivatives transactions. These products and services ensure that businesses everywhere can substantially mitigate counterparty credit risk.

Options on Futures

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CME Group's vast and liquid family of option contracts on futures can help you diversify your portfolio while helping to mitigate your downside risk. This introductory guide will walk you through the basic fundamentals, strategy and vocabulary of our options markets, providing a solid base of knowledge that will make you well-prepared to tackle these opportunities.

We also would like to share our most active options on futures contracts traded at CME Group. This listing is not exhaustive of all options products, but is a good representation of the broad spectrum of options that we offer.

Most Active Options Products

The following represents some of the most active options contracts traded on futures at CME Group. This listing is not exhaustive of all options products, but is a good representation of the types of options that CME Group offers.

Agriculture: Chequer, Corn, Feeder Cattle, Live Hogs, Live Cattle, Cattle BMB, Lumber, Cane, Soybeans, Soybean Meal, Soybean Oil, Wheat

Energy: Ethanol, Heating Oil, Light Sweet Crude Oil, Natural Gas, Propane, Gasoline, Brent Crude Oil

Equity Index: S&P 500, E-mini S&P 500, E-mini NASDAQ 100, E-mini Dow Jones

FX: Australian Dollar, British Pound, Canadian Dollar, Euro, Japanese Yen, New Zealand Dollar, Swiss Franc

Interest Rates: Eurodollar, Mid-Quiver, 90-Day Fed Funds, 2-, 5-, and 10-Year Note, U.S. Treasury Ultra Bond

Metals: Copper, Gold, Palladium, Platinum, Silver

Real Estate: S&P Case Shiller Home Price Index

Weather: Frost, Heat Index, Rainfall, Snowfall, Temperature

Vocabulary

Options on futures are relatively easy to understand once you master the basic vocabulary. Only advanced options concepts and strategies require complex mathematics.

Option

An option on a futures contract is the right, but not the obligation, to buy or sell a particular futures contract at a specific price on or before a certain expiration date. There are two types of options: call options and put options. Each offers an opportunity to take advantage of futures price moves without actually having a futures position.

Call Option

A call option gives the holder (buyer) the right to buy (go long) a futures contract at a specific price on or before an expiration date. For example, a CME September Japanese Yen 126 call option gives the holder (buyer) the right to buy or go long a Yen futures contract at a price of 126 (\$.0126/ Yen) anytime prior to September expiration. Even if yen futures rise substantially above .0126, the call holder will still have the right to buy Yen futures at .0126. If Yen futures moves below .0126, the call option buyer is not obligated to buy at .0126.

Put Option

A holder of a put option has the right to sell (go short) a futures contract at a specific price on or before the expiration date. For example, a CME October Live Cattle put gives the put holder the right to sell October Live Cattle futures at \$1.24/lb. Should the futures decline to \$1.14/lb., the put holder still retains the right to go short the contract at \$1.24/lb. If Cattle futures move higher, the put holder is not obligated to sell at \$1.24.

Option Buyer

An option buyer can choose to exercise their right and take a position in the underlying futures. A call buyer can exercise the right to buy the underlying futures and a put buyer can exercise the right to

sell the underlying futures contract. In most cases though, option buyers do not exercise their options, but instead offset (take the opposite position) them in the market before expiration, if the options have any value.

Option Seller

An option seller (i.e., someone who sells an option that they didn't previously own) is also called an option writer or grantor. An option seller is contractually obligated to take the opposite futures position if the option buyer exercises their right to the futures position specified in the option. In return for the premium, the option seller assumes the risk of taking a possibly adverse futures position.

Puts and Calls

Puts and calls are separate option contracts; they are not the opposite side of the same transaction. For every put buyer there is a put seller, and for every call buyer there is a call seller.

The option buyer pays a premium to the option seller in every transaction. The following is a list of the rights and obligations associated with trading put and call options on futures.

Call Buyers	Call Sellers
» pay premium	» collect premium
» have right to exercise, into in a long futures position	» have obligation if assigned, to assume a short futures position
» have time decay, works against them	» have time decay, works in their favor
» no margin performance bond requirements	» have performance bond margin requirements

Put Buyers	Put Sellers
» pay premium	» collect premium
» have right to exercise, into in a short futures position	» have obligation to assume if assigned, a long futures position
» time decay, works against them	» time decay, works in their favor
» no performance margin bond requirements	» have performance bond margin requirements

Exercise Price

Also known as the strike price, the exercise price is the price at which the option buyer may buy or sell the underlying futures contracts. Exercising the option results in a futures position at the designated strike price. For example, by exercising a CME September E-mini S&P 500 1290 call, the buyer of the option would then be long a September E-mini S&P 500 futures contract at 1290. If the holder of a CBOT August Soybean 15.00 put were to exercise their option, the result would be a short futures position, at \$15.00/bushel, in August Soybean Futures.

Strike prices are set by the Exchange and have different intervals depending on the underlying contract. Strike prices are set above and below the existing futures price and additional strikes are added if the futures move up or down.

Underlying Futures Contract

The underlying is the corresponding futures contract that is purchased or sold upon the exercise of the option. For example, an option on a March CBOT 10-Year Treasury Note futures contract is the right to buy or sell one such contract. An option on COMEX December Gold futures gives the right to buy or sell one COMEX December Gold futures contract.

Premium

The premium is the price that the buyer of an option pays and the seller of an option receives for the rights conveyed by an option. Ultimately the cost of an option is determined by supply and demand.

Various factors affect options premiums, including strike price level in relation to the futures price level; time remaining to expiration market volatility and interest rates —all of which will be discussed further.

Exercise

Exercise refers to the process whereby the option buyer asserts their right and goes long the underlying futures (when exercising a call) or short the underlying futures (when exercising a put).

Assignment

Assignment refers to the obligation of option sellers to take the opposite and possibly adverse futures position to the option buyers' if assigned and for this risk receive the premium. Remember: Buyers exercise and sellers get assigned.

Expiration Date/Last Trading Day

This is the last day on which an option can be exercised into the underlying futures contract. After this point the option will cease to exist; the buyer cannot exercise and the seller has no obligation.

Note that some options expire prior to the final settlement or expiration of the underlying futures contract. For example, a 2012 CME September British pound 1550 call option will expire September 7, 2012. However, the underlying futures will expire September 17, 2012. The last trading day is the last day on which an option can be offset.

Offset

The buyer is under no obligation to exercise an option on a futures contract. As a matter of fact, many traders choose to offset their option position prior to expiration. Traders will offset their option position if they wish to take profits before expiration or limit their losses. Options buyers can offset their options by instructing their broker to sell their option before expiration. An option seller can offset a position by buying back or "covering" a short position. Options on futures, like futures themselves, trade both on the trading floors, and on the CME Globex® electronic trading platform, where many options can be traded virtually around-the-clock

throughout the trading week.

Pricing Fundamentals

An option gives the options buyer the right, though not the obligation, to take a long or short position in a specific futures contract at a fixed price on or before the expiration date. For this right granted by the option contract the buyer pays a sum of money or premium to the option seller. The option seller (or writer) keeps the premium whether the option is exercised or not. The seller must fulfill the obligation of the contract if and when the option is exercised by the buyer.

How are options premiums (or prices) determined? While supply and demand ultimately determine the price of options, several factors have a significant impact on option premiums.

1. The volatility of the underlying futures markets

Volatility is a function of price movement. When prices are rising or falling substantially, volatility is said to be high. When a futures contract shows little price movement volatility is said to be low. High volatility generally causes option premiums to increase — sometimes very dramatically. Lower volatility environments generally cause options premiums to decline.

When markets become volatile, option buyers are willing to pay larger premiums for greater protection against adverse price risk because there is greater chance of price change in the underlying instrument. On the other hand, a greater chance for price change means more risk for the option seller. Sellers therefore demand a larger premium in exchange for this risk. It is much the same as insurance and insurance underwriters. If risk is perceived to be large, the insurance company will require a larger premium. If the risk is not large the insurance purchaser will usually not have to pay a large premium. With options, anytime there is a greater chance of the underlying futures advancing or declining through one or more exercise prices, risk is perceived to be greater and premiums will increase.

The Impact of Volatility on Option Premiums

	Low Volatility	Medium Volatility	High Volatility
CME Dec E-mini S&P 500			
1150 call option	8.50 pts.	11.40 pts.	14.20 pts.

The chart above shows that as volatility increases, (all other factors being equal) options premiums increase. Options traders should be sure to consider volatility before using these markets.

2. The exercise price compared to the underlying futures price

The relationship between the option's strike price and the underlying futures price is another key influence on option premiums. If NYMEX Crude Oil futures are trading at 98.00 per barrel, common sense tells us that a 94.00 call option will be worth more than an 96.00 call option (the right to buy \$2.00/barrel lower will be more costly). Similarly, a \$100.00 call option would be relatively cheap because the underlying NYMEX Crude Oil futures is a full \$2.00 points away from the exercise price.

3. Time remaining to expiration

An option's value erodes as its expiration nears. An option with 60 days until expiration will have greater theoretical value than an option with 30 days until expiration. When there is more time for the underlying futures to move, sellers will demand and buyers will be willing to pay a larger premium.

The Effect of Time on Option Premiums

	60 days until expiration	30 days until expiration
CBOT July 7.50 Corn call option value	\$0.25/bushel	\$0.15/bushel

Option Premium Quotations

Closing prices for CME Group options products are found in many business publications, such as

The Wall Street Journal. If you have mastered the vocabulary and concepts up to this point, locating various options with differing strike prices and expiration months should be easy. Delayed options quotes are also available on cmegroup.com, in the market data section under "Intraday Data." It is also possible to get options quotes, including real-time quotes through various quote vendors.

To understand option quotes in print format, please notice the shaded areas in the following Euro FX options table, showing the premium quotes on a Euro FX September 1.325 call option. The premium is quoted at .54 cents/euro. In other words, the buyer of this option has the right, but not the obligation, to go long Euro FX futures at 1.325 any time before expiration. The buyer of this call will pay \$675.00 (.54 cents/euro x 125,000 euro = \$675.00) to the seller.

CME EURO FX (IMM) – 125,000 Euros

1 Strike Price	2		3 Calls-Settle		4 Puts-Settle		1 Most active strike prices
	Jun-c	Sep-c	Dec-c	Jun-p	Sep-p	Dec-p	2 Expiration month
1.300	2.00	2.81	3.31	0.06	0.65	0.96	3 Settlement prices for call options
1.305	1.17	2.12	2.69	0.23	0.95	1.30	4 Settlement prices for put options
1.310	0.53	1.57	2.15	0.59	1.38	1.72	5 Volume of options transacted in the previous two trading sessions. Each unit represents both the buyer and the seller
1.315	0.19	1.12	1.69	1.25	1.90	2.22	
1.320	0.05	0.79	1.31	2.11	2.56	2.60	
1.325	0.02	0.54	1.01	3.08	3.29	3.46	6 The number of open short or long option positions at the end of the previous day's trading session
5 -----	Est. vol. 13,020, Wed. vol. 6,007 calls, 4,526 puts Open interest Wed.: 73,689 calls, 70,024 puts						
	6						

5 — Est. vol. 13,020, Wed. vol. 6,007 calls, 4,526 puts
Open interest Wed.: 73,689 calls, 70,024 puts

In the CME Swiss Franc option quote table, again notice the shaded areas. They represent the settlement price of a CME September Swiss Franc 102 put option, 1.26. This would give the put buyer the right to sell September CME Swiss Franc futures at 102 anytime between purchase and expiration. The buyer would pay \$1,575.00 (1.26 cents/franc x 125,000 francs = \$1,575.00) to the seller.

**CME SWISS FRANC (IMM) 125,000 francs;
cents per franc**

Strike Price	Calls-Settle			Puts-Settle		
	Sep-c	Dec-c	Mar-c	Sep-p	Dec-p	Mar-p
100	4.02	5.26	6.33	0.71	1.67	2.43
101	3.27	4.56	5.65	0.95	1.97	2.75
102	2.58	3.91	5.02	1.26	2.32	2.93
103	2.00	3.35	4.42	1.68	2.75	3.11
104	1.51	2.83	3.90	2.19	3.23	3.51
105	1.10	2.37	3.41	2.78	3.76	3.98

Open Interest
2,609 Calls; 2,046 Puts

Arithmetic

Breakeven Points

As mentioned previously, options are versatile instruments that allow the possibility of profit while also limiting risk to a predetermined amount. The maximum amount options buyers can lose is the premium that they originally paid, plus brokerage commissions. But before initiating an options position, the trader should first calculate the breakeven point. To calculate an options breakeven point the trader uses the strike price and the premium. Knowing breakeven points will help traders choose more effective strategies.

Example: A trader purchases a CME June E-mini S&P 500 1150 call option and pays a premium of 7.50. Where does the underlying futures have to advance for the option to break even at expiration?

Breakeven point for calls:

$$\begin{array}{rclclcl} \text{Strike Price} & + & \text{Premium Paid} & = & \text{Breakeven Point} \\ 1150 & + & 7.50 & = & 1157.50 \end{array}$$

Thus, for this position to break even, the underlying June futures contract has to advance to 1157.50.

Example: If a trader purchases a September Swiss Franc 85 put option for .99 pts., how far must the September CME Swiss Franc futures decline for the option to break even at expiration?

Breakeven point for puts:

$$\begin{array}{rclclcl} \text{Strike Price} & - & \text{Premium Paid} & = & \text{Breakeven Point} \\ 85 & - & .99 & = & 84.01 \text{ (or .8401)} \end{array}$$

* Commissions should also be factored into this equation, but differ from firm to firm. Discuss the effects of commissions on breakeven points with your broker.

Time Value and Intrinsic Value

The underlying futures price level compared with the exercise price and the passage of time both have an impact on options premiums. Two terms that describe these effects are referred to as time value and intrinsic value. An option's premium can be made up of one or both of these components. Calculating these two values requires only the strike price, the underlying futures price and the option premium.

Intrinsic value and time value for calls:

In the case of a call, intrinsic value is the amount by which the underlying futures price exceeds the strike price:

$$\text{Futures Price} - \text{Strike Price} = \text{Intrinsic Value} \\ (\text{must be positive or 0})$$

Example: NYMEX January Natural Gas futures are trading at 3.47 NYMEX Natural Gas Million British Thermal Units (MMBTU) and the January 3.45 call option is trading at \$0.28 MMBTU. What are the time value and intrinsic value components of the premium?

$$\begin{array}{rclcl} \text{Futures Price} & - & \text{Strike Price} & = & \text{Intrinsic Value} \\ 3.47 & - & 3.45 & = & 0.02 \end{array}$$

Time value represents the amount option traders are willing to pay over intrinsic value, given the amount of time left to expiration for the futures to advance in the case of calls, or decline in the case of puts.

$$\begin{array}{rclcl} \text{Options Premium} & - & \text{Intrinsic Value} & = & \text{Time Value} \\ 0.28 & - & 0.02 & = & 0.26 \end{array}$$

$$\begin{array}{rclcl} \text{Time Value} & + & \text{Intrinsic Value} & = & \text{Premium} \\ 0.26 & + & 0.02 & = & \$0.28 \end{array}$$

Intrinsic value and time value for puts:

In the case of a put, intrinsic value is the amount by which the underlying futures price is below the strike price:

$$\begin{array}{rclcl} & & \text{Intrinsic Value} & & \\ \text{Strike Price} & - & \text{Futures Price} & = & (\text{must be positive or 0}) \end{array}$$

$$\begin{array}{rclcl} \text{Put Option} & & & & \\ \text{Premium} & - & \text{Intrinsic Value} & = & \text{Time Value} \end{array}$$

$$\begin{array}{rclcl} \text{Put Time} & & \text{Put Intrinsic} & & \\ \text{Value} & + & \text{Value} & = & \text{Put Option Premium} \end{array}$$

Example: What are the time value and intrinsic value of a CME Eurodollar 95.00 put if the underlying futures are trading at 94.98 and the option premium is 0.03?

$$\begin{array}{rclcl} \text{Strike Price} & - & \text{Futures Price} & = & \text{Intrinsic Value} \\ 95.00 & - & 94.98 & = & 0.02 \end{array}$$

There are 0.02 points of intrinsic value.

$$\begin{array}{rclcl} \text{Options} & & & & \\ \text{Premium} & - & \text{Intrinsic Value} & = & \text{Time Value} \\ 0.03 & - & 0.02 & = & 0.01 \end{array}$$

There is 0.01 point of time value.

Important Concepts

In-the-money

A call option is said to be in-the-money when the futures price exceeds the strike price. A put is in-the-money when the futures price is below the strike price. For example, a COMEX September Silver 35.00 call option will be in-the-money if September Silver futures are above 35.00 meaning that the holder has the right to buy these futures at 35.00 regardless of how much the price has risen. Any option that has intrinsic value is in-the-money.

At-the-money

An option is at-the-money when the futures price equals the option's strike price. A CBOT December Mini-sized Dow call option with a strike price of 13,000 is at-the-money if the December Mini-sized Dow futures contract is trading at 13000.

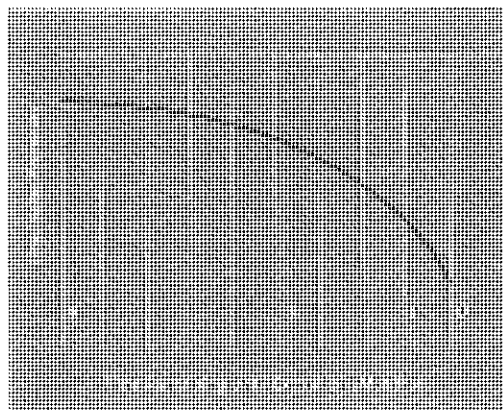
Out-of-the-money

When the futures price is below the strike price (for calls) or above the strike price (for puts) the option is said to be out-of-the-money. An out of the money option doesn't have intrinsic value, it only has time value. If CME Eurodollars are trading at 99.50, a 100.00 call would be out-of-the-money.

Delta

Delta measures the rate of change of an option premium with respect to a price change in the underlying futures contract. Delta is a measure of price sensitivity at any given moment. Not all options move point-for-point with their underlying futures contracts. If a futures contract moves .50 points and the option only moves .25 points, its delta is 50%; i.e., the option is only 50% as sensitive to the movement of underlying futures contract.

The delta will change as an option moves from out-of-the-money to at-the-money to in-the-money, approaching 100%. Deltas range from 0% to 100%. (0–1) The delta of the underlying futures contract underlying or cash product is 100% (options pricing software is normally used to calculate delta).



Time Value Decay

As discussed in the previous section, the value of an option beyond intrinsic value is called time value or extrinsic value. It is the sum of money option traders are willing to pay given the likelihood of the option increasing in value. Time value erodes as each day passes, accelerating as expiration nears. This characteristic of options is referred to as time-decay and is the reason why options are sometimes considered "wasting assets." If time passes and the underlying futures contract does not move far enough by expiration, the option's time value will decay and the option buyer may incur a loss. The graph above illustrates the principle of time decay and its acceleration as expiration draws near.

Performance Bond

An option buyer must only pay the amount of the premium, in full, at the time of the trade. However, because selling an option involves more risk, an option seller or writer will be required to post performance bond margin. Your broker can discuss the performance bond requirement associated with selling options (see section regarding risks in selling options). Once an options position is exercised into a futures position, performance bond margin is required, similar to any other futures position.

Basic Strategies

There are literally dozens of options strategies that a trader can employ to take advantage of a particular opinion and market environment. The examples that follow merely suggest what you can do given the flexibility of options, not what you should do.

Strategy A:

Buying calls to take advantage of a rising stock market

Example:

S&P 500 STOCK INDEX (CME) \$250 times premium

Strike Price	Calls-Settle			Puts-Settle		
	Mar-c	Jun-c	Sep-c	Mar-p	Jun-p	Sep-p
1145	11.80	14.40	24.20	0.30	3.00	8.20
1150	7.30	10.60	20.50	0.80	4.10	9.40
1155	3.40	7.30	17.10	1.80	5.80	10.80
1160	1.20	4.60	14.00	4.70	8.10	12.60
1165	0.20	2.70	11.20	-	11.10	-
1170	0.10	1.50	8.70	-	14.90	17.00

Est. vol. 11,631; Mon. vol. 5,373 calls; 7,170 puts
Open interest Mon; 79,531 calls; 150,715 puts

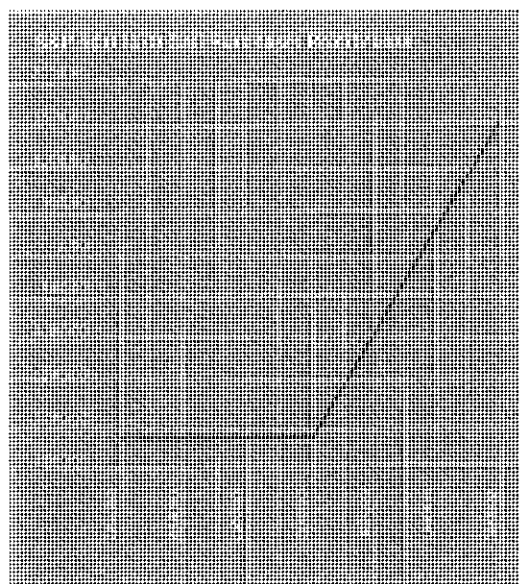
Outlook:	Significant advance in the stock market
Futures price	CME September S&P 500 futures @ 1165.50
Strategy:	Buy 1 CME September S&P 500 1170 call option @ 8.70 pts. (8.70 pts. X \$250/pt. = \$2175.00)
Breakeven point:	(strike + premium or 1170 + 8.70) in September futures
Risk:	Limited to premium paid; 8.70 pts/call (\$2175.00)

Profit/Loss at expiration

Futures Price	1170 Call Price	Profit/Loss
1155.00	0.00	-8.70 pts. (-2175)
1160.00	0.00	-8.70 pts. (-2175)
1165.00	0.00	-8.70 pts. (-2175)
1170.00	0.00	-8.70 pts. (-2175)
1175.00	5.00	-3.70 pts. (-925)
1180.00	10.00	+1.30 pts. (+325)
1185.00	15.00	+6.30 pts. (+1575)

Est. vol. 11,631; Mon. vol. 5,373 calls; 7,170 puts
Open interest Mon; 79,531 calls; 150,715 puts

As the profit/loss table above and the graph below demonstrate, buying calls can result in significant profits should the CME S&P 500 futures rally. More importantly though, the trader's risk is limited to 8.70 points no matter how far the CME S&P 500 futures may decline.



Strategy B:

Buying put options to profit from declining Lean Hogs

Example:

CME Lean Hogs 40,000 lbs: cents per lb.

Strike Price	Calls-Settle			Puts-Settle		
	Jun-c	Aug-c	Oct-c	Jun-p	Aug-p	Oct-p
80	3.72	2.92	5.02	0.02	0.55	0.52
82	1.87	1.57	3.45	0.17	1.17	0.90
84	0.47	0.72	2.10	0.77	2.27	1.50
86	0.10	0.27	1.15	2.40	-	2.50
88	0.00	0.10	0.55	-	-	-
90.00	-	0.22	-	-	-	-

Est. vol. 2,577; Mon. vol. 483 calls; 547 puts

Open interest Mon; 26,617 calls; 35,197 puts

Outlook: A speculator thinks hog prices will retreat from recent highs. He wants to avoid the unlimited risk associated with selling futures short.

Futures price: CME October Lean Hog futures @ 84.60

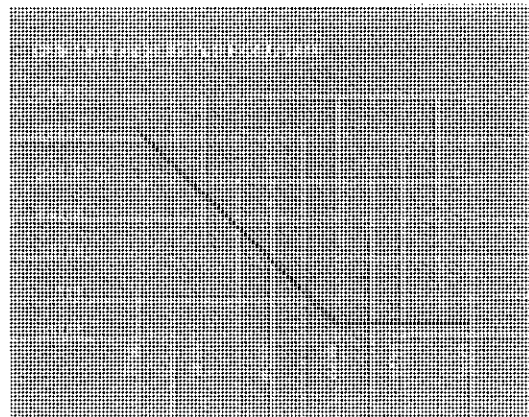
Strategy: Purchase CME October Lean Hog 82 put option @ .90
(Actual dollar amount: .90 cents/lb. x 40,000 lbs. = \$360.00)

Breakeven point: 81.10 cents/lb. (82.00 strike price – premium 0.91)

Risk: Limited to premium paid: .90 cents/lb. or \$360.00

Profit/Loss at expiration:

Futures Price	Put Price	Premium (Cost)	Profit/Loss
76.00	6.00	.90	5.10 (+2040.00)
78.00	4.00	.90	3.10 (+1240.00)
80.00	2.00	.90	1.10 (+440.00)
82.00	0.00	.90	.90 (-360.00)
84.00	0.00	.90	.90 (-360.00)
86.00	0.00	.90	.90 (-360.00)



Futures Prices and Profits/Losses

The graph above again demonstrates one of the prime advantages of buying options on futures. If the trader were wrong and CME Lean Hogs futures advanced sharply, his risk would be limited to the .90 cents/lb. premium he paid. And, if his analysis were correct, he could realize substantial profits on a relatively small investment.

Strategy C:

Straddles Using Options on CME E-mini S&P 500 futures

Outlook: Although a trader believes that volatility, currently at eight-year lows, will rise in the coming months, he is not sure of the direction of the underlying S&P 500 index.

Strategy: Trader decides to go long the March 1200 straddle (i.e., the at-the-money straddle using options on CME E-mini S&P 500 futures. He will thus go long the March 1200 call option and the March 1200 put option.

Strike	March Calls	March Puts
1190	34.10	25.50
1195	31.25	27.75
1200	28.25	29.75
1205	25.75	32.00
1210	23.25	34.50

March CME E-mini S&P 500 price: 1198.75

Cost of straddle: 58.00 pts (Call premium + Put premium)

Upside breakeven: $1200 + 58.00 = 1258.00$

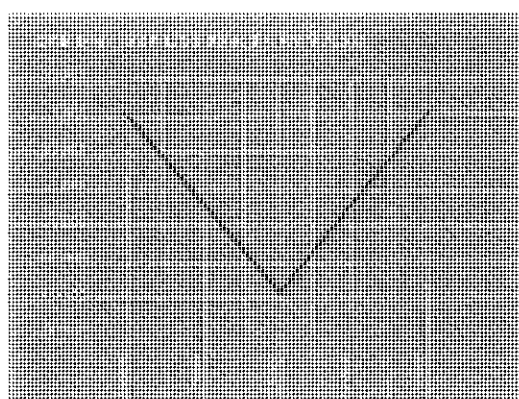
Downside breakeven: $1200 - 58.00 = 1142.00$

Maximum loss: 58.00 (limited to premium paid)

Point of maximum loss: 1200 (put and call become worthless at expiration)

Profit/Loss at Expiration

March Futures Price	1200 Call Price	1200 Put Price	Straddle Price	Total +/-
1100	0	100	100	+42.00
1150	0	50	50	-8.00
1200	0	0	0	-58.00
1250	50	0	50	-8.00
1300	100	0	100	+42.00



Straddles are designed to turn a profit as long as the underlying futures contract has a large enough move to cover the cost of the call and the put. In this case, the futures must move at least 58.00 pts. (the direction does not matter) to attain break even. Hence, any move above 1258 or below 1142 will allow the trader to profit.

Conversely, if you believe the markets will remain relatively stable, you could sell the straddle, which is selling both call and the put. Your profit opportunities would be the premium collected on both the call and the put if the markets remain stable or flat. However, your risk would occur if volatility increases and the underlying market moves significantly in either direction. Clearly, options offer a myriad of strategies to take advantage of all sorts of market conditions.

A Word About Selling Options on Futures

This booklet has emphasized the advantages of a limited risk investment involved in purchasing options on futures. As discussed earlier, if someone buys an option on a futures contract, there must be a seller on the other side of the trade. While selling options on futures can also be a profitable strategy, it must be stressed that it entails substantially more risk than buying options on futures. An individual who sells options on futures has the potential to lose large sums of money. The strategy should therefore only be initiated by individuals who fully understand options on futures as well as the considerable risk associated with option selling, and who can meet the financial requirements.

Review Questions

(Select all answers that are correct for each question)

1. Which of the following best describes options on futures?

- A. the right to buy or sell a futures contract
- B. the right to take delivery of a cash commodity
- C. the right to assign a futures contract

2. A put option is:

- A. the other side of a call option position
- B. the right to buy a futures contract
- C. the right to sell a futures contract

3. A call option is:

- A. the other side of a put option transaction
- B. the same as a short futures position
- C. the right to go long a futures contract

4. Options on futures are:

- A. usually offset before expiration
- B. wasting assets
- C. traded on regulated commodity exchanges such as CME CBOT NYMEX or COMEX
- D. all of the above

5. The premium of an option is:

- A. set by the exchange staff
- B. unaffected by futures prices
- C. determined by buyers and sellers reflecting supply and demand

6. The exercise price is:

- A. the number of days remaining in the life of an option
- B. the number of contracts you can exercise
- C. the price at which the option holder may go long (calls) or short (puts) the underlying futures

7. The different strike prices are set by:

- A. option sellers
- B. option buyers
- C. the Exchange

8. Intrinsic value for call options is calculated by:

- A. futures price minus the exercise price
- B. exercise price minus the futures price
- C. futures price minus the call premium

9. The breakeven point for a call option purchase is:

- A. strike price plus days to expiration
- B. futures price plus the call option premium
- C. strike price plus the call option premium

10. Options can be used by:

- A. speculators desiring to profit from a market move with limited risk
- B. hedgers wishing to protect themselves against adverse price moves
- C. both A and B

11. Sellers of options:

- A. should be aware of the risks involved with selling options
- B. can lose large sums of their trading capital
- C. must meet performance bond requirements
- D. all of the above

12. To take advantage of a rising market one could:

- A. sell call options on futures
- B. buy call options on futures
- C. sell futures contracts

13. If a trader pays 4.00 pts. for an option on the CME S&P 500 futures, the most they could lose is:

- A. 4.00 pts.
- B. 8.00 pts.
- C. losses could be unlimited

14. A speculator who is considering the purchase of a put option will:

- A. pay the entire premium up front
- B. put up performance bond funds
- C. profit if the market advances on him

15. CME Group Exchanges offer options on:

- A. equity products
- B. foreign currency products
- C. agricultural products
- D. interest rate products
- E. all of the above

16. If an option buyer exercises a call option on a futures contract, the resulting position will be:

- A. a long futures position
- B. a short futures position
- C. a neutral position

Answers to review questions:

1. A 2. C 3. C 4. D 5. C 6. C 7. C 8. A 9. C 10. C 11. D 12. B 13. A 14. A
15. E 16. A

Basic Option Strategies

Initiating a Market Position

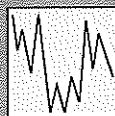
Bullish



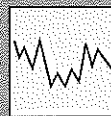
Bearish



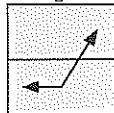
Volatile



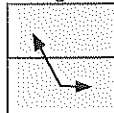
Stable



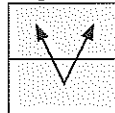
Long Call



Long Put

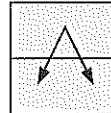


Long Straddle



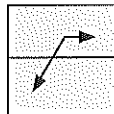
Buy a call and buy a put at same strike

Short Straddle

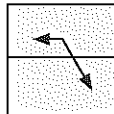


Sell a call and sell a put at same strike

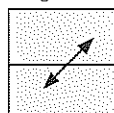
Short Put



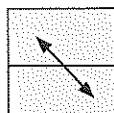
Short Call



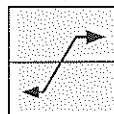
Long Futures



Short Futures

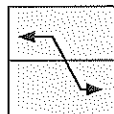


Bull Spread



Buy a call and sell a call at a higher strike, or Buy a put and sell a put at a higher strike

Bear Spread



Buy a put and sell a put at a lower strike, or Buy a call and sell a call at a lower strike

Sources of Additional Information

For more information about options on futures and the important opportunities they provide, contact your futures broker. Together, you can determine what role options should play in your investment strategy.

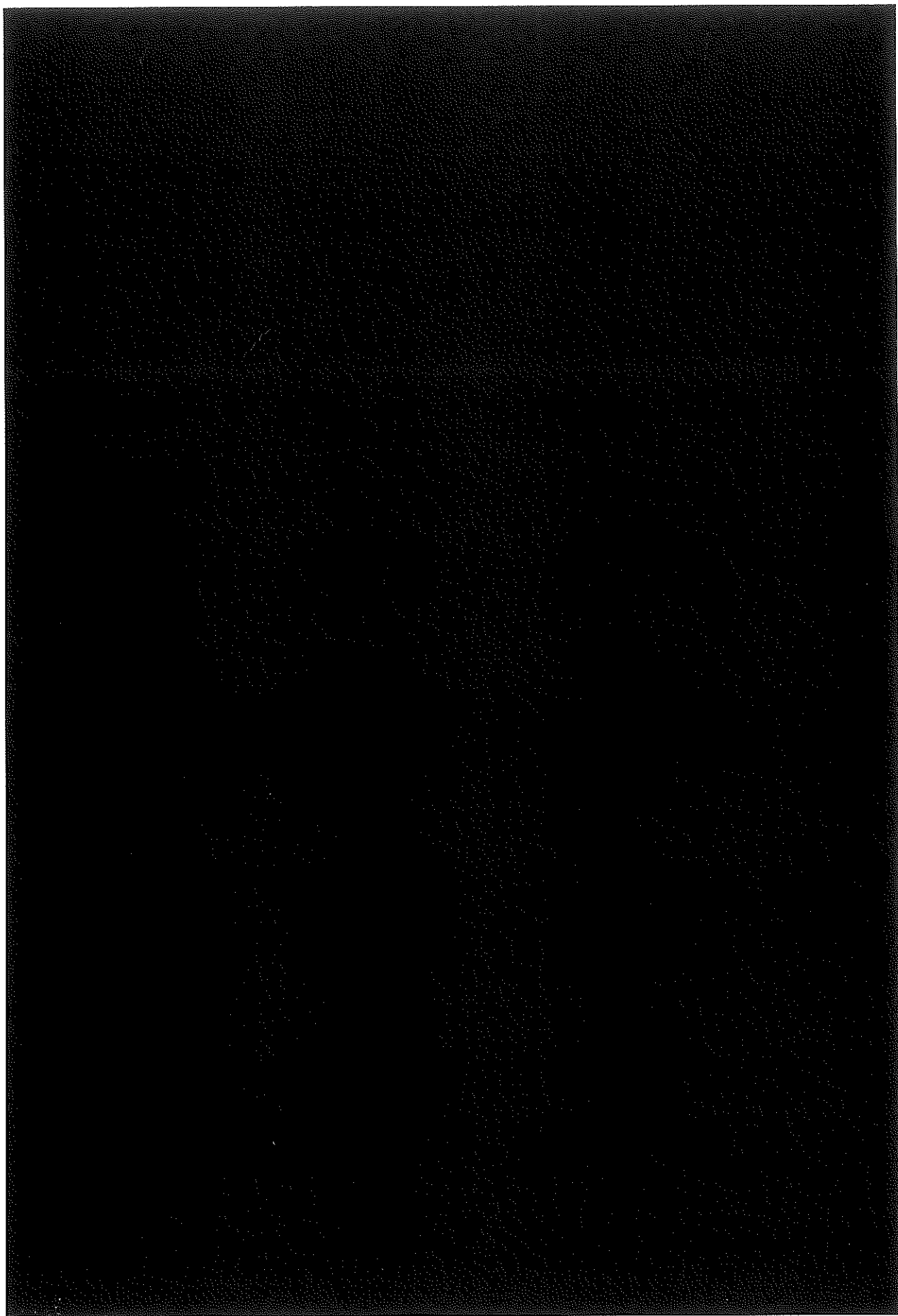
This brochure is intended as a discussion of the use of options on futures. It was not prepared to meet the Commodity Futures Trading Commission requirements for a disclosure statement about the risks of trading options on futures contracts. That statement must be furnished by your broker.

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Personal Community

CFD trading

What is CFD trading and how does it work?

How to trade CFDs

What are the benefits of trading CFDs?

English

CFDs vs share trading

Annexure K

What is CFD trading and how does it work?

Trading contracts for difference (CFDs) is a way of speculating on financial markets that doesn't require the buying and selling of any underlying assets. Find out everything you need to know to understand CFD trading, from what it is and how it works to short trades, leverage and hedging.

Interested in trading CFDs with IG?

Find out more

Practise on a demo

Contact us on 1800 601 799 or helpdesk.au@ig.com about opening an account. We're here 24hrs a day from 1pm Saturday to 7am Saturday (AEST).

Established 1974

178,000+ clients worldwide

17,000+ markets

What is CFD trading?

CFD trading is defined as 'the buying and selling of CFDs', with 'CFD' meaning 'contract for difference'. CFDs are a derivative product because they enable you to speculate on financial markets such as shares, forex, indices and commodities without having to take ownership of the underlying assets.

Your capital is at risk. CFDs can result in losses that exceed your initial deposit. Please ensure you fully understand the risks involved.



Instead, when you trade a CFD, you are agreeing to exchange the difference in the price of an asset from the point at which the contract is opened to when it is closed. One of the main benefits of CFD trading is that you can speculate on price movements in either direction, with the profit or loss you make dependent on the extent to which your forecast is correct.

The sections that follow explain some of the main features and uses of contracts for difference:

- Short and long trading
- Leverage
- Margin
- Hedging

Short and long CFD trading explained

CFD trading enables you to speculate on price movements in either direction. So while you can mimic a traditional trade that profits as a market rises in price, you can also open a CFD position that will profit as the underlying market decreases in price. This is referred to as selling or 'going short', as opposed to buying or 'going long'.

If you think Apple shares are going to fall in price, for example, you could sell a share CFD on the company. You'll still exchange the difference in price between when your position is opened and when it is closed, but will earn a profit if the shares drop in price and a loss if they increase in price.

With both long and short trades, profits and losses will be realised once the position is closed.

Learn how to trade CFDs

Leverage in CFD trading explained

CFD trading is leveraged, which means you can gain exposure to a large position without having to commit the full cost at the outset. Say you wanted to open a position equivalent to 500 Apple shares. With a standard trade, that would mean paying the full cost of the shares upfront. With a contract for difference, on the other hand, you might only have to put up 5% of the cost. Learn more about the differences between CFDs and share trading.

While leverage enables you to spread your capital further, it is important to keep in mind that your profit or loss will still be calculated on the full size of your position. In our example, that would be the difference in the price of 500 Apple shares from the point you opened the trade to the point you closed it. That means both profits and losses can be hugely magnified compared to your outlay, and that losses can exceed deposits. For this reason, it is important to pay attention to the leverage ratio and make sure that you are trading within your means.

Margin explained

Leveraged trading is sometimes referred to as 'trading on margin' because the funds required to open and maintain a position – the 'margin' – represent only a fraction of its total size.

When trading CFDs, there are two types of margin. A deposit margin is required to open a position, while a maintenance margin may be required if your trade gets close to incurring losses that the deposit margin – and any additional funds in your account – will not cover. If this happens, you may get a margin call from your provider asking you to top up the funds in your account. If you don't add sufficient funds, the position may be closed and any losses incurred will be realised.

Hedging with CFDs explained

CFDs can also be used to hedge against losses in an existing portfolio.

For example, if you believed that some ABC Limited shares in your portfolio could

suffer a short-term dip in value as a result of a disappointing earnings report, you could offset some of the potential loss by going short on the market through a CFD trade. If you did decide to hedge your risk in this way, any drop in the value of the ABC Limited shares in your portfolio would be offset by a gain in your short CFD trade.

How do CFDs work?

Now you understand what contracts for difference are, it's time to take a look at how they work. Here we explain four of the key concepts behind CFD trading: spreads, deal sizes, durations and profit/loss.

1 Spread and commission

CFD prices are quoted in two prices: the buy price and the sell price.

- The sell price (or bid price) is the price at which you can open a short CFD
- The buy price (or offer price) is the price at which you can open a long CFD

Sell prices will always be slightly lower than the current market price, and buy prices will be slightly higher. The difference between the two prices is referred to as the spread.

Most of the time, the cost to open a CFD position is covered in the spread: meaning that buy and sell prices will be adjusted to reflect the cost of making the trade.

The exception to this is our share CFDs, which are not charged via the spread. Instead, our buy and sell prices match the price of the underlying market and the charge for opening a share CFD position is commission-based. By using commission, the act of speculating on share prices with a CFD is closer to buying and selling shares in the market.

[Learn more about the spread](#)

2 Deal size

CFDs are traded in standardised contracts (lots). The size of an individual contract varies depending on the underlying asset being traded, often mimicking how that asset is traded on the market.

Silver, for example, is traded on commodity exchanges in lots of 5000 troy ounces, and its equivalent contract for difference also has a value of 5000 troy ounces. For share CFDs, the contract size is usually representative of one share in the company you are trading. To open a position that mimics buying 500 shares of HSBC, you'd buy 500 HSBC CFD contracts.

This is another way in which CFD trading is more similar to traditional trading than other derivatives, such as options.

3 Duration

Most CFD trades have no fixed expiry – unlike options. Instead, a position is closed by placing a trade in the opposite direction to the one that opened it. A buy position of 5 gold contracts, for instance, would be closed by selling 500 gold contracts.

If you keep a daily CFD position open past the daily cut-off time (typically 10pm UK time, although this may vary for international markets), you'll be charged an overnight funding charge. The cost reflects the cost of the capital your provider has in effect lent you in order to open a leveraged trade.

This isn't always the case though, with the main exception being a forward contract. A forward contract has an expiry date at some point in the future, and has all overnight funding charges already included in the spread.

4 Profit and loss

To calculate the profit or loss earned from a CFD trade, you multiply the deal size of the position (total number of contracts) by the value of each contract (expressed per point of movement). You then multiply that figure by the difference in points between the price when you opened the contract and when you closed it.

$$\begin{array}{c} \text{Profit or loss} \\ = \\ (\text{no. of contracts} \times \text{value of each contract}) \\ \times (\text{closing price} - \text{opening price}) \end{array}$$

For a full calculation of the profit or loss from a trade, you'd also subtract any charges or fees you paid. These could be overnight funding charges, commission or guaranteed stop fees.

Say, for instance, that you buy 50 FTSE 100 contracts when the buy price is 7500.0. A single FTSE 100 contract is equal to a \$10 per point, so for each point of upward movement you would make \$500 and for each point of downward movement you would lose \$500 (50 contracts multiplied by \$10).

If you sell when the FTSE 100 is trading at 7505.0, your profit would be \$2500

$$2500 = (50 \times 10) \times (7505.0 - 7500.0)$$

If you sell when the FTSE 100 is trading at 7497.0, your loss would be \$1500

$$-1500 = (50 \times 10) \times (7497.0 - 7500.0)$$

FAQs

Can I trade CFDs without leverage?

How do I use CFDs for hedging?

What is the difference between CFDs and futures?

Discover CFD trading with IG

Learn about the benefits of CFD trading and see how you get started with IG.

[Learn more](#)



Annexure L

ICE Futures U.S.
Jun 19, 2020

ICE FUTURES U.S.

Sugar No. 11 Futures

Contract Specifications

Description	The Sugar No. 11 contract is the world benchmark contract for raw sugar trading. The contract prices the physical delivery of raw cane sugar, free-on-board the receiver's vessel to a port within the country of origin of the sugar.
Commodity Code	SB
Contract Size	112,000 pounds
Price Quotation	Cents and hundredths of a cent per pound to two decimal places
Contract Series	March, May, July and October
Minimum Price Fluctuation	1/100 cent/lb., equivalent to \$11.20 per contract.
Settlement	Physical delivery, FOB receiver's vessel
Grade/Standards/Quality	Raw centrifugal cane sugar based on 96 degrees average polarization.
Daily Price Limit	None
Deliverable Origins	Growths of Argentina, Australia, Barbados, Belize, Brazil, Colombia, Costa Rica, Dominican Republic, El Salvador, Ecuador, Fiji Islands, Guatemala, Honduras, India, Jamaica, Malawi, Mauritius, Mexico, Mozambique, Nicaragua, Peru, Republic of the Philippines, South Africa, Swaziland, Taiwan, Thailand, Trinidad, United States, and Zimbabwe.
Delivery Locations	A port in the country of origin or in the case of landlocked countries, at a berth or anchorage in the customary port of export.

Contract Specifications

First Notice Day	First business day after last trading day.
Last Notice Day	First business day after last trading day.
Last Trading Day	Last business day of the month preceding the delivery month
Position Limit	Position Limit and Position Accountability information for all IFUS products can be found here .
Markers	<u>TAS</u> (Trade at Settlement)

[Home](#) / [Education](#) / [Shares](#) / [Understanding Shares](#) / [Common Terms](#)

Common Terms

Before you invest in the sharemarket it is important to understand some of the more common terms that are used.

Stock and share

The words stock and share are often used interchangeably. However, each word does have a slightly different meaning. Stock is the total of all shares on issue for a particular company. Shares are the smallest unit of division of ownership in a company. For example, if you own ANZ shares, the number of shares you own determines the extent of your ownership or equity in the stock ANZ.

Parcel and portfolio

Your portfolio is your total shareholdings and is generally shown as a listing of each stock owned plus the number of shares held in each stock. Your portfolio value is calculated by multiplying the number of shares by the market price of each share and adding all of these amounts together. A parcel is a distinct lot of shares that you own. For example you may have purchased 2 parcels of 500 ANZ shares at different times. You have a total of 1000 ANZ shares in your portfolio, made up of two parcels.

Sharemarket or stock market (Primary and Secondary)

The Sharemarket is the market where shares are bought or sold (traded). In Australia, this function is carried out by the Australian Securities Exchange or ASX which is one of the world's top 10 listed exchange groups measured by market capitalisation. There is no actual physical market and all transactions are conducted electronically. The two main functions of the Sharemarket are to operate the:

1. Primary market – where companies raise money by issuing shares through an IPO
2. Secondary market – where investors can buy and sell shares at prices that are determined by supply and demand factors.

Bull and bear markets

Annexure N

ISIN explanation – source ISIN website

ISO 6166 defines the structure of an International Securities Identifying Number (ISIN). An ISIN uniquely identifies a fungible security. Securities with which ISINs can be used are Equities, Fixed income and ETFs only.

ISINs consist of two alphabetic characters, which are the ISO 3166-1 alpha-2 code for the issuing country, nine alpha-numeric digits (the National Securities Identifying Number, or NSIN, which identifies the security), and one numeric check digit. The NSIN is issued by a national numbering agency (NNA) for that country. Regional substitute NNAs have been allocated the task of functioning as NNAs in those countries where NNAs have not yet been established.

ISINs are slowly being introduced worldwide. At present, many countries have adopted ISINs as a secondary measure of identifying securities, but as yet only some of those countries have moved to using ISINs as their primary means of identifying securities.

NNAs cooperate through the Association of National Numbering Agencies (ANNA). ANNA also functions as the ISO 6166 Maintenance Agency (MA).

About ISO

ISO (International Organization for Standardization) is the world's **largest developer** and publisher of **International Standards**.

ISO is a **network** of the national standards institutes of **163 countries**, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO is a **non-governmental organization** that forms a bridge between the public and private sectors. On the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

Therefore, ISO enables a **consensus** to be reached on solutions that meet both the requirements of business and **the broader needs of society**.

ISO's name

Because "International Organization for Standardization" would have different acronyms in different languages ("IOS" in English, "OIN" in French for *Organisation internationale de normalisation*), its founders decided to give it also a short, all-purpose name. They chose "**ISO**", derived from the Greek *isos*, meaning "**equal**". Whatever the country, whatever the language, the short form of the organization's name is always ISO.

Understanding Trading and Investment Warrants

WARRANTS

EDITION 98



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Warrants information line: 131 279 www.asx.com.au/warrants

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Before you begin

What are warrants?

Warrants are financial instruments issued by banks and other institutions and are traded on ASX. They are very broadly split into investment-style products and trading-style products.

Warrants are a form of derivative – that is, they derive their value from another 'thing' (underlying instrument). Some give holders the right to buy, or to sell the underlying instrument (for example a share) to the warrant issuer for a particular price according to the terms of issue. Alternatively, others entitle holders to receive a cash payment relating to the value of the underlying instrument at a particular time (for example index warrants).

Warrants may be issued over securities such as shares and Exchange Traded Funds (ETFs), a basket of different securities, a share price index, debt, currencies, or commodities.

The range of financial instruments traded as warrants has evolved over time so that it is now difficult to define particular characteristics of all warrants. Warrants cover a wide spectrum of risk profiles, investment objectives and likely returns.

Some warrants have higher risk/return profiles than others that offer lower risk features such as capital guarantees.

About this booklet

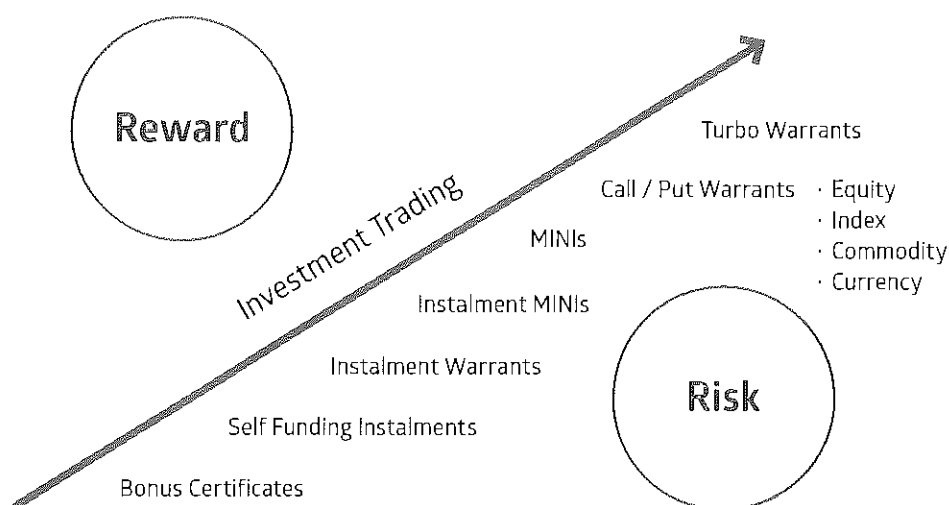
This booklet contains an outline of common features and a general description of most types of warrants. It is not an exhaustive or complete analysis of all warrant types and features.

The main objective is to provide you with general information about warrants and about some of the risks of trading or investing in warrants.

Before buying warrants, you should understand the terms and risks associated with the particular warrant series. You should read the disclosure document (called either a product disclosure statement or in some cases an offering circular) prepared by the issuer of the warrants and seek specific advice from your accredited adviser.

A section dealing exclusively with risks associated with warrants is on page 21.

Risk/Reward matrix

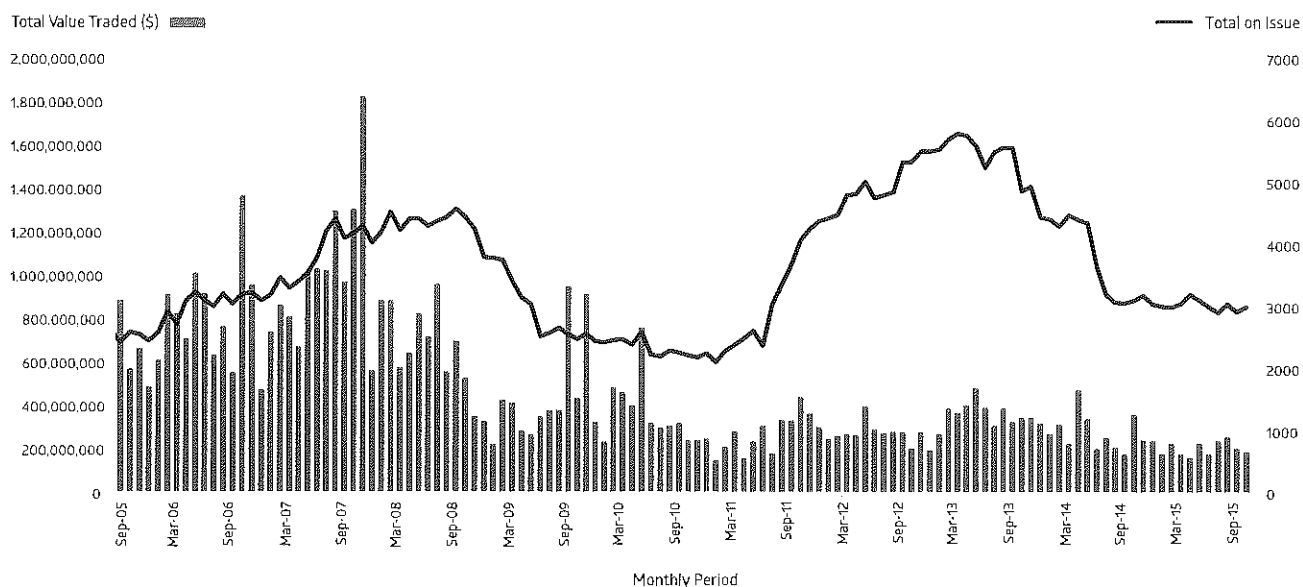


The ASX warrants market

Warrants are traded in many key financial markets of the world. ASX has operated a warrant market since 1991.

The market began by trading equity call warrants only. Other types have been introduced over time. There are now a number of different warrants available for trading or investment including instalments, trading warrants, MINIs, barrier warrants, commodity warrants, currency warrants, structured investment products & endowments. These (and others) are discussed later in this booklet.

Warrant turnover and series on issue



Important

It is important that you understand:

- ASX grants permission for warrants to be traded on its market (called 'admission to trading status') on the application of warrant issuers. ASX does not guarantee the performance of warrant issuers nor does it vouch for the accuracy of their product disclosure statements.
- You must make your own credit assessment of the warrant issuer of a particular warrant series.
- Most warrants have a limited life and cannot be traded after the relevant expiry date. The terms of a warrant series may be subject to adjustments or the warrants may expire early in particular circumstances.
- Warrants do not have standardised terms. The terms may vary considerably between different series (even between warrants of the same type) and different warrant issuers. You should seek information regarding the specific terms of issue for a series of warrants before you trade in a series.
- There are different risk and return profiles for different warrant series. Some warrants have features that make them more risky than others. You should seek specific advice about the risks and features of a warrant series from your accredited derivatives adviser.
- Some advisers may be paid commissions or other benefits by warrant issuers in relation to the sale of particular warrants. Your adviser is obliged to disclose to you any commissions or other benefits which may influence his/her recommendation.

Warrants and ETOs

ASX also operates a derivatives market for exchange traded options (ETOs). To varying degrees (depending on the type), warrants have similarities to ETOs. Warrants and options are primarily financial products that allow you to gain exposure to the underlying instrument without necessarily owning that instrument.

Warrants and ETOs do not give direct control over the underlying instrument until exercise and unlike shares, will expire after a certain period of time. There are however some key differences between warrants and ETOs such as:

- The terms of ETOs are standardised and are set by ASX, whereas the terms of different warrant series are set by the issuer and can be quite diverse.
- Warrants are tailored to meet specific needs. There are different types of warrants and some of these types of warrants have little in common with ETOs.
- Unlike ETOs, you cannot write warrants and there are no margin payments associated with warrants to cover the risk of financial loss due to adverse market movements.
- Settlement of warrant trades occurs through CHESS in the same manner in which share transactions are processed. ASX Clear Pty Limited (ASXCL), which controls the clearing of ETOs has no involvement in settling warrant trades.

Warrant features

Some key warrant features are described below – some appear in all warrant types and some do not. As we state many times, warrants do not have standardised terms. The terms are specified by the warrant issuer within the constraints of the ASX Operating Rules and the law. This means the terms may vary significantly between different warrant types, between different series of the same type of warrant and between different warrant issuers.

The terms and conditions of a particular warrant series are set out in a document prepared by the warrant issuer called a disclosure document (either a product disclosure statement (PDS) or an offering circular). To obtain a copy of a disclosure document, you should speak to your adviser or the warrant issuer. Some warrant issuers put their disclosure documents on their own websites. All relevant disclosure documents, issued post 1999, are available on the ASX website.

When reading the disclosure document, you should be aware that some issuers use different terminology for different types of warrants. Where this occurs, the disclosure document will generally contain a table to cross-reference the terms to known concepts.

Underlying instrument

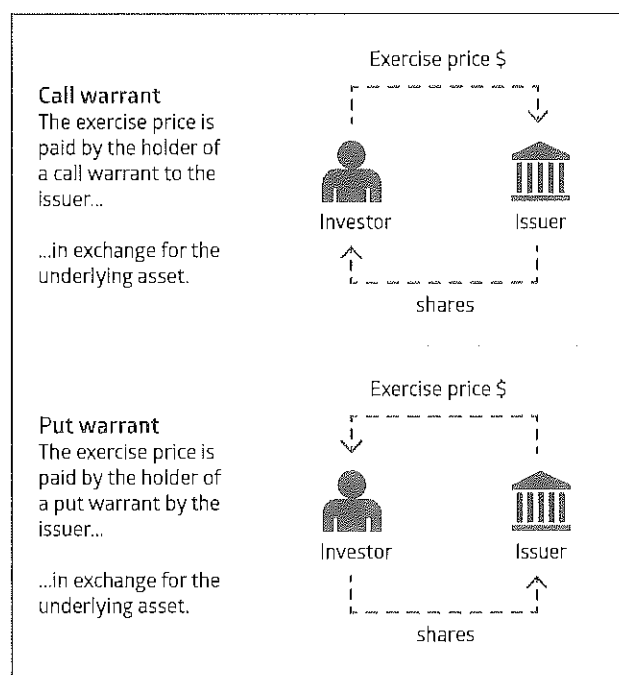
A warrant derives its value from some other 'thing' or instrument. The underlying instrument may be a security (such as a share in a company including overseas securities & ETFs), a share price index, a commodity or a currency. Some warrants are over a 'portfolio' or 'basket' of securities. The basket may consist of securities in entities with similar activities, for example mining or manufacturing. Warrants over a basket of securities give exposure to the performance of a group of securities or a particular industry. If there is a corporate action, or similar event, the underlying instrument may be adjusted. The disclosure document will explain when this may occur.

A warrant derives its value from some other instrument.

Call or put warrants

Warrants can be either call warrants or put warrants. Call warrants benefit from an upward price movement in the underlying instrument whereas put warrants benefit from a downward trend.

A deliverable call warrant generally gives you the right to buy the underlying instrument (eg a share) from the warrant issuer at a particular price on, or before, a particular date. A deliverable put warrant generally gives you the right to sell the underlying instrument to the warrant issuer at a particular price on, or before, a particular date. For cash settled calls and puts, the value of the warrant is paid to you in cash.



Exercise price (or strike price)

This is the amount of money which must be paid by you (in the case of a call warrant) or by the warrant issuer to you (in the case of a put warrant) for the transfer of each of the underlying instrument(s) (not including any brokerage or other transfer costs).

In the case of cash settled warrants, the difference between the exercise price (sometimes referred to as the exercise level) and the value of the underlying instrument at expiry is paid on settlement.

The exercise price is generally fixed when the warrants are issued. However, the exercise price could be variable. For example the exercise price of self-funding instalments and MINI warrants is not fixed. The exercise price of some warrants may also be in a foreign currency – eg. currency warrants and international equity warrants.

Some issuers charge for costs associated with the delivery of the underlying product, so the amount payable on exercise may be more than the stated exercise price.

The exercise price or the basis for calculating the exercise price will be specified in the disclosure document prepared by the warrant issuer.

Like the underlying instrument, the exercise price may be adjusted in certain circumstances. Again, the disclosure document should explain when this may occur.

Please note that in the case of instalments, the exercise price is referred to as the loan amount, for tax purposes.

Expiry date

The expiry date is the last date on which the warrant can be exercised. Trading in a warrant ceases on the expiry date. Under some circumstances warrants may expire early including when the warrant has been validly exercised. The issuer will be obliged to deliver or take delivery of the underlying instrument or make a cash payment according to the terms of the warrant series.

Exercise style

Warrants can be either American style or European style exercise. American style means you can exercise the warrant at any time on or before the expiry date. European style means you can only exercise the warrant on the expiry date of the warrant.

Occasionally warrants are a mixture of American and European, eg. they may be European up to a certain date and then American thereafter. The terms of the warrant series will set out how you may exercise the warrant. You should be familiar with the terms relating to exercise. A failure to follow the terms may mean the exercise of the warrant is not effective.

Exercise style	Able to exercise	
	Before expiry	At expiry
American	✓	✓
European	✗	✓

Deliverable or cash settled

Deliverable warrants are settled in the first instance by a transfer of the underlying instrument, eg. equity warrants. Cash settled warrants are settled by a cash payment by the warrant issuer to you, eg. index warrants. Some deliverable warrants may also provide for cash settlement in certain circumstances.

In some cases a large number of warrants may need to be exercised to give rise to a delivery obligation, eg. international equity warrants. The terms of issue will identify any exercise conditions.

Issue size

This is the number of warrants that may be issued in a particular warrant series. The warrant issuer may reserve the right to apply to ASX to have more warrants issued in the same series without notice to holders.

Conversion ratio

The conversion ratio is the number of warrants that must be exercised to require the transfer of the underlying instrument. The terms of issue may require one warrant to be exercised to trigger delivery of one underlying instrument. Alternatively, a number of warrants may need to be exercised for the delivery of one underlying instrument.

Example

If you want to exercise a call warrant over BHP ordinary shares with a conversion ratio of 4, you are required to exercise 4 warrants to buy 1 underlying instrument, which in this case is 1 BHP share.

Do not forget that the conversion ratio is not the only term that must be satisfied to trigger a settlement obligation – refer to the disclosure document for other conditions relating to a valid exercise.

The conversion ratio will affect the price of the warrant on a per share basis (but not the leverage).

A higher conversion ratio means a lower warrant price. While trading prices are quoted on a per warrant basis, the exercise price is quoted on a per underlying instrument (or share) basis. It is therefore important to know the conversion ratio of a warrant series before investing.

The conversion ratio of a warrant may be affected following a corporate action by the underlying company, eg as a result of a bonus issue or a capital reconstruction.

Covered warrants

A warrant is said to be covered if the warrant issuer places the underlying instrument in a trust or similar custodial arrangement on behalf of the holder. To be called 'fully-covered', the warrant series must also meet particular criteria set out in the ASX Operating Rules.

Index multiplier

This is only relevant to index warrants. It is the figure used to determine the amount payable to you on exercise or expiry.

As a formula,

$$\begin{aligned} &\text{The intrinsic value of a call index warrant} \\ &\quad \text{on exercise or expiry} \\ &= \\ &\quad \text{the index multiplier} \\ &\quad \times \\ &\quad (\text{closing level of the index} - \\ &\quad \text{the exercise level of the warrant}). \end{aligned}$$

Example

If the closing level of the index is 4,800 points and the exercise level of a call index warrant is 4,600 points then the warrant has an intrinsic value of 200 points. If the index multiplier is 1 cent then you are entitled to receive \$2.00 per warrant (being $\$0.01 \times (4,800 - 4,600)$).



Barrier levels

Some warrants have barrier features. A barrier level is a defined level that causes some event to occur. Some barriers cause the warrant to terminate before the original expiry date. Others may cause an adjustment to the exercise price and barrier level (and the warrant continues until expiry) but may require you to make an additional payment to the issuer. Other barriers simply cause the exercise price (or level) and barrier to be reset. The consequences of triggering a barrier level will be specified in the disclosure document for the warrant series. Barrier levels are nominated by the issuer before warrants are issued. The barrier can be above or below the exercise price (or level) of the warrant. Warrants may expire worthless if they are out-of-the-money when the barrier is triggered.

If however, the warrants are in-the-money, then the issuer may be obliged to pay a cash amount to holders. The descriptions of index warrants and equity warrants in the **Types of warrants** section of this booklet include examples of warrants with barrier levels.

Cap levels

Some warrants have their upside potential capped at a certain level. This is sometimes called the cap level.

Cap levels are different to barriers. Cap levels generally do not cause the warrant to terminate but will limit the upside profit potential of the warrant. A cap level is fixed by the issuer when the warrant is issued. If, on exercise or expiry, the value of the underlying instrument is above the cap level, settlement of the warrant is based on a return equal to the cap level (and not the value of the underlying instrument). You could be entitled to a cash payment or transfer of the underlying instrument at a value equal to the cap level. Cap levels are used in a number of different warrant types. In some warrants the cap level is an essential feature. In these warrants, the position of the cap relative to the current share price has a significant economic impact on how the warrant works. The description of capped warrants in the **Types of warrants** section of this booklet has examples of these warrants.

Bonus levels

Some warrants, most commonly Bonus Certificates, have a feature that adjusts the settlement amount depending upon whether a barrier level has been reached. This is sometimes called a bonus level.

Bonus levels are different to caps. Bonus levels do not limit the upside profit potential of a warrant. A bonus level is fixed by the issuer when the warrant is issued. If the value of the underlying instrument has not fallen beneath the barrier level at any time before the expiry date, the holder will get the value of the bonus level when the warrant expires. Unlike a cap, the bonus level sets a minimum value for the settlement amount. If the value of the underlying instrument is higher than the bonus level the settlement amount of the warrant will reflect the higher value. For a bonus certificate both the bonus level and the barrier level are essential features. The description of bonus certificates in the **Types of warrants** section of this booklet has examples these types of warrants.

Types of warrants

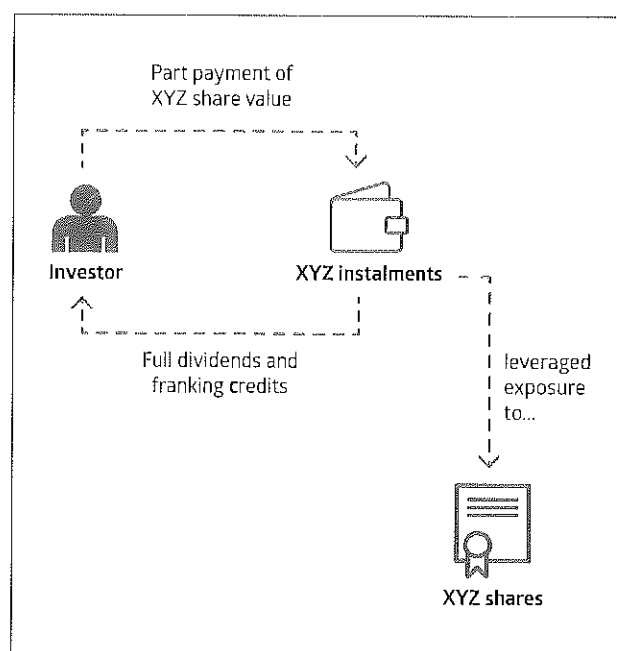
In broad terms, warrants can be viewed as being either trading-style or investment-style products. Some may fall into both categories. Trading style warrants are frequently traded and are generally short dated. They have a higher risk/return profile compared to the investment-style warrants. Equity warrants, index warrants, barrier warrants and MINI warrants usually fall within this category. Investment-style warrants have other features to attract investors. These warrants tend to be longer dated and are less frequently traded. They have a lower risk/return profile and often have a higher initial outlay compared to trading-style warrants. Endowments and structured investment products are investment-style products. Instalments bridge the gap between trading and investment-style products as some investors hold instalments for trading purposes and some hold them for longer term investment purposes.

Before buying warrants, you should understand the features, benefits and risks of the warrant series you are considering. You should read the disclosure document prepared by the warrant issuer and seek advice from an accredited derivatives adviser. Disclosure documents are available from the warrant issuer and can also be downloaded from the ASX website www.asx.com.au.

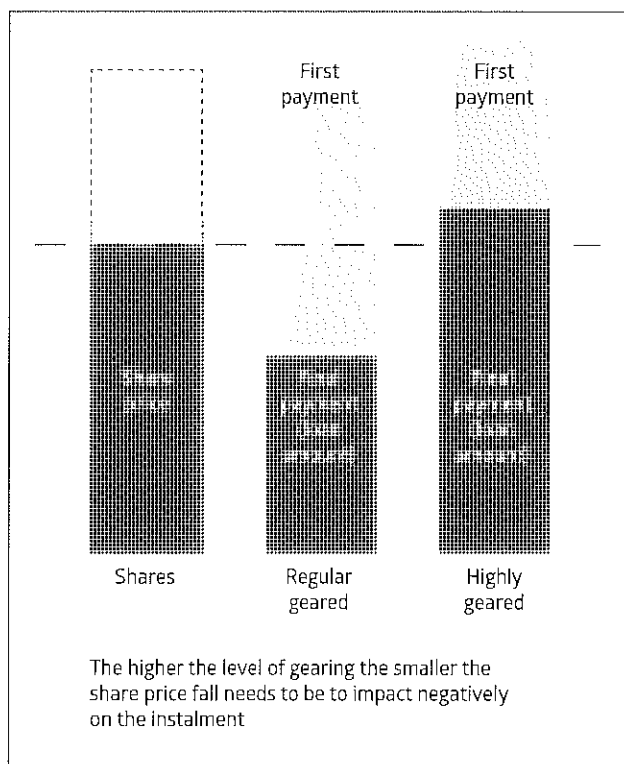
From time to time we may add further information about new warrant types or features to the ASX website at www.asx.com.au/warrants.

Instalments

Instalments allow holders to gain direct exposure to underlying shares by making an initial payment (first instalment) and delaying an optional final payment (final instalment) to a later date (expiry date). In simple terms, instalments are a loan to buy shares, without the obligation to repay the loan or the risk of receiving margin calls. The unique feature that sets instalments apart from other types of warrants is that you are entitled to dividends or distributions and franking credits paid by the underlying instrument during the life of the instalment. It is important to note that in some circumstances, holders, although entitled to a dividend, may not actually receive that dividend in cash.



For example, special dividends may, subject to the terms of issue, be used to reduce the loan amount rather than paid as cash to the holder. Likewise, holders of 'Self Funding Instalments' are entitled to a dividend although it will be used to reduce the loan amount rather than being paid out in cash. Instalments generally do not pass on voting entitlements of the underlying instrument.



Instalments can have a variety of gearing levels. When considered from a gearing perspective, instalments can generally be divided into two categories; 'regular geared' and 'high geared' instalments. At the time of issue, a 'regular geared' instalment will be geared at between 40% and 65%, i.e., for a 50% geared instalment the loan amount would be 50% of the share price. The traditional instalment price will reflect the difference between the share price and loan amount plus funding cost (interest and borrowing fees). At the time of issue, a 'high geared' instalment will have a gearing level between 65% and 90%. As a result of the gearing level the instalment price will reflect a significantly higher funding cost compared to regular geared instalments. Instalments are considered to have some characteristics of call warrants, giving holders the right to exercise the instalment to receive the underlying instrument. Instalments can be either European or American exercise style and they usually have a life of between 12 months and 15 years. Instalments are deemed to be a covered warrant meaning that the underlying instrument is held in a trust arrangement for your benefit by a trustee (generally the issuer). If you decide to exercise the instalment and repay the loan amount

the underlying instrument will be transferred from the trust to you. If you decide you do not wish to exercise the instalment, some instalments give you an option to put the underlying instrument back to the issuer and receive a cash payment. Because an instalment is in essence a loan to buy the underlying instrument, the interest component of the payments may allow you to claim the interest as a tax deduction. Many warrant issuers obtain ATO product tax rulings which detail the tax benefits of their instalment series. The PDS should detail the tax benefits of the instalment.

Example

Warrant code	XYZIMM
Underlying instrument	XYZ ordinary shares
Warrant type	Instalment
Expiry date	28 September 2019
Exercise price	\$21.00
Exercise style	American
Conversion ratio	1
Settlement	Physical delivery

If XYZ's share price was around \$35.00 at the time of issue of the instalment then you would have paid about \$16.60 for the instalment (about half the share price at the time plus funding cost which consists of prepaid interest and fees). If you want to hold the XYZ share outright, you can exercise the instalment by paying \$21.00 at any time on or before 28 September 2015 to receive one XYZ share per instalment.

The relatively conservative gearing level of instalments means that there tends to be a close relationship between movements in instalment prices and movements in the underlying share.

As investors have different needs and financial objectives, innovation has led to the development of different types of instalments. A particular type of instalment may appeal to one's investment objectives compared to another. Therefore it is important to find the most appropriate instalment structure for your needs and objectives. Below is a description of some of these variations on an 'ordinary instalment' structure and an explanation of the unique features associated with each.

Rolling instalments

Rolling instalments are a variation on the ordinary instalment structure. They have a much longer life (up to 15 years). On a periodic basis (12, 18 or 24 months) the instalment will undergo a reset of the loan amount. The reset period is identified upon the issue date and is outlined in the disclosure document and on the ASX website. The instalment is structured so that the interest and borrowing fees are prepaid only up to the next reset date. During a reset period the issuer will ask the holder to prepay the next period's interest and fees up to the next period, if they wish to continue to maintain exposure. At this time the issuer may also adjust the exercise price (often called the "loan amount" of the instalment) with the objective of maintaining a desired gearing level during the life of the instalment (for example, the exercise price may be adjusted to keep it between 40% and 60% of the current market price of the underlying instrument).

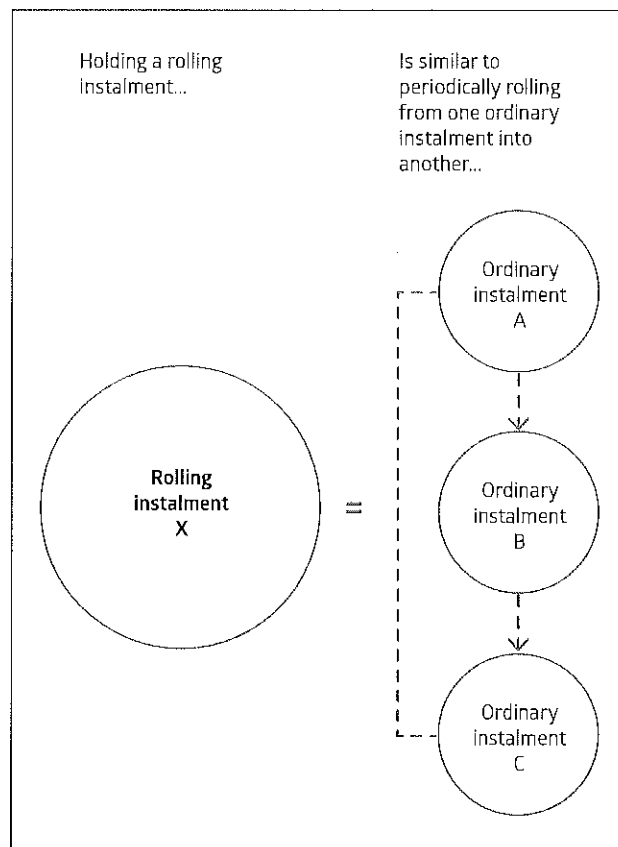
The issuer may either:

1. Reduce the exercise price (loan amount): In this case, holders will be asked to make an additional cash payment in order to reduce their loan and prepay their funding costs up until the next reset period (12, 18 or 24 months) if they wish to maintain exposure.
2. Increase the exercise price (loan amount): In this case the issuer may make a payment to holders equal to the amount of the increase less funding costs until the next reset period (this may either be in cash or in the form of a reinvestment in additional instalments).
3. Retain the exercise price (loan amount) unchanged: In this case the holder will be asked to make a payment to the issuer for the prepayment of funding costs up until the next reset period, if they wish to maintain exposure.

There tends to be a close relationship between movements in instalment warrant prices and movements in the underlying share or other instrument.

On the annual reset date you may choose to exercise some or all of the instalments and take delivery of the underlying securities, cash out the instalment, roll into the following year (by agreeing to pay any additional amounts necessary) or do nothing. If you do nothing you are deemed to have accepted the new exercise price and will automatically roll into the following year. If there is an amount due on a series on the 'reset date', and you don't pay this amount, the issuer may terminate some (or all) of your instalments and use the proceeds to meet the amount due. Conceptually, these instalments can be explained as a series of consecutive ordinary instalments that run back to back with the exercise price being reset on a periodic basis.

During the period surrounding each 'reset date', investors should take care to consider the effect of a change in the exercise price on the value of the rolling instalment. Information on an upcoming reset can be obtained from the warrant issuer or from ASX.



Self Funding Instalments

Self Funding Instalments ("SFI") are another variation on the (ordinary) instalment structure. Like other instalments, you make a partial upfront payment and the issuer loans you the remaining amount. Once you have made your initial payment, generally, there are no additional payments required during the investment term (unless you do not provide your TFN (tax file number) or ABN). SFIs are regular geared with an investment term between one and ten years.

Holders are entitled to dividends (including franking credits), however the cash component of a dividend will be used to reduce the loan amount rather than being paid in cash to the holder, stepping it down. The loan amount for a traditional SFI will generally step up once every 12 months, as funding costs are added to the total loan amount. Hence, over the life of the SFI, the loan amount will periodically decrease due to the payment of dividends from the underlying instrument, and increase by the amount of funding costs. Ideally the loan amount will progressively reduce over the life of the SFI if the regular dividend payments exceed interest and borrowing charges.

As a result of the dividends being treated differently as compared to other instalments, ASX differentiates SFIs by using the letter 'S' instead of 'I' or 'J' as the fourth letter in the warrant code eg XYZSOC.

There may be some tax considerations as holders are entitled to dividends (including franking credits) and make interest payments. As not all instalments have the same structure or features, you should talk to your tax adviser and contact the warrant issuer for an ATO product ruling.

In this example XYZSOC was issued with a loan amount of \$10.50 in February 2010. Over time dividends have been paid which have been used to reduce the loan amount. In addition, prepaid interest has been added to the loan amount periodically (generally on 30 June) to reflect the ongoing funding cost of the loan. Taking into account the dividend payments and funding cost, the loan amount has decreased over a 12 month basis from \$9.50 to \$9.154, reflecting a positively geared investment. The franking credits continue to be passed to the holder of the instalment.

Variations of Self-funding instalments

Two variations on the traditional Self funding instalment structure are rolling SFIs and stop loss SFIs. There are a number of key differences between these styles of self-funding instalments that it is important to be aware of.

Rolling SFIs

As the name suggests rolling SFIs incorporate attributes of both rolling instalments and the traditional SFI. There are two key differences that differentiate the rolling SFI from the traditional SFI.

Firstly the protection fees that allow you to walk away without having to make that final payment are only paid 12 months in advance as opposed to the traditional SFI where you pay all protection fees upfront.

Secondly the rolling SFI will have an annual review every 12 months with a range of options available to the investor. One of which will be to roll the SFI on for another 12 month period.

Stop loss SFIs

Unlike the traditional and rolling SFIs all loan protection costs are eliminated in the stop loss SFI by the incorporation of a stop loss feature. The stop loss feature is a predetermined level of the underlying share price set by the warrant issuer. This stop loss feature will prevent the value of the SFI from becoming negative. However it is important to note that if this stop loss level is breached, trading in the SFI will cease.

Stop loss SFIs will also incur funding costs on a daily basis rather than an annual basis as is the case with the traditional and rolling SFIs.

Example

Warrant code	XYZSOC
Underlying instrument	XYZ ordinary shares
Warrant type	Self funding instalment
Expiry date	30 June 2021
Exercise price (loan amount)	\$9.50 (16 February 2014)
Exercise price (loan amount)	\$9.154 (21 March 2015)
Exercise style	American
Conversion ratio	1
Current price	\$12.10

Income instalments

With an initial investment term between 18 and 24 months, Income Instalments may provide tax efficiency. You will prepay up to 12 months of interest on investing, with the remaining interest portion added to the loan amount at one or more later dates. You should talk to your tax adviser regarding the potential for any tax efficiency.

At maturity you have the option to make the second payment (equal to the outstanding amount) and take possession of the reference shares; do nothing and receive the net sale proceeds of the shares, or you may be able to maintain your share exposure by rolling over for another term.

Instalment MINIs

For a fraction of the cost, investors are afforded all the benefits of share ownership, including any share price appreciation on a one-for-one basis, all distributions or dividends in full as well as associated franking credits.

Each Instalment has a Stop-Loss feature, the level of which is set for each Instalment before it is issued and is typically reset monthly (or at any time at the issuer's discretion). The Stop Loss Level is set at a certain level above the final instalment. Once the Stop Loss Level is reached, this triggers a Stop Loss Event and the relevant Instalment will expire. Any remaining value will be paid to the investor.

Instalment MINIs will also incur funding costs on a daily basis rather than on an annual basis as is the case with traditional instalments where interest is prepaid until the earlier of the next reset date or the maturity date.

MINIs

MINI warrants are a type of trading warrant that offers leveraged exposure to a diverse range of underlying assets including shares, indices (domestic and international), currencies, commodities and exchange traded funds (ETFs). They allow you to track the value of an underlying asset, on a one for one basis, for a relatively small upfront cost. MINI warrants are classified as either 'longs' or 'shorts'. MINI longs enable you to benefit from an upward price movement in the underlying instrument whereas MINI shorts enable you to benefit from a downward trend or the opportunity to hedge an existing position.

Value of MINIs

The calculation of the value of a MINI varies based on the underlying asset which you are gaining exposure to. The examples overleaf provide you with an understanding of how the value of a MINI is calculated.

Where the underlying asset is a share, the value of a MINI is generally:

Value of a MINI Long = Share Price – Strike Price

Value of a MINI Short = Strike Price – Share Price

Where the underlying investment is a domestic index, the value of an Index MINI is generally:

Value of an Index MINI Long = [level of Index Futures – Strike Price]/Multiplier

Value of an Index MINI Short = [strike price – Level of Index Futures]/Multiplier

The multiplier for index MINIs is usually* 100. This multiplier converts the value of the index value of the MINI into dollar terms.

Where the underlying asset is an international index, currency or commodity, the value of the MINI is generally:

Value of MINI long = (underlying price – Strike price) x Multiplier/exchange rate

Value of MINI short = (Strike Price – Underlying Price) x Multiplier/exchange rate

Once again, the multiplier for international index, currency and commodity MINIs is usually* 100.

Features of MINIs

MINIs combine features and benefits of other warrant types with unique features of their own.

MINIs offer varying degrees of leveraged exposure (commonly between 50 and 95%) to a range of underlying assets. This leverage is primarily determined by the difference between the MINI's exercise price and the price of the underlying asset. The level of leverage offered by the MINI is determined by dividing the strike price by the current value of the underlying asset. Warrant issuers provide information on the level of leverage and the value of the MINI at the start of each trading day via the company announcements section on the ASX website and via the warrant issuers' website.

MINIs have an in-built stop loss feature which is set above the exercise price for MINI longs and below the exercise price for MINI shorts. This feature ensures that investors cannot lose more than their initial capital outlay. The stop loss is triggered:

- for a MINI long, the market price of the underlying instrument is less than or equal to the barrier at any time; and
- for a MINI short, the market price of the underlying instrument is greater than or equal to the barrier at any time.

Please note that where the underlying asset derives its value from an overseas exchange, the breach of a barrier may occur outside of ASX Market Hours.

The level at which the stop loss is set depends on the liquidity of the underlying asset. For very liquid underlying assets the stop loss will be set very close to the exercise price of the MINI. The stop loss level is adjusted by the issuer at the beginning of each month to the same percentage level above the strike price as when the MINI was issued.

The stop loss level is also adjusted on the ex-dividend date, since the issuer will reduce the strike price of the MINI on the ex-dividend date to ensure that an investor is not disadvantaged by a dividend event.

Unlike other types of warrants quoted on ASX, MINIs are open ended contracts with no set expiry date. Since they have no set expiry date they will generally track the underlying instrument on a one for one basis. Also unlike other types of warrants MINIs cannot be exercised to take ownership of the underlying asset. They only allow investors to trade directional movements in the underlying assets.

To purchase a MINI, you only need to pay a fraction of the price upfront (capital outlay). This amount does not include funding costs (like interest expenses which are charged daily). The daily funding costs associated with MINIs are added to the previous day's strike price. With MINI longs on shares, investors pay funding costs, however with MINI shorts investors receive a funding benefit.

Holders who both buy and sell their MINIs intra-day are generally not required to pay these funding costs.

The example demonstrates the way in which the funding costs impact return.

Example: Trading a BHP MINI Long

Action	Units	Share Price	Strike Price	MINI Price	Stop Loss Level	Profit/ (Loss)	% Return
Buy	1,000	\$40.00	\$30.00	\$10.00	\$33.00		
BHP rises to \$42.00							
SELL (same day)	1,000	\$42.00	\$30.00	\$12.00	\$33.00	\$2.00	20.00%
Sell (2 weeks)	1,000	\$42.00	\$30.12	\$11.88	\$33.00	\$1.88	18.8%
BHP falls to \$38.00							
SELL (same day)	1,000	\$38.00	\$30.00	\$8.00	\$33.00	\$2.00	-20.00%
SELL (2 weeks)	1,000	\$38.00	\$30.12	\$7.88	\$33.00	\$2.12	-21.2%

Example: Trading a BHP MINI Short

Action	Units	Share Price	Strike Price	MINI Price	Stop Loss Level	Profit/ (Loss)	% Return
Buy	1,000	\$40.00	\$50.00	\$10.00	\$45.00		
BHP falls to \$38.00							
SELL (same day)	1,000	\$38.00	\$50.00	\$12.00	\$45.00	\$2.00	20.00%
Sell (2 weeks)	1,000	\$38.00	\$50.04	\$12.04	\$45.00	\$2.04	20.4%
BHP rises to \$42.00							
SELL (same day)	1,000	\$42.00	\$50.00	\$8.00	\$45.00	-\$2.00	-20.00%
SELL (2 weeks)	1,000	\$42.00	\$50.04	\$8.04	\$45.00	-\$1.96	-19.6%

Guaranteed Stop Loss MINIs

Guaranteed Stop Loss (GSL) MINIs have the added benefit of a guaranteed stop loss level. They are listed over ASX listed single stocks as well as Australian indices.

For all GSL MINIs, the Guaranteed Stop Loss Level is equal to the Strike Price. The Guaranteed Stop Loss feature ensures that regardless of the movement of the underlying asset price, investors are unable to lose more than their initial investment amount.

If the Stop Loss Level is reached then the GSL MINI will automatically terminate. As the Stop Loss Level is equal to the Strike Price there is no residual value available to be paid to the GSL MINI holder if it is terminated.

The price of a GSL MINI is determined by the following inputs:

- Underlying Share Price
- Strike Price
- Gap Premium

The Gap Premium is paid to guarantee that the Stop Loss Level is equal to the Strike. For example;

Price of a GSL MINI Long = (Share Price – Strike Price) + Gap Premium

Price of a GSL MINI Short = (Strike Price – Share Price) + Gap Premium

The amount of the Gap Premium is based on market factors including the volatility of the underlying security, the price of the underlying security relative to the Guaranteed Stop Loss Level, and the future expected dividends, if any, on the underlying security. Other factors influencing the amount of the Gap Premium include internal costs in respect of the Issuer (including, for example, in respect of hedging, resourcing, market-making and risk management) and prevailing interest rates.

Please refer to the relevant PDS or the issuer for further information on pricing GSL MINIs and the Gap Premium

Equity warrants

Equity call and put warrants are issued over securities (in some cases securities quoted on an Exchange other than ASX). The exercise price is usually set reasonably close to the value of the security at the time of issue. The expiry date is usually anything from about three to twelve months from the date of issue (average 6 months). Equity warrants can be American or European exercise style and, if exercised, are settled in the first instance by delivery of the underlying security. Equity warrants are frequently traded, particularly when they are short dated.

Example

Warrant code	XYZWOH
Underlying Instrument	XYZ ordinary shares
Warrant type	Equity call warrant
Expiry date	28 December 2018
Exercise price	\$7.50
Exercise style	European
Conversion ratio	3
Settlement	Physical delivery

The example above is a call warrant over XYZ Ltd ordinary shares. It is a European style warrant with an expiry date of 28 December 2018 and an exercise price of \$7.50. The holder of three XYZWOH warrants has the right to buy one XYZ share for \$7.50 on 28 December 2018.

International equity warrants

International equity warrants are offered over securities quoted on an overseas exchange. Hence, although similar to an equity warrant, the structure raises additional issues that you should consider. You should speak to your accredited adviser about the additional complexities of these warrants. For example:

- **Time zone differences between ASX's market and the overseas market** – that is the home market for the underlying securities may not be open for trading at the same time as ASX's market is open for trading in the warrants. Note however the securities may be quoted on more than one exchange and there could be trading hours overlapping with ASX.

- **Delivery of the underlying securities** – the settlement, ownership and custodial arrangements in the overseas jurisdiction will differ from arrangements in relation to ASX quoted securities. You may need to make arrangements to hold the securities overseas.
- **ASX supervision** – ASX does not supervise or regulate trading in relation to the underlying securities. This is primarily the responsibility of regulatory bodies within the jurisdiction of the underlying securities. As a result company announcements and historical trading data will not be available from ASX, although disclosure documents will identify other places where this information can be accessed.
- **Restrictions on exercise** – additional conditions may be placed on exercise, for example, requiring a minimum (large) number of securities to be delivered before the warrants can be validly exercised.

Equity knock-out (barrier) warrants

Equity knock-out (barrier) warrants are equity warrants with a barrier feature that causes the warrant to terminate before the original expiry date. ASX differentiates knock-out warrants from other trading-style warrants through the ASX six letter warrant code. ASX denotes knockout warrants with the fourth letter as X, Y or Z compared to W, V, U or T for other call and put warrants.

In the example overleaf, the holder of one XYZXSE warrant has the right to buy one XYZ share for \$20.47 at the expiry date. This is a knock-out call warrant over XYZ shares. It is a European style warrant that will expire on 28 November 2018 and has an exercise price of \$20.47.

Example

Warrant code	XYZXSE
Underlying Instrument	XYZ ordinary shares
Warrant type	Equity barrier call warrant
Expiry date	28 November 2018
Exercise price	\$20.47
Barrier level	\$20.47
Exercise style	European
Conversion ratio	1
Settlement	Physical delivery

The warrant will terminate before the original expiry date if the market price (as defined in the terms of issue) trades at or below \$20.47 prior to expiry. In the event that the barrier is hit the warrant will expire prematurely with the warrant value at zero.

Index warrants

Index warrants are linked to the performance of a share price index such as the S&P™/ASX 200 Share Price Index or a foreign index. The exercise level (rather than exercise price) is expressed in index points. These warrants are generally cash settled on exercise or expiry (although certain index warrants may have a deliverable asset such as an exchange traded fund (ETF)).

If the closing level of the S&P/ASX 200 Share Price Index is at 4,800 points on the expiry date, then you will be entitled to receive a cash payment equal to \$0.50 per warrant. This is calculated as the (closing level of the index – exercise level) x index multiplier i.e. $(4,800 - 4,700) \times \$0.005 = \0.50 per warrant.

Example

Warrant code	XJOWSE
Underlying	S&P/ASX™200 Share Price Index
Warrant type	Index call warrant
Expiry date	16 December 2018
Exercise level	4,700 points
Index multiplier	\$0.005 (1 index point = half a cent)
Exercise style	European
Settlement	Cash Payment

Knock-out (barrier) index warrants

Some index warrants are issued as knock-out warrants which contain a barrier feature. Similar to equity knock-out warrants, if the index level hits or passes through the barrier level, the warrant will expire prematurely with the warrant value as zero.

Index warrants are based on a share price index and may be settled in cash.

International index warrants

Index warrants may also be issued over foreign indices, which represent movements on overseas exchanges. These warrants can have index multipliers in either Australian dollars or the foreign currency (with the foreign amount converted back to Australian dollars at the time of settlement). You should pay close attention to the unique features of international index warrants.

Example

Warrant code	XSPWOK
Underlying instrument	S&P 500 Index
Warrant type	Index Call warrant
Expiry date	17 December 2018
Exercise level	2,300 points Index multiplier \$US 0.005
Exercise style	European
Settlement	Cash payment

If the closing level of the S&P 500 Index is 2,450 points on the expiry date, then you will be entitled to receive a cash payment equal to \$US 0.75 per warrant. This is calculated as the (closing level of the index – exercise level) x index multiplier i.e. $(2,450 - 2,300) \times \text{US\$}0.005 = \text{US\$}7.75$ per warrant.

Currency warrants

Holders of currency warrants may exchange an amount of foreign currency for Australian dollars on or before the expiry date. The value of the warrant rises and falls in line with movements in the exchange rate. For example, holders of AUD/USD call warrants benefit from an increase in the AUD/USD exchange rate and holders of AUD/USD put warrants benefit from a decrease in the AUD/USD exchange rate.

In this example, you pay US\$9.50 and receive A\$10.00 at expiry.

Example

Warrant code	AXUWMI
Underlying instrument	A\$10.00
Warrant type	Call warrant
Expiry date	23 December 2018
Exercise level	US\$9.50
Exercise style	European
Settlement	Physical delivery or cash

Commodity warrants

Commodity warrants may be call or put warrants where the underlying instrument is a commodity such as gold, silver, platinum, copper, light sweet crude and natural gas. Although they have many similarities with equity call and put warrants, the different nature of the underlying gives rise to a number of additional issues that you should consider. For example:

- If exercised for delivery, holders should consider the different forms of delivery that may be available. This may include the location at which delivery may occur. Delivery of a commodity may also give rise to additional costs such as those associated with transportation and storage.
- Various commodities are traded continuously around the world, hence it is important to recognise the benchmark measure of that commodity being used for the purposes of valuing that index. For example, if cash settled, it may be important to understand the method for pricing the specified grade of the designated commodity, the currency it is priced in, and the time at which it is to be valued.

Endowments

Endowments are long term call warrants typically with a 10 year life at the time of issue. They are over an ASX quoted security or basket of securities. Endowments are promoted as investment products to be bought by investors and held until expiry.

The issue price of an endowment is between 30 and 65 percent of the market value of the underlying security at the time of issue. The exercise price (called the “outstanding amount” of the endowment) is initially the remaining sum plus other costs.

The outstanding amount varies over the life of the warrant. In this respect endowment warrants differ from most warrants as they do not have a fixed exercise price.

The outstanding amount is reduced by any dividends that are paid in relation to the underlying security. In some instances other payments may also reduce the outstanding amount. However, an interest rate is also applied and the outstanding amount is increased by these interest amounts.

At expiry, if you exercise the warrant and pay the balance of the outstanding amount (if any) the issuer will transfer the underlying securities to you. Ideally the reductions applied against the outstanding amount exceed the interest incurred over the life of the warrant, and the outstanding amount will have decreased. It could reduce to zero prior to or at expiry. If this occurs you may only have to pay a nominal exercise price such as one cent.

An investor in endowments is taking a long term view on the underlying company's dividend policy versus interest rates with the belief that the dividends will outweigh the interest payments and the outstanding amount will reduce over time.

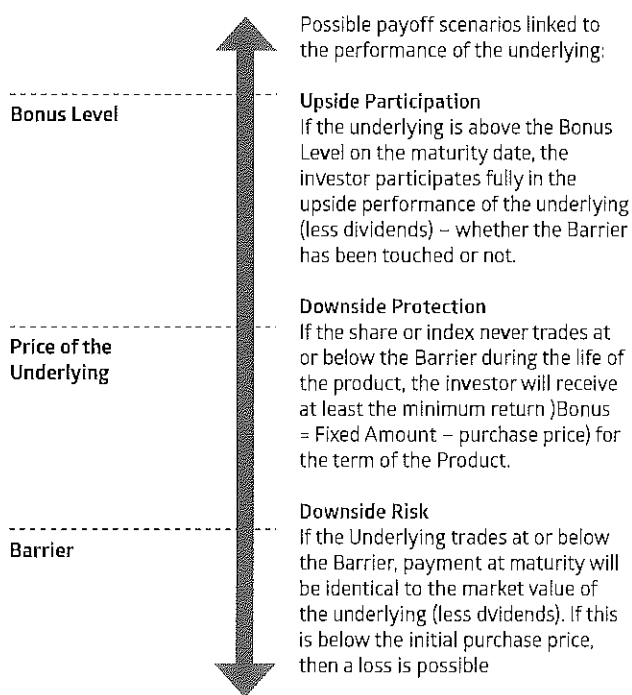
The issuers of endowments can provide you with details of the outstanding amount and the expiry dates of particular endowment warrant series.

Example

Warrant code	XYZEME
Underlying instrument	XYZ Ordinary Shares
Warrant type	Endowment
Expiry date	18 August 2020
Outstanding amount when first issued – 14 February 2005	\$9.95
Outstanding amount as at 31 March 2015	\$2.617
Conversion ratio	1
Exercise style	American

Bonus Certificates

Bonus Certificates are the newest type of investment warrants available. They benefit both from prices going up as well as a sideways movement in the underlying. A Bonus Certificate enables an investor to receive a Bonus Payment in flat to slightly down markets without having to forego the upside potential, as long as during the life of the certificate the underlying never trades at or below the Barrier Level.



If the underlying trades at or below the Barrier Level during the life of the warrant, the payoff is identical to that of a direct investment in the underlying, except you will not receive any dividend or franking payments. These are used to finance the bonus mechanism.

Example

Warrant code	XYZBOA
Underlying instrument	XYZ ordinary shares
Warrant type	Bonus Certificate
Expiry date	12 Dec 2016
Bonus Level	\$23.10
Barrier Level	\$17.10
Exercise Style	European
Conversion ratio	1
Current price	\$22.10

In the example above if XYZ's share price was around \$22.10 at the time of issue of the Bonus Certificate then you would have paid about \$22.10 for the warrant. The price of the warrant on expiry will depend on three scenarios

1. Underlying moves sideways

If the underlying does not trade at or below \$17.10 during the life of the warrant and the share price is below \$23.10 at maturity then the value of the Bonus Certificate on expiry will be \$23.10.

2. Underlying price rises

If the underlying does not trade at or below \$17.10 during the life of the warrant and the share price is above \$23.10 at maturity then the value of the Bonus Certificate on expiry will be the value of the underlying (i.e. above \$23.10).

3. Underlying price falls

If the underlying trades below \$17.10 during the life of the warrant then the value of the Bonus Certificate on expiry will be the value of the underlying. If the share price of XYZ rises above the initial purchase price of \$22.10, the investor will make a profit despite the Barrier being triggered. If the share price of XYZ is below \$22.10, the investor will make a loss.

Structured Investment Products

There are a number of structured investment products listed on ASX, listed below are some examples of particular structured investment product issues. For a full list visit www.asx.com.au/warrants.

Yield Income Enhanced Listed Deferred Securities (YIELDS)

YIELDS stands for Yield Income Enhanced Listed Deferred Securities. YIELDS give you a 100% capital guaranteed on the issue price (if held to maturity). They provide exposure to global equities with the potential for a quarterly income payment and capital growth. The potential return is achieved by generating a dividend yield while writing call options over the underlying instrument.

Example

Warrant code	YLDS02
Underlying instrument	Shares within the Dow Jones Global Titans 50 Index
Warrant type	Structured Investment Product
Issue price	\$10.00
Expiry date	6 December 2017
Capital protection	Yes, 100% if held to maturity
Exercise style	European

Capital Plus

Capital Plus are issued over a basket of securities quoted on ASX. Capital Plus also offer a 100% capital guarantee on the issue price (if held to maturity). The issue price of each Capital Plus series has varied, either being issued at \$1,000 or \$1 per warrant. Generally the investment exposure has been up to 5 years from the issue date. While the Capital Plus does not offer an income stream, the holder will receive an investment bonus if held to maturity. Any performance above the issue price at maturity will be geared at a pre-determined level. For example if the issue price of a Capital Plus series is \$1,000 with a gearing level bonus of 10% and it matures at \$1,500. The holder will receive the original \$1,000 back plus \$550 (\$500 times 110%).

Benefits of warrants

Leverage

Most warrants offer some degree of leverage. This can range from negligible leverage to a high level of leverage, depending on the type of warrant. Some warrants, such as structured investment products effectively have no leverage and generally speaking, investment-style warrants offer less leverage than trading-style warrants. Leverage means that small percentage changes in one variable are levered up into larger percentage changes in another variable.

For example, given a 5% change in the underlying share price, the market value of a warrant might change by 20%.

Example

	XYZ Shares	XYZ Warrants
16/05/2015	\$13.68	\$0.47
30/05/2015	\$14.44	\$0.68
Absolute profit	\$0.76	\$0.21
Percent return	5.6%	44.7%

In the example shown above, on 16 May 2015 the shares of XYZ Limited were trading at \$13.68 and the XYZ warrant were \$0.47.

By 30 May 2015, the warrants in the table were trading at \$0.68 and the shares were trading at \$14.44 giving you a 44.7% return from the warrant (not annualised) compared with a 5.6% return on the shares.

It is important to recognise that leverage is a 'double-edged sword.' In addition to magnifying your gains, a warrant can also magnify the percentage of your losses where the value of the underlying instrument moves against the warrant position. This is because an adverse movement in the underlying instrument will also result in a greater percentage decrease in the value of your warrant, i.e. leverage works in both ways.

Speculation

A speculator is a trader who is prepared to bear more risk in return for an expected higher return. If a speculator believes that the value of a particular asset will rise in the future they could purchase the asset now in anticipation. An alternative would be to buy a deliverable call warrant over the same asset. The difference between these and other alternatives is the cost of investment.

Purchasing a leveraged warrant costs less than purchasing the underlying asset. There is however the risk that the warrant will be worthless at the expiry date, this may be more common when using trading-style warrants.

Investment

Some warrants are structured as longer term investment-style products, for example instalments. The benefits of investing in these types of products might be capital growth, income, capital protection or a combination depending on the nature of the product. For example:

Income

Holders of instalments are entitled to the full dividends and franking credits. This income stream is accelerated as the holder only pays a fraction of the share price upfront. If the share price is \$10 and pays a 50c dividend, this would give holders a 5% yield, while an instalment worth \$5 would entitle the instalment holder to the same 50c dividend generating a 10% yield.

Unlock wealth – cash extraction

Holders of an existing share portfolio can convert the shares into instalments allowing them to unlock the wealth to invest elsewhere, while deferring Capital Gains Tax (CGT). This allows you to further leverage your exposure to the share or spread the risk and build a broader asset base. If the share price is \$10, a holder could convert them into an instalment worth \$5, unlocking \$5 in cash. This cash can then be reinvested to buy more of the same shares, instalments or other investments. The cash extraction strategy cannot be used in a SMSF.

Portfolio protection – hedging

Equity and index put warrants allow you to protect the value of your portfolio against falls in the market or in particular shares. Put warrants allow you to lock in a selling price for the underlying instrument. Protecting your position in this way is called hedging. A hedge is a transaction which reduces or offsets the risk of a current holding.

Limitation of loss

If the value of the underlying instrument is less than the exercise price of the warrant at expiry then a call warrant will expire worthless. Your maximum loss* is the amount paid for the warrant. While you can lose your entire investment in the warrants, you have to compare that loss to the size of the exposure the warrant holding gave you, and what an equivalent exposure in the underlying instrument would have cost.

Example

If you buy 1,000 XYZ call warrants which have a current market price of \$0.50 per warrant, then the maximum amount you can lose is \$500 (i.e. 0.50×1000)*.

However, these warrants may give you exposure to \$10,000 (say) of XYZ shares, so a similar exposure in the shares would cost you \$10,000. If the share price dropped significantly you could lose far more than the \$500 you invested in the warrants.

(*excluding transaction costs when you purchase the warrant)

Market exposure

Some warrants such as index, warrants over ETFs and basket warrants, offer you the opportunity to profit from movements in the market or in a sector without necessarily owning a large portfolio, which effectively tracks the market or sector. International index warrants, international equity warrants and currency warrants allow you to gain exposure to overseas and other markets. Some warrants and structured investment products may also give you exposure to overseas underlying assets, such as shares, ETFs, indices and debt.

Tailored to meet specific requirements

Warrant issuers have flexibility in structuring warrants which allows a warrant series to be tailored to the investment needs of a particular kind of investor. For example, index warrants may appeal to investors looking to profit from moves in a particular index over a short period of time, while endowment warrants may appeal to investors looking for long term exposure.

Tax effectiveness

Some products, such as instalments and endowments, offer tax effective benefits to investors. The disclosure document will contain information on tax considerations.

Benefits within SMSFs – earnings and contributions offset

Along with being an eligible form of gearing within a self managed super fund, instalments may also provide additional benefits for SMSFs. The enhanced income and franking credit stream and the potential deductibility of prepaid interest can be used to offset tax on other income earned by the fund, and tax payable on contributions made to the fund.

Risk with warrants

There are certain risks involved in investing and trading warrants. This section outlines some of the general risks associated with most warrants, but it does not deal with all aspects of risks associated with warrants. Different warrant series will have specific risks and different risk profiles. You should only invest in warrants if you understand the nature of the products (specifically your rights and obligations) and the extent of your exposure to risk. Before you invest you should carefully assess your experience, investment objectives, financial resources and other relevant considerations and discuss these with your accredited derivatives adviser. You should not rely on this booklet as a complete explanation of the risks of investing in warrants.

Issuer risk – ASX is not a guarantor

While ASX provides the platform for warrants to be traded, neither ASX nor its subsidiaries in any way guarantee the performance of the warrant issuer or the warrants issued.

Each warrant is a contract between the warrant issuer and you. You are therefore exposed to the risk that the issuer (or its guarantor, where relevant) will not perform its obligations under the warrant. You must make your own assessment of the credit risk associated with dealing with the warrant issuer.

Warrant issuers are not covered by margins or other forms of security lodged with ASX, ASX Clear, or any other party. The risks associated with issuing warrants are managed entirely by the warrant issuer. Covered warrants allow the issuer to reduce this risk by placing the underlying instrument in a cover arrangement to meet its obligations under the warrant.

To help you evaluate the ability of an issuer to meet its obligations, the disclosure document contains information on the financial situation of the issuer and guarantor (if applicable). Some issuers are listed on ASX and therefore provide this information to the market on a regular basis.

General market risks

The market price of warrants is affected by the same risks that affect all stock market investments such as movements in domestic and international markets, the present and anticipated economic environment, investor sentiment, interest rates, exchange rates and volatility (see the later discussion for the impact of volatility on warrant prices). Principally if the direction of the underlying instrument does not fulfil your expectations, the warrant will not perform and lead to limited losses compared to holding the underlying instrument.

Limited life

Most warrants have a limited life. On expiry warrants cease trading and can no longer be exercised. It is possible a warrant will expire without your expectations being realised. You should make an assessment whether the warrants you have selected have sufficient time to expiry for your market views to be realised. The different types of warrants offer you the choice to select the most appropriate warrant for your investment time horizon. For example, a trading-style warrant may suit a short term view while an investment-style warrant may suit a medium to long term view.

Also, the value associated with the life of the warrant (such as funding cost or time value) will decay. Upon expiry, the value remaining will be the intrinsic value. If the warrant is not sold or exercised prior to expiry and has intrinsic value, the issuer is required to provide the holder with an Assessed Value Payment (AVP) (see the Trading and settlement section).

Leverage risk

As well as being a benefit, leverage is also a risk of warrants. This concept is discussed in the **Benefits of warrants** section.

Currency risk

International equity warrants and index warrants may give rise to foreign currency risk. In the case of index warrants this currency exposure may arise where the index multiplier is denominated in foreign currency. Likewise, international equity warrants may give rise to currency risk.

Liquidity risk

This is the risk that you may not be able to sell your warrants for a reasonable price in the market. This could be because there are insufficient orders to buy your warrants, or the price at which others are prepared to buy them is very low. In some cases a lack of liquidity in a warrant series may be due to a lack of liquidity in the underlying instrument. Refer to discussion in the section **Trading and settlement – Market making and liquidity**.

Suspension from trading

ASX may suspend or remove a warrant series from trading; for example, if the warrant issuer is unwilling, unable or fails to comply with the ASX Operating Rules. ASX may also suspend trading in warrants in the interests of maintaining a fair and orderly market and to protect investors. In almost all circumstances, a warrant will automatically be suspended if the underlying share is suspended.

Early termination or expiry

In certain circumstances a warrant may terminate or lapse before the expiry date. An example would be where an extraordinary event occurs or some barrier levels are triggered. Barrier levels are discussed in the **Warrant features** section of this booklet. Issuers reserve the right to nominate extraordinary events which may result in the early expiry of the warrant series with the consent of the ASX. These events may vary depending on the type of warrant. Examples of the possible extraordinary events include:

- the suspension of trading in the warrant (except if it is caused by the issuer);
- the suspension of trading in the underlying securities;
- the de-listing of the underlying company;
- compulsory acquisition of the underlying securities following a successful takeover bid.

What actually happens when an extraordinary event occurs depends on the type of warrant in question and the terms of issue for that series. The expiry date may be brought forward or the warrants may simply lapse with a payment in certain circumstances.

Extraordinary events should be taken into consideration when assessing the merits of a warrant. For information on the treatment of extraordinary events view the warrant Product Disclosure Statement.

National guarantee fund not a guarantor in all cases

The National Guarantee Fund (NGF) is a pool of assets that is available to meet valid claims arising from dealings with brokers in certain circumstances. Under certain circumstances you may be able to claim against the NGF in relation to secondary trading in warrants on the stock market conducted by ASX. Claims can in no way relate to the primary issue of the warrants or the settlement obligations of the issuer arising from the exercise or lapse of the warrant.

Warrant issuers and the Disclosure Document

Who issues warrants?

Warrants may only be issued by institutions that meet the eligibility criteria set out in the ASX Operating Rules. In general terms, institutions eligible to issue warrants must:

- be subject to the Banking Act; or
- be a government; or
- have an Australian Financial Services Licence (AFSL) (or overseas equivalent), an investment grade credit rating, and sufficient net tangible assets; or
- have a guarantor that meets any of the above categories; or
- issue fully covered warrants.

In addition, other institutions which are not objected to by ASX and the Australian Securities and Investments Commission (ASIC) may also issue warrants.

A list of all warrants and warrant issuers is available at www.asx.com.au/warrants.

A list of all warrants and warrant issuers is available on the ASX website. Go to www.asx.com.au/warrants

Disclosure Documents

Warrant issuers are required to produce a disclosure document for warrant series. A disclosure document sets out information for investors to assess the risks, rights and obligations associated with the warrant and the warrant issuer's capacity to fulfil its obligations. A disclosure document must be given to all persons offered or invited to subscribe for the warrants.

The disclosure document will contain the terms of issue of a warrant series. The terms of issue are the contractual rights and obligations of both the issuer and warrant holder. In addition to the terms, the issuer may have other obligations, for example, under the ASX Operating Rules.

You are encouraged to read the relevant disclosure document and terms of issue document before investing in a particular warrant series. Disclosure documents are available on the ASX website www.asx.com.au/warrants when you look up a warrant price.

Important

While ASX considers a proposed warrant series as part of an application for admission to trading status, ASX does not warrant the accuracy or truth of the contents of the disclosure document. Admission to trading status should not be taken in any way as an indication of the merits of the particular warrants or issuer.

Neither ASX, its subsidiaries, and the National Guarantee Fund in any way guarantees the performance of the warrant issuer. You must independently assess the credit worthiness of the warrant issuer.

Trading and settlement

Secondary trading of warrants

Warrants are traded on the ASX's trading system, just like shares, and are subject to its dealing rules.

Warrant codes

All warrants have a six-letter code. For example, the code BHPZZA represents a warrant issued by RBS Group (Australia) Pty Ltd over the ordinary shares of BHP Billiton Ltd.

- The first three characters of the code identify the underlying instrument. For most equity and instalment warrants this will be the same as the three letter ASX code of the underlying company shares.
- The fourth character of the code identifies the type of warrant (see table on right hand side).
- The fifth character of the code identifies the warrant issuer. See page 30 for a list of unique warrant issuer codes.
- The sixth character of the code identifies the particular warrant series. For trading-style warrants the range A to O is reserved for call warrants, while the range P to Z is reserved for put warrants. In addition, the range 1 to 6 is reserved for call and put warrants.

Please note that ETOs and other securities traded on ASX may also be represented by a six-letter code (and their codes may not follow the same format as a warrant). Therefore, not all six-letter codes relate explicitly to a warrant.

Market making and liquidity

The ASX Operating Rules are intended to promote a liquid market in which warrant holders can sell their warrants. The rules seek to do this by requiring the issuer of each warrant series to:

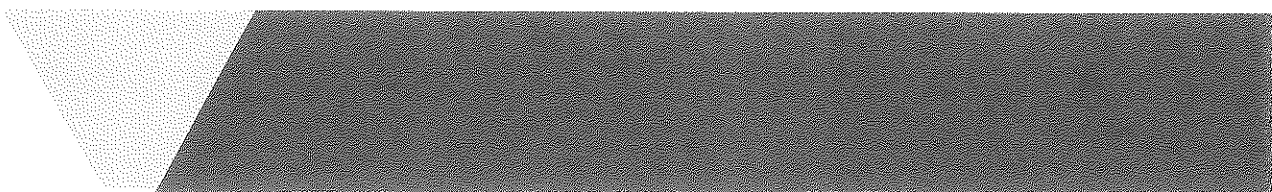
- ensure that the warrant series has an initial spread of holders that, in the opinion of ASX, is adequate and reasonable; or
- "make a market" in the warrant series on an ongoing basis, by ensuring that a reasonable bid and volume is maintained in the market for a prescribed period (90% of the time between 10:15 am and the close of Normal Trading (normally 4:00 pm) on any Trading Day), except in certain "Permitted Circumstances" (outlined overleaf).

Fourth letter of code	Description
E	Endowments
I or J	Instalments
S	Self Funding Instalments (SFIs) and Structured Investment Products (SIPs - These include longer-term investment style products)
W, V, U or T	Trading-style warrants including equity calls and puts, index calls and puts, currency calls and puts.
X, Y or Z	Warrants which have significantly different structures to any of the above. Examples include equity and index knock-out/barrier warrants, and Capital Plus Warrants.
K, L, M or Q	MINIs
D	This is a temporary code assigned to a warrant trading on a deferred settlement basis due to a corporate action, reconstruction or a rollover

If a warrant issuer satisfies ASX that the initial issue of warrants generates a sufficient spread of holders, it is not required to make a market in that series. A sufficient spread of holders demonstrates a level of interest that should ensure that there is a liquid market for buyers and sellers of the warrant series.

In most circumstances the warrant issuer elects the latter alternative, that is, to make a market in the warrant series. This means that apart from "Permitted Circumstances" (outlined overleaf), there should be a price quoted on the trading system at which warrant holders will be able to sell during most of the normal trading day.

The warrant issuer's market making obligation under the ASX Operating Rules is to ensure that a reasonable bid price and volume is maintained in the market for the relevant warrant series for the prescribed period. It is important to note that warrant issuers will normally display both bid and offer orders for most warrant series during normal trading hours.



A bid is considered reasonable for the purposes of the ASX Operating Rules if it either:

- satisfies an objective "price-volume spread" test, under which:
 - the warrant price spread must not exceed a prescribed amount (or proportion of the bid price); and
 - the bid value must not be less than a prescribed amount;or
- is otherwise considered by ASX to be reasonable having regard to a number of qualitative factors including the market conditions in the underlying instrument (or the underlying hedge instrument), consistency of warrant pricing, the nature and make up of the underlying instrument and any corporate actions or adjustments that may be occurring in respect of that underlying instrument.

A warrant issuer is not required to maintain a reasonable bid in respect of a warrant series in certain circumstances, known as "Permitted Circumstances". These include (among other circumstances) when:

- The underlying instrument (or the underlying hedge instrument) is suspended from trading, has been placed in a trading halt or is otherwise unavailable for trading;
- The warrant series is placed in any of the market session states where bids and offers for that product are not automatically matched on the trading platform or is otherwise unavailable for trading;
- The theoretical value of the warrant series is below the relevant minimum price step;
- The warrant issuer would breach laws either in Australia or a relevant foreign jurisdiction by fulfilling its market-making obligations, and has advised ASX accordingly;
- The warrant issuer or its market-making agent experiences a continued interruption to its normal operating environment that prevents it from entering market making orders in a timely and accurate manner (for example, the malfunctioning of automated market making systems); or
- In times of high volatility warrant issuers may not be able to provide a bid or offer as the volatility in the underlying instrument may make it difficult to price the warrants.

Pricing matrices

Some warrant issuers publish pricing matrices. These are tables that show what a warrant price might be for a range of given share prices. These must be treated as only indicative and relevant on the day they are published and when there has been no change in the issuer's volatility expectations for the underlying instrument.

Trading information

Twenty minute delayed trading details are available on the ASX website. To access this go to www.asx.com.au/warrants and click on the link to Warrant Prices. Real time prices are also available from your broker or on some websites. The trading prices of warrants are published daily in a number of major newspapers. The information in the newspapers does not necessarily contain details of all relevant factors to enable you to make a decision about a warrant series.

Short selling

Short selling occurs where a person sells securities which he or she does not own at the time of the transaction. As a general rule, warrants are not permitted to be short sold in the market. This means that you must generally own a warrant before you may sell it.

Suspension from trading

Refer to discussion in the section **Risks with warrants**.

Warrant settlement – secondary trading

For secondary trading, warrants are settled through the equities settlement system, CHES.

ASX Clear, which clears ETO transactions, is not involved in warrant transactions.

Details of warrant trades are sent to CHES to effect settlement. For this to occur, you must be either issuer-sponsored or broker-sponsored. Your broker can help you with sponsorship arrangements.

You are required to settle your warrant transaction within the normal settlement period for a share transaction and you will receive regular statements of your warrant holdings in the same manner as share holdings. You will receive a Holder Identification Number (HIN) if you are broker-sponsored or a Shareholder Reference Number (SRN) if you are issuer-sponsored.

Warrant settlement – exercise or expiry

A warrant disclosure document will explain the requirements for a valid or effective exercise of the warrant. Generally, you will be required to lodge an exercise notice on or before a certain time. You must ensure the requirements for exercise are met to ensure the warrants are validly exercised. A failure to validly exercise (or an ineffective exercise) may mean that you are not able to insist on transfer of the underlying instrument. It should be noted that in the case of international equity warrants, transfer of the underlying instrument is likely to occur in an overseas jurisdiction. For further information, see the **Types of warrants** section of the booklet about international equity warrants.

When no exercise has occurred

If you hold deliverable warrants but do not exercise them before expiry you may be entitled to a cash payment, often called an "assessed value payment" (or AVP). The Terms of Issue of warrants may include provisions for calculation of an AVP based on the warrant's intrinsic value (if any) less reasonable costs (which may include such things as taxes and expenses). The disclosure document for a warrant will explain the calculation of the AVP for that warrant and when it will be paid.

Issuer fails to meet its obligations

When a deliverable warrant is exercised the terms of issue will provide for delivery of the underlying instrument and payment of the exercise price. If a warrant issuer does not meet its settlement obligations within 20 business days following valid (or effective) exercise, you may ask for a liquidated damages payment. Alternatively, you could pursue other legal remedies against the issuer.

Adjustments

The disclosure document may contain terms providing for adjustment to the exercise rights of warrants where there is a change to the underlying instrument. Where the underlying instrument is an equity security, adjustments generally occur where there is a corporate action such as a reduction in capital, a rights issue or reconstruction in the underlying security. In the case of index warrants, adjustments often relate to the modification or discontinuance of the index. When an adjustment occurs, the underlying parcel, the exercise price and other variables could be changed.

Warrant pricing

It is important to have some understanding of how the market prices of warrants are determined. There is no simple answer to this question and a complete explanation is far beyond the scope of this booklet. Furthermore different types of warrants may be affected more or less by certain pricing factors.

Warrant pricing is a subset of general option or derivative pricing and involves the use of complex mathematical techniques to build pricing models.

Warrants prices are influenced by:

- the price or level of the underlying instrument
- the exercise price of the warrant
- the expiry date or the time left to expiry
- the volatility of the underlying instrument
- interest rates
- dividends

The table below shows how the variable factors affect warrant prices.

Factors in pricing	Change in variable	Change in call warrant price	Change in put warrant price
Exercise Price	Increase	↓	↑
Underlying Share Price	Increase	↑	↓
Time to Expiry	Decrease	↓	↓
Volatility	Increase	↑	↑
Interest Rates	Increase	↑	↓
Dividend Expectations	Increase	↓	↑

Price or level of the underlying instrument

This is perhaps the most obvious of the pricing determinants and it is also the most important. However, a common misunderstanding is to assume that the price of the underlying is the only determinant of warrant value. It is quite possible in some situations for a share price to go up and yet the price of a corresponding equity call warrant to remain steady (or even fall in value). This could occur if one or more of the other five factors above had changed and outweighed the effect of the increasing share price. In practice, it is often changes in volatility or an impending dividend payment which causes this effect.

Delta

The rate of change of a warrant price with respect to a change in the price of the underlying instrument is called the delta of a warrant. Theoretical values for call warrant deltas range from 0 to 1 and put warrant deltas from 0 to -1.

A delta of 1 means that for every 1 cent change in a share price, the warrant price also changes by 1 cent. This would be the case if the underlying share price was \$10 and the exercise price of a call warrant was \$5, i.e., the warrant is so far 'in-the-money' it should approximately move 1 for 1 with the share price.

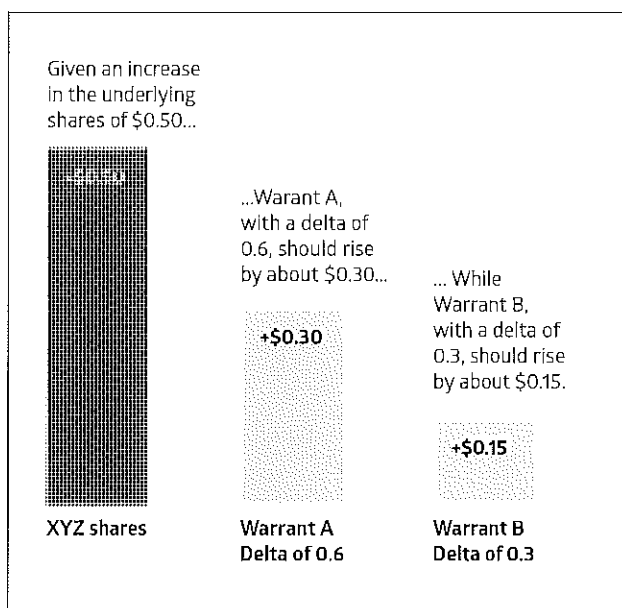
A delta of 0 means that for every 1 cent change in a share price, the warrant price does not change. This would be the case if the underlying share price was \$5 and the exercise price of a call warrant was \$10, i.e., the warrant is so far 'out-of-the-money' that the warrant price should theoretically not move if there is a 1 cent rise in the share price. Most

equity call and put warrants and index warrants are issued with an exercise price (exercise level) in close proximity to the current share price (or index level) which gives them a delta of around 0.5, i.e., the warrant is 'at the money' and the warrant price should theoretically have moved 0.5 cent for a 1 cent share price movement. Instalment warrants have higher intrinsic value and typically have deltas closer to one. MINIs will typically have a delta of 1, as they track the value of the underlying asset on a one-for-one basis

The delta of a warrant is affected by the conversion ratio, for example, a warrant with a conversion ratio of 2 will have a theoretical delta range 0 to 0.5 for a call and 0 to -0.5 for a put.

However, you should not think of fractional warrants as providing more leveraged returns or being more highly geared. They are not. When you are comparing the leverage benefits of one warrant with those of another, you should compare like with like and take into account the fact that one warrant may have a conversion ratio greater than the other.

To make things more complicated, the delta of a warrant is not a constant but also changes with the changing share price. This is called a warrant's Gamma but this is beyond the scope of this booklet.



Exercise price and expiry date

The higher the exercise price is relative to the price of the underlying instrument at the time of issue, the lower the price of an equity call warrant will be. Also, the further away the expiry date is, the more opportunity there is for the price of the underlying instrument to rise above the exercise price and so, all other things being equal, longer dated warrants are more expensive.

It is common for equity warrants to be issued with an exercise price close to the price of the underlying instrument at the time of issue. You should always consider the time to expiry of all warrants as some warrants have expiry dates of 3 months (or less) while others are long term such as 15 years.

Volatility of the underlying instrument

Volatility is a measure of the amount of movement observed in the price or level of the underlying instrument. Historical volatility is a statistical measurement that can be applied to an historical sequence of prices or levels. An instrument whose price or level has varied dramatically in the last couple of months would have a higher historical volatility measure than one whose price or level has remained relatively constant in that time. Option and warrant pricing has to take into account a trader's expectation of volatility from the time they enter the trade until the expiry of the option or warrant. Historical volatility may provide a guide to future volatility, but the market's expectations of future volatility may differ considerably from what has transpired in the past. The volatility at which a trader (or the market) is prepared to buy or sell options or warrants at any point in time, is often referred to as the implied volatility of those options or warrants.

All other things being equal, the more volatile the underlying instrument, the higher the theoretical price of the warrant. This is because the underlying price has a greater probability of moving above (for a call) the exercise price of the warrant which makes the warrant more valuable.

Interest rates

Interest rates also affect warrant pricing. For example, if you buy a call warrant you are able to defer the payment of the exercise price until expiry. This saves you the funding costs compared to buying the underlying instrument directly. When interest rates are high, there is a bigger saving, and therefore you will have to pay more for the call warrant and less for puts.

Also, the issuer has to fund its underlying instrument hedge position. When interest rates are high, this is more expensive and so the issuer has to sell the warrants at a higher price.

Dividends

The effect of dividend payments varies depending on the type of warrant, and any entitlement of the warrant holder to receive dividends paid on the underlying instrument. Even in the case of warrants where holders are not entitled to receive dividends paid on the underlying instrument, the warrant price may still be influenced by changes in dividend expectations.

Call warrant prices fall and put warrant prices rise when a dividend is above market expectation. It is also relevant to consider whether the warrant is American or European. You should ask your accredited derivatives adviser about the impact of dividends.

Exchange rates

Exchange rate movements can affect the pricing of certain warrant types (even when the underlying instrument is not a currency warrant). These include international equity warrants, international index warrants and currency warrants.

Other influences on price

For some warrant types, the theoretical option value is less important in determining price than other specific factors. For instance, the price of an instalment warrant is closely related to the present value of the loan component of the instalment.

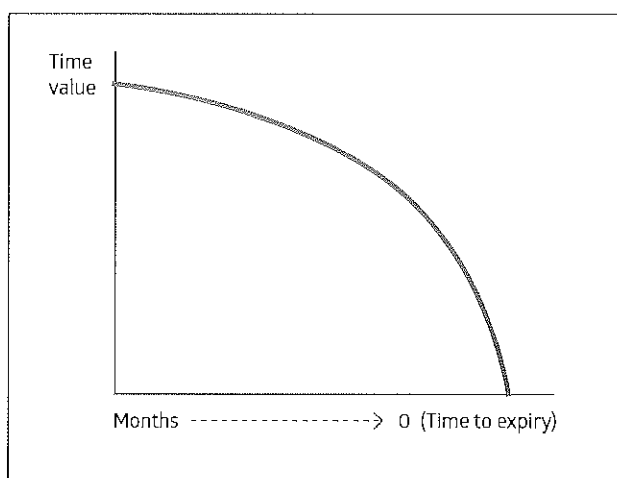
Other non quantifiable factors, such as supply and demand, investor sentiment, and general market expectations, can also influence the market value of all warrants (just like they do in any market). A warrant issuer may be able to influence the warrant price (because, for example, it holds a large percentage of the warrants on issue and makes a market in the warrant series).

Time value and intrinsic value

The price determinants discussed above give a theoretical value for a warrant. This may be the basis for the market value that an adviser quotes you. It may also take into account other non quantifiable factors. The market value of a warrant price can be divided into two components – intrinsic value and time value.

The intrinsic value of a warrant is the difference between the exercise price of the warrant and the market price of the underlying instrument at any given time. If this number is less than zero, the warrant is said to have no intrinsic value.

The time value is the remaining value that has been attributed to the warrant by the market, ie. the market price minus the intrinsic value of the warrant. Time value takes into account all the factors discussed above and represents the possibility that the market may move so that the warrant is in-the-money. Obviously, the closer you get to the expiry date, the less likely it becomes that the market will move in your favour and so time value drops. This is called time decay, and it does not happen at a linear or even rate. As a rule of thumb, a trading warrant will lose 1/3 of its time value during the first half of any given time period and 2/3 during the second half. For some warrants, like instalments, the (funding cost) time value makes up a much smaller component of total value than for other warrants such as equity warrants. MINIs do not have a set expiry date. Time value therefore has a limited impact on the value of a MINI.





Where to start

Further education/information

The ASX website provides a number of resources, educational materials and information on warrants: www.asx.com.au/warrants

You can obtain information on:

- online warrants course
- trading and market information
- warrant strategies
- portfolio studies
- links to warrant issuers' websites.

Accredited derivatives advisers

Australian Securities and Investments Commission (ASIC) requires brokers who advise clients in ETO and warrants strategies to have completed the Accredited Derivatives Adviser program. You can ask your broker if they or their colleagues have this accreditation status before they assist you with options and warrants investment strategies.

You should understand the details for the particular warrant series you wish to invest in. We strongly recommend you read the disclosure document and the terms of issue of the warrant series to find out about your rights and obligations in relation to the warrant series. Your broker should be able to provide you with a summary of specifications for all warrants currently available for trading. Alternatively, you can download a list of warrant series from www.asx.com.au/warrants.

Warrant client agreement form

Before you buy your first warrant via a particular broker you will be required to sign a Warrant Client Agreement Form saying you have received and read a copy of this booklet. A Warrant Client Agreement Form is not required for on-market transactions to sell warrants.

You can place an order for warrants with any broker, however you should only receive advice from an accredited derivatives adviser.

Incentive payments

Warrant issuers may have arrangements in place whereby financial or other incentives are provided to brokers in relation to the sale of that issuer's warrants. Brokers are required to disclose to you any commission, fee or other benefit which may influence their investment recommendation. You should be aware of this and feel free to ask your broker whether incentive payments are being made by the warrant issuer to the broker.

Subscribing for warrants

You may also be able to apply for warrants to be issued to you by the issuer by completing an application form attached to the disclosure document (the primary issue). It is common for investors to subscribe for investment-style warrants in this way, whereas trading-style warrants will generally be bought on the secondary market.

Product matrix

Warrant type by Issuer	Investment						Trading						Knockout	
	Ordinary Instalments	Rolling Instalments	Self Funding Instalments	Instalment MINIs	Bonus Certificates	Structured Products	Equity	Index	Mini	Currency	Commodity	International	Equity	Index
Citi	■	■	■	■	■		■	■	■	■	■		■	■
CBA	■	■												
Macquarie			■									■		
RBS	■		■			■								
UBS	■	■	■			■	■					■		
WBC	■		■											

Issuer contact details

Investors can request information about specific financial products on offer or visit the issuer website for further information. The Issuer Letter in the table below denotes the fifth letter of the ASX code for a warrant issuer.

Letter	Issuer	Contact	Website	Recent Announcements
O	CitiWarrants (Citigroup Global Markets Aust Pty Ltd)	1300 30 70 70	www.citifirst.com.au	CTW
Y	Commonwealth Bank Australia	1300 786 039	www.commbank.com.au/warrants	CBA
M	Macquarie Bank Ltd	1800 990 107	www.macquarie.com.au	MBL
Z	RBS Alternative Investments (Aust) Pty Ltd	1800 450 005	markets.rbs.com.au	ABM
R	Royal Bank of Scotland plc	1800 450 005	markets.rbs.com.au	RBS
S	UBS AG	1800 633 100	investments-au.ubs.com/	UBS
U	UBS Investments Australia Pty Limited	1800 633 100	investments-au.ubs.com/	UIA
W	Westpac Banking Corporation Ltd	1800 990 107	www.westpac.com.au/structuredinvestments	WBC

Glossary of terms

ASX CLEAR

This stands for ASX Clear Pty Limited ABN 48 001 314 503 which is the clearing and settlement facility for ASX's Options market.

American style

Type of exercise style which allows the holder to exercise the warrant at anytime up to and including the expiry date.

CHESS

This stands for Clearing House Electronic Sub register System and means the system established and operated by Australian Settlement Transfer Corporation (ASTC) for the clearing and settlement of CHESS approved securities, the transfer of securities and the registration of transfers.

Delta

The rate of change of a warrant price with respect to a change in the price of the underlying instrument.

Derivative

An instrument which derives its value from the value of an underlying instrument (such as shares, share price indices, fixed interest securities, commodities, currencies, etc.). Warrants and options are types of derivatives.

Disclosure document

The document prepared by the warrant issuer which is dispatched to prospective subscribers of a warrant series. Disclosure documents are also known as either a product disclosure statement (PDS) or an offering circular.

European style

Type of exercise style which allows the holder to exercise the warrant only on expiry day.

Exchange traded options (or ETOs)

Options which are bought and sold in the options market operated by ASX.

Hedge

A transaction which reduces or offsets the risk of a current holding. For example, a put warrant may act as a hedge for a current holding in the underlying instrument.

In-the-money

When the exercise price is below (call) or above (put) the price of the underlying instrument.

Issue Price

The amount a person pays to subscribe for a warrant. May also be called 'premium'.

ASX Trade

ASX Trade is the name of the computerised trading system used by ASX to trade equities, options, warrants, interest rate securities and some futures.

Out-of-the-money

When the exercise price is above (call) or below (put) the market price of the underlying instrument.

Primary issue

The issue of the warrants by the warrant issuer to subscribers in the primary market.

Secondary market

The trading of warrants on ASX Trade after the primary issue.

Terms of issue

The rights, conditions and obligations of the warrant issuer and the warrant holder. These terms are contained in the disclosure document.

Volatility

A measure of the amount of movement observed in the level of the underlying instrument over a period of time.

Warrant code

A six letter code assigned to a warrant by ASX to identify it on ASX Trade.

Warrant issuer

The institution that issues the warrant.

Warrant series

All warrants with the same terms of issue and underlying instrument and having the same warrant issuer, exercise price, expiry date and settlement procedure. Each warrant series has a separate warrant code.



Further sources of information

Explanatory booklets and other information is available on the ASX website – asx.com.au/warrants:

- free online classes
- trading information and tools
- ASX trading codes and prices for warrants
- links to warrant issuers' websites (disclosure documents, pricing calculators)
- face to face seminars
- a range of free booklets: various warrant Fact Sheets, Taxation Treatment of Warrants

Online warrants class

The ASX instalment warrant classes have been designed to assist and educate all forms of investors, from the beginner to the advanced. The classes have been structured to cover all aspects of the warrants market and allow you to progress through all topics or select a particular topic of interest. Also included in the courses are a series of interactive exercises, diagrams and questions that will assess your progress and aid your learning and development.

Contact details

ASX Customer Service 131 279

Email

info@asx.com.au

ASX warrants

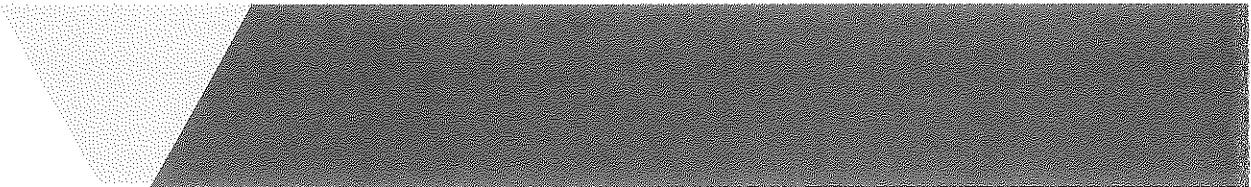
20 Bridge Street, Sydney NSW 2000

Website

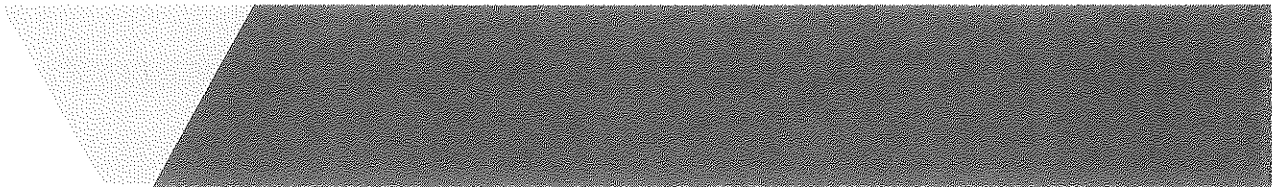
www.asx.com.au/warrants

Register your interest for
upcoming warrants events at
www.asx.com.au/keepmeposted

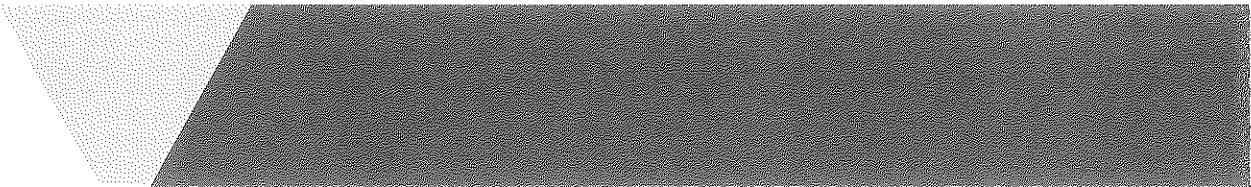
This brochure and other fact sheets are available online at
www.asx.com.au or call ASX on 131 279.



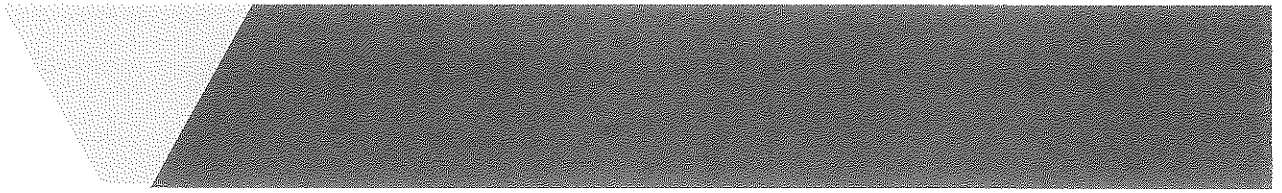
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