行政院所屬各機關因公出國人員出國報告書
（出國類別：實習）

赴新加坡參加 UBS Warburg 舉辦之

外匯研習課程報告

服務機關：中華電信股份有限公司
出國人　職　　稱：助理管理師
　　姓　　名：沈素梅

出國地點：新加坡
出國期間：91 年 11 月 10 日至 91 年 11 月 16 日
報告日期：92 年 1 月 29 日

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公 務 出 國 報 告 提 要

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報告名稱:

赴新加坡參加UBS Warburg舉辦之外匯研習課程

主辦機關:

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關鍵詞: 外匯

內容摘要: 近年來新種金融商品不斷推陳出新，使國際間投資管道大量增加；而電子資訊的蓬勃發展及電子商務的欣欣向榮也使得國際間資金的移動更加迅速及頻繁。影響所及，國際匯市波動幅度加劇，如何加強掌握公司外匯交易情形及部位管理亦日趨重要。進口商若能事先知道未來某特定時日，將有外匯必須支付之事實，可以採取各種避險方式，諸如向銀行預購遠期外匯、自行合成預購遠匯、區間遠匯、選擇權等。而選擇權依其組成之方式可分爲一般選擇權（vanilla options）與特殊選擇權（Exotic options）兩大類。至於應採何種選擇權，並沒有絕對的答案，端視個案及決策者願意承受的風險大小與願意支付的成本多寡而定。

本文電子檔已上傳至出國報告資訊網

目錄

赴新加坡參加 UBS Warburg 舉辦之外匯研習課程報告

摘要

近年來新種金融商品不斷推陳出新，使國際間投資管道大量增加；而電子資訊的蓬勃發展及電子商務的欣欣向榮也使得國際間資金的移動更加迅速及頻繁。影響所及，國際匯市波動幅度加劇，如何加強掌握公司外匯交易情形及部位管理亦日趨重要。

進口商若能事先知道未來某特定時日，將有外匯必須支付之事實，可以採取各種避險方式，諸如向銀行預購遠期外匯、自行合成預購遠匯、區間遠匯、選擇權等。而選擇權依其組成之方式可分為一般選擇權（vanilla options）與特殊選擇權（Exotic options）兩大類。至於應採何種選擇權，並沒有絕對的答案，端視個案及決策者願意承受的風險大小與願意支付的成本多寡而定。

目的

職於民國九十一年十一月十日至十一月十六日止，奉派赴新加坡研習外匯課程，為期七天。此次課程的目的主要在提升本公司財務處資金規劃部門人員之專業素養且希望此行所得或能提供本公司未來外匯避險操作之參考。近年來新種金融商品不斷推陳出新，使國際間投資管道大量增加；而電子資訊的蓬勃發展及電子商務的欣欣向榮也使得國際間資金的移動更加迅速及頻繁。影響所及，國際匯市波動幅度加劇，如何加強掌握公司外匯交易情形及部位管理亦日趨重要。

本公司為因應民營化的競爭，八十八年度下半年於財務處成立資金規劃科，期強化財務處的專業功能。雖然現在仍屬國營事業，但本處不斷向外界學習日新月異的新金融工具，期盼能突破舊有體制，在與其他世界知名企業並駕齊驅的同時，充分發揮財務處的功能。

本公司於九十一年八月份的董事會中通過本公司衍生性商品交易處理程序，本科同仁積極吸取相關知識，欣逢本公司海外釋股三家承銷商之一－瑞銀華寶願意提供為期一週的外匯相關訓練課程。新加坡為亞洲最大的全球金融交易中心，參與此次瑞銀華寶在新加坡所舉辦的外匯課程，相信對將來本公司在外匯方面的衍生性商品操作必能有相當大的助益。

行程

十一月十日：台灣飛往新加坡

十一月十一日至十五日：參加研習課程

十一月十六日：搭機返台

課程內容

十一月十一日

09:00~12:00 ＊Capital Markets and Money Markets

＊Brief History of Foreign Exchange (FX) Markets

＊Foreign Exchange Markets – Rates and Quotes

13:00~17:00 ＊Triangular Arbitrage

＊What determines the Exchange Rates?

＊FX Derivatives – Forwards, Futures, Options, Swaps, Exotics

十一月十二日

09:00~12:00 ＊Option Value – Forward Value and Volatility Value

＊Option Pricing Models – Binomial Model and Black-Scholes Model

13:00~17:00 ＊Option Strategies

＊Risk Measures – the Greeks

＊What the Greeks mean – trading volatility

十一月十三日

09:00~12:00 ＊Non-standard or Exotic Options – Basics and Pricing

＊Interest Rate Derivatives – who uses them and why

＊FRAs, Futures, Caps, Floors

13:00~17:00 ＊Interest Rate Swaps and Cross-Currency Swaps

＊Swaptions

＊Corporate FX hedge Strategies

十一月十四日

09:00~12:00 ＊Corporate FX Risk Management

- Why corporate hedge?
- Translation vs. transactional risk – What corporate hedge?
- Risk measurement: VaR, sensitivity analysis and stress test
- Choices of instruments
- Hedge ratio and hedge horizon
- Mark to market

＊Case study hedging Chunghwa's A/P in USD

13:00~17:00 ＊FAS133/IAS39 – implications for risk management

- Qualifying exposure/instrument
- Cash flow hedge and Fair value hedge
- Allocation between effective and ineffective hedging
- Documentation issues

十一月十五日

09:00~12:00 ＊FX dealing floor layout

＊Behind the scenes – order execution and risk management – "What happens after your trade is done?"

＊Exotic options pricing practicality

13:00~17:00 ＊E – commerce tools demonstration

- FX Prime Brokerage
- FX Option Trader
- FX Orders
- FX Trader
- FX Web

心得與建議

假設進口商三個月後須支付貸款一百萬美元，目前外匯市場美元兌新台幣即期匯率為34，三個月期美元存款利率及新台幣貸款利率分別為1%及3%。為避免三個月後美元兌新台幣之價格上揚，進口商成本提高，進口商在不額外支付權利金的情況下，可採取幾種方式規避外匯風險：

【方式一】預購遠匯：

遠期外匯契約為交易雙方所簽訂的契約，它賦予買方一種義務，在未來特定時日按照簽約日雙方同意的價格（即遠期匯率）買進特定的外幣資產；同時，契約的賣方有義務在相同特定時日，按照遠期匯率出售特定的外幣資產。如果到期日外幣即期匯率高於原先訂定的遠期匯率，則買方獲利而賣方損失；反之，則買方損失而賣方獲利。遠期外匯契約為最早推出且最簡易的外幣避險工具。

遠期外匯＝即期匯率×（1+新台幣利率）/（1+美元利率）

＝34×（1+3%× 3/12）/（1+1%× 3/12）

＝34.1696

【方式二】自行合成預購遠匯：

進口商向銀行借入新台幣資金，期限為三個月，並在即期外匯市場上先兌換成美元，投資三個月貨幣市場工具，使到期之本利和恰為一百萬美元，用以支付進口貨款。投資於三個月貨幣市場的投資金額計為：

US$1,000,000÷（1+1%× 3/12）＝US$997,506,.23

因此，進口商需向銀行借入之新台幣資金則為：

US$997,506.23× 34＝NT$33,915,211.82

進口商借入新台幣資金，三個月後需償還之本利和為：

NT$33,915,211.82×（1+3%× 3/12）＝NT$34,169,575.91

三個月後，進口商收回貨幣市場投資金額以支付貨款並清償新台幣借款。此時，進口商支付一百萬美元貨款折算成新台幣的有效匯率為：

NT$34,169,575.91÷ 1,000,000＝34.1696

進口商以此匯率鎖定其支付進口貨款成本，便可完全不受三個月內任何匯率波動之影響，此一結果與預購遠匯完全相同，亦即表示進口商實際上已自行合成了遠匯的預購。

【方式三】區間遠匯（Range Forward）

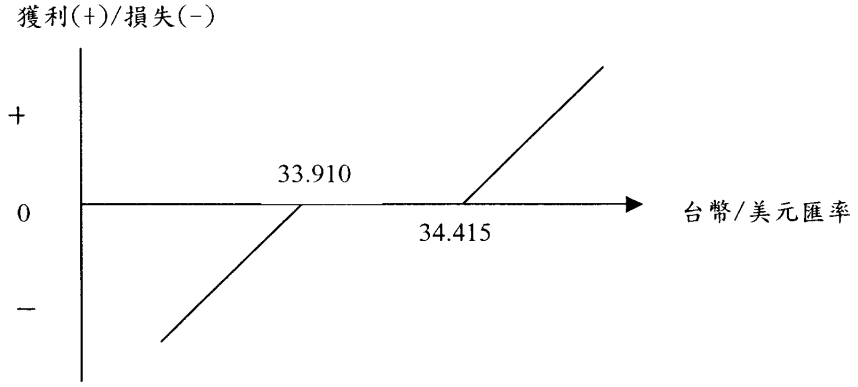
又稱為零成本選擇權（Zero Cost Option），此乃藉由買入一外匯選擇權之同時也賣出一外匯選擇權，使其權利金互相抵銷，達到零操作成本之目的。

何謂外匯選擇權?

「外匯選擇權（Currency Options）」又稱為「貨幣選擇權」，它是一種貨幣買賣契約，選擇權買方支付權利金(Premium)予選擇權賣方之後，自該項契約成立之日起，至預先約定未來某一時日或之前，得以事先約定之履約價格(Strike Price 或 Exercise Price)，買方有權要求買入(買權;Call)或賣出(賣權;Put)定量之某種貨幣，賣方有義務按約定匯率履行交割義務。

假設本例情況：

買入一履約價格在 33.910 之美元買權(Call)，付出美元買權之權利金，同時賣出一履約價格在 34.415 之美元賣權(Put)，收入美元賣權之權利金，此兩選擇權之權利金金額相同，可互相抵銷，進口商不必支付任何操作成本。



第(1)種情況：若到期匯率高於 34.415 元，則進口商可行使原來買入的美元買權，即以 34.415 買入美元(低於市場上現匯之買入價格，可節省買

匯之成本，產生匯率上之獲利)。第(2)種情況：若是到期時匯率低於 33.910，則進口商會被要求執行原來賣出的美元賣權，亦即必須以 33.910 元買入美元(高於市場上現匯之買入價格，會增加買匯之成本，造成匯率上之損失)。第(3)種情況：若到期匯率介於 33.910~34.415 之間，則沒有任何一選擇權會被執行，進口商會直接以市場價格購入美元。

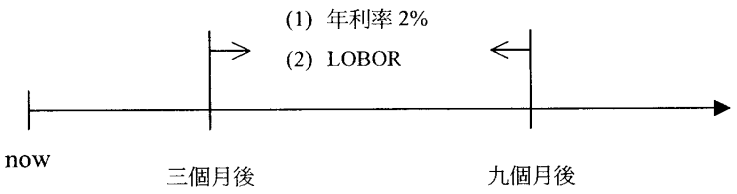
以上所談的都是不須額外支付權利金或任何費用的方式，若進口商願意支付權利金，尚有許多特殊選擇權（Exotic options）可作為決策的參考。衍生性商品種類繁多，其觀念與內容無法於此一一羅列，謹以些許附件方式呈現。

此次新加坡研習課程，印象最深刻的是老師的一個問題，我覺得非常有意思，和大家一起分享：

如果公司三個月後會有一筆 100 萬元資金，以下兩種與銀行的約定方式，您認為何者較沒有風險？

(1)三個月後存入銀行 100 萬元，年利率 2%，期間六個月。

(2)三個月後存入銀行 100 萬元，利率是三個月後 LIBOR，期間六個月。



我的直覺反應是(1)，因為利率固定感覺上就是鎖定利益，當然比較沒有風險囉！但老師提供我另一個思考的方向：當我選擇第(1)時，三個月後若是利率為 1.5%（低於 2%），則該筆 100 萬元，實質上已多於 100 萬元。而三個月後若是利率是 2.5%(高於 2%)，則該筆 100 萬元實質上已低於 100 萬元，因此三個月後該筆資金就會因當時利率高低而產生不確定性，所謂的不確定也就是風險。反觀第(2)的情況，不管三個月後利率多少，三個月後的 100 萬元，實質上仍為 100 萬元。以三個月後的這個時點而言，似乎

選擇第(2)，反而較無風險。因此我認為風險應該是一種相對的觀念，會因時點的不同而有不一樣的看法。

附件

Non-Standard or Exotic Options - An Introduction

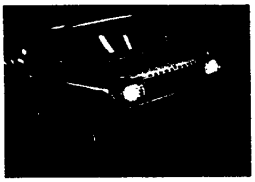
SECTION 7

UBS Warburg

Exotic options ...

- What are exotic options?
- Are exotics more risky?
- Why do people use exotics?
- Are exotics better products?



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Exotics - an Example

SECTION 7.1

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Japanese hedger

- Today is the 1st of march 2002
- A Japanese car manufacturer just sold 1,000 cars to a European wholesaler for 10 million Euro
- The car manufacturer will receive the 10 million Euro in 3 months.
- A car costs 1 million JPY to produce

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How to hedge the FX risk?

- EURJPY Spot is 116
- An exchange rate of 116 results in a 16% margin and is acceptable
- The company believes that the minimal (operating) margin to satisfy the shareholders is 10%, but the company believes that they should get more out of this trade
- 3-month forward exchange rate is 115
- What should the company do?
  - Alternative #1: _____
  - Alternative #2: _____
  - ...

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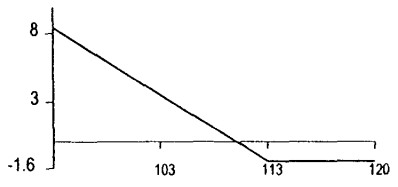
3 month 113 EUR put JPY call

- Buy insurance!
- 3 month standard 113 strike EUR put JPY call costs
  - 1.3775% of JPY face
  - 15,565,756 JPY
  - this results in a worst-case margin of 11.44%



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Range-reset-forward

- Enables to take a view of the likely spot range over the option
- You have a known best and worst case rate
- You always have a hedge!
- No action points needed!
- Is the Range-Reset-Forward an option?

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How to (precisely) expresses a view?

SECTION 7.2

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An other example

- Spot USDJPY is 117
- Hedge Fund thinks that spot is slowly moving down.
- Not 100 % sure, so doesn't want to sell spot

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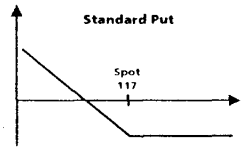
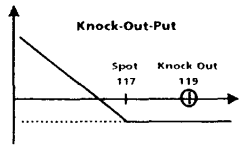
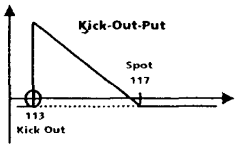
Standard, knock-out and kick-out



- Market quotes the following prices:
  - 1m 117 USD put JPY call for 1.58% of face
  - 1m 117 USD put JPY call Knock-Out at 119 for 1.26% of face
  - 1m 117 USD put JPY call Kick-Out at 113 for 0.35% of face





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Structured Products - An Example

SECTION 7.3

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Cliquet GROI on NASDAQ

Product Details	
Underlying	Nasdaq 100-Index® (Bloomberg: NDX)
Nominal	USD 5000
Issue Price	USD 5000 (100%)
Initial Index Level	USD 1617.58 (Closing of Underlying on November 19th, 2001)
Guaranteed Minimum	**USD 5000 (=100% of Nominal)**
Maximum Return	65% (of Nominal of US$ 5'000)
Issue Price	100%
Redemption	At Redemption the Cliquet GROI pays out the greater of **Guaranteed Minimum** or **Nominal * [100% + (Max. Return - monthly negative performances)]** where the (Max. Return - monthly negative performances) is calculated as $65\% - \sum_{i=1}^{12} \left(Max\left(\frac{NDX_{i-1} - NDX_i}{NDX_{i-1}}; 0 \right) \right)$ and NDXi Level of the Index close of business at the resetting date of month i NDXi-1 Level of the Index close of business at the resetting date of month i-1

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Summary

- In certain cases, Exotics are the best products to fulfil your needs
  - They can give a risk profile that hedges your requirements in the most cost effective manner
  - They can increase gearing to maximise returns on speculative views
  - Exotics have to be understood in context with a strategy
- Are Exotics Options risky?
  - Depends on the specific option
  - Lower up front premiums can reduce premium at risk
  - Clever product selection can reduce portfolio risk
  - Bad product choices can cause problems

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Exotic Options - Many Varieties

SECTION 7.4

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What is an exotic option?

- All options other than standard calls and puts?
- Many exotic options are referred to as "path-dependent"
- Not all "exotic" options are path-dependent.
- Some have referred to these as "second-generation" options.
- We'll refer to these as "non-standard" options.
- George Soros refer to exotic options as "the economic equivalent of crack cocaine"

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What can be non-standard

- The Type of Option
  - neither a Call nor a Put
  - payoff may be a a fixed amount or Max[0 , $(ST - X)^2$], or...
- The Underlying
  - may not be a traded asset or security, e.g., volatility
- The Underlying Price
  - may be the average price or the maximum price
- The Strike Price
  - may be the average price or the maximum price
- Conditional Events
  - payoff may depend on spot trading within a range
- Payout may be in an other currency

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Put Call Parity

- Put Call Parity is a relationship between plain vanilla calls and puts with the same strike X
- If F(X) denotes a forward with forward price X, then

Put Call Parity: **C – P = F(X)**

- Does Put Call Parity extend to Exotics?

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"Put Call Parity" for Exotics

- Different relationships for different classes of exotic options

Knock-out call – knock-out put = knock-out forward

Average-rate call – average rate put = average rate forward

- There are also relationship between different classes of exotic options

Out-strike + In-strike = vanilla

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Barrier Pricing – a Simple Approach

- For a barrier option, the price is also based on its expected value
  - but the payoff rules are different...
- The option's value at maturity is based on the path that the spot price takes during its life
  - so the payoff is 'Path Dependant'
- Consider a 100 call with a knockout at 98
  - All the 'paths' that touch or cross 98 must be excluded from the tree
  - Let's look at the Binomial Tree, but only count the 'valid' paths that produce a payoff

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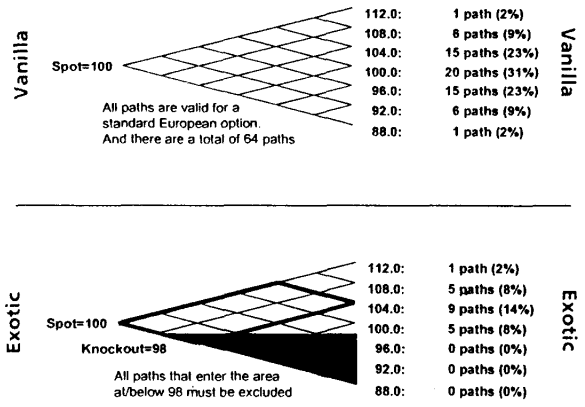
Barrier Pricing – a Simple Approach



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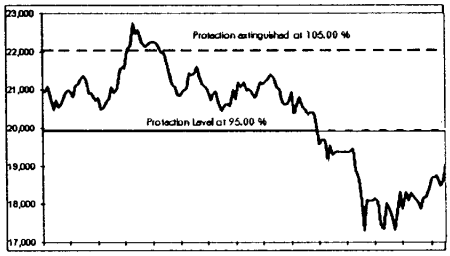
Example: kick-out-put

- Underlying does touch barrier and put option gets kicked out
- Spot at 21'000
- Barrier 105%
- Strike 95%



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Pricing and Decomposition

SECTION 7.5

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Taxonomy of Knock-Out Options

- Knock-Out Call
  KO < S < X
  or KO < X < S
- Kick-Out Call
  S < X < KO
  or X < S < KO
- Knock-Out Put
  X < S < KO
  or S < X < KO
- Kick-Out Put
  KO < X < S
  or KO < S < X

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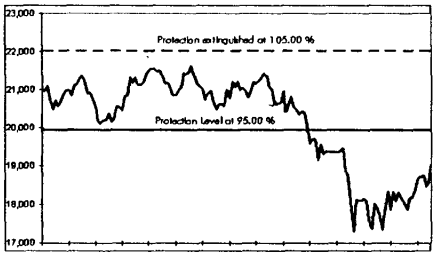
Example: kick-out-put

- Underlying doesn't touch barrier
- Spot at 21'000
- Barrier 105%
- Strike 95%



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Barrier options

- Path-dependent options
- Payoff pattern and survival dependent on whether the underlying sells at or through a barrier (instrike, outstrike) price during the life of the option.
- Payouts of an ordinary European call or put option, provided they are active at expiration.
- Barrier breached from above: 'Down' knock-in and knock-outs
- Barrier breached from below: 'Up' knock-in and knock-outs
- A total of eight kind of barrier options.

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Options with "OUT"- strikes

- Down-and-out: Barrier lies below the spot at settlement. The option starts active; it deactivates if the spot price drops below the barrier.
- Up-and-out: Barrier lies above the spot at settlement. The option starts active; it becomes inactive if the spot rises above the barrier

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Options with "IN"- strikes

- Down-and-in: Barrier lies below the spot at settlement. The option starts inactive; it only activates if the spot price falls below the barrier.
- Up-and-in: Barrier lies above the spot at settlement. The option starts inactive; it activates only if the spot rises above the barrier.

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Warburg terminology

Warburg Notation	
Calls	
Up & Out	Kick-Out
Up & In	Kick-In
Down & Out	Knock-Out
Down & In	Knock-In

Warburg Notation	
Puts	
Up & Out	Knock-Out
Up & In	Knock-In
Down & Out	Kick-Out
Down & In	Kick-In

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