Asian derivative markets today account for one third of worldwide foreign exchange and over 40% of equity derivatives trading. Korea is hosting the world’s largest derivatives exchange, India has the world’s fastest growing exchange, whereas Thailand and the Philippines do not yet have an established derivatives exchange. Derivatives products have made Asian capital markets more competitive and also have significant developmental benefits, for example as hedging tools for commodity producers and as cheaper financing tools for corporations. Policy makers have learned to emphasize good regulation, governance, and risk management through central counterparties in order to minimize potential threats to financial stability. Additional emphasis on monitoring of FX and credit derivatives, especially at public sector banks and corporations is necessary. A stylized roadmap for a prudent development of derivative markets is proposed which might lead to further technical assistance for member countries in this area.

This paper's finding, interpretations, and conclusions are entirely those of the author and do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.
EMERGING DERIVATIVE MARKETS IN ASIA

This chapter looks at the rapidly growing market for derivatives in Asia. The objectives are threefold: to analyze the benefits and driving factors; to illustrate potential risks and appropriate policy choices; and to develop a roadmap for further sound development of derivative markets. So what are derivatives and why have they developed? Derivatives are instruments that can be derived from another substance: financial derivatives derive future prices from underlying commodities or assets, and they are traded on organized exchanges or in unregulated over-the-counter markets. Back in the 17th century, options on tulips were traded in Holland and futures on rice in Japan. Today, financial derivatives have become invaluable tools for risk management but they also pose dangers to the stability of financial markets and have been called potential “weapons of mass destruction”. Derivative markets have grown especially fast across Asia over the past decade and have created many benefits for the region, but lessons can also be learned from some high-profile failures. Successful development of derivative markets must build on a foundation of solid product design, strong regulation, and sound market infrastructure.

1. GLOBAL DERIVATIVE MARKETS

Modern derivative markets have their intellectual roots in the research of Black, Scholes, and Merton in the early 1970s which then spurred rapid growth as the IT revolution progressed and when two major futures exchanges in Chicago were established. The World Bank and IBM were among the first institutions that in 1981 developed derivatives and swapped loans of different currencies. The development of derivative instruments then followed two tracks: highly customized interest rate and foreign exchange products were developed by leading financial institutions which created the so-called over-the-counter (OTC) derivatives market. Innovation led to the rapid development of new products, encouraged by minimum regulation and rich profit margins in oligopolistic markets dominated by US banks. In 1993, the Group of Thirty called for the establishment of independent risk oversight, which triggered various legislative initiatives. On the second track, institutional investors were pursuing more standardized equity and commodity products that were traded in more organized and transparent exchanges, starting in Chicago, London, and Tokyo. These exchanges had to be more regulated as retail investors became active market participants.
The BIS reports that **over-the-counter (OTC) derivative markets** have grown ten-fold over the past decade and in 2004 reached $248 trillion, with an average annual growth rate that exceeds 30% since 1990. The market value of these OTC derivatives is about $9 trillion (as compared to US GDP of $12 trillion and US treasury bonds of $4 trillion), but after netting arrangements the actual net market value is estimated to be around $2 trillion. About 40% of this market is currently traded in the US (half of it at a single financial institution, JP Morgan Chase), another 40% in Europe (mostly London and Frankfurt) and 20% in Asia (mostly Tokyo). The large majority of OTC derivatives (75%) are interest rate products (mostly swaps), and a smaller proportion (12%) are foreign exchange products (chart 1). The fastest growth has been recorded in credit derivatives, which now account for about $6 trillion. This market remains dominated by a few large financial institutions as well as inter-dealers, and only 10% of activity is currently attributed to non-financial institutions. The main functions of the OTC market are to provide cost-effective financing, enable cross-currency and interest rate hedging, as well as the transfer of credit risk.

**Chart 1: Global Derivative Markets (2004)**

- **OTC Derivative Markets**: $248 trillion notional, $9 trillion market value. US: 40%, EU: 40%, Asia: 20%, JPMC: $43 trillion.
- **Exchange-Traded Derivatives**: $53 trillion notional, $10 trillion market value. 65% FX, 26% Interest, 7% Gov-Debt, 2% Equ-Index, 1% Stocks, 1% Comm, 1% Credit.

---

**Sources**: BIS (Dec 2004); FIBV (Jan 2005)
On the other hand, the Futures Industry Association and BIS are reporting that exchange-traded derivative markets (ETD) have grown to notional $53 trillion in 2004 which have a market value of $10 trillion (larger than the OTC market value). The exchange-traded products are equity futures and options (65%, both on the index and individual stocks), interest rate derivatives (26%, both on short-term interest rates and long-term government bonds), as well as commodity futures (9%). The main function of these markets is to hedge commodity price risks and to redistribute equity market and interest rate risks from issuers to investors. About half of the market is driven by institutional investors (with a strong international participation), and the other half is shared by retail investors, trading and securities firms, as well as some non-financial institutions. Major ETD markets report that about half of their volumes are trading oriented, and the other half is hedging or arbitrage-related. The fastest growth in equity derivative markets has been recorded in Asia, which currently accounts for over one third of worldwide volumes. The Korean Stock Exchange has become the largest derivatives exchange in the world, and extremely rapid growth rates in Brazil, Mexico, China, and India have propelled their exchanges to the world’s top-20 (table 1). While many of them are focusing on equity derivatives (Korea, India, Hong Kong), others are specializing in fixed-income products (Brazil, Mexico, Singapore) and there are also a few remaining commodity specialist exchanges (Dalian, Tokyo, and Zhengzhou).

Table 1: Largest Derivatives Exchanges

<table>
<thead>
<tr>
<th>Turnover Ranking</th>
<th>Derivatives Exchange</th>
<th>Growth 2002-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Korea Stock Exchange</td>
<td>34%</td>
</tr>
<tr>
<td>8</td>
<td>Bovespa Brazil</td>
<td>159%</td>
</tr>
<tr>
<td>9</td>
<td>Mexican Derivatives Exchange</td>
<td>150%</td>
</tr>
<tr>
<td>11</td>
<td>BM&amp;F Brazil</td>
<td>81%</td>
</tr>
<tr>
<td>14</td>
<td>Pacific Exchange</td>
<td>21%</td>
</tr>
<tr>
<td>16</td>
<td>Dalian Commodity Exchange</td>
<td>82%</td>
</tr>
<tr>
<td>17</td>
<td>Indian Stock Exchange</td>
<td>465%</td>
</tr>
<tr>
<td>18</td>
<td>Tokyo Commodity Exchange</td>
<td>-1%</td>
</tr>
<tr>
<td>20</td>
<td>Taiwan Futures Exchange</td>
<td>56%</td>
</tr>
<tr>
<td>21</td>
<td>Sydney Futures Exchange</td>
<td>49%</td>
</tr>
<tr>
<td>23</td>
<td>Shanghai Futures Exchange</td>
<td>233%</td>
</tr>
<tr>
<td>28</td>
<td>Osaka Securities Exchange</td>
<td>193%</td>
</tr>
<tr>
<td>31</td>
<td>Singapore Exchange</td>
<td>-14%</td>
</tr>
<tr>
<td>36</td>
<td>Australian Futures Exchange</td>
<td>21%</td>
</tr>
<tr>
<td>37</td>
<td>Hong Kong Exchange</td>
<td>215%</td>
</tr>
<tr>
<td>38</td>
<td>Tokyo Stock Exchange</td>
<td>44%</td>
</tr>
<tr>
<td>49</td>
<td>Malaysia Derivatives Exchange</td>
<td>106%</td>
</tr>
</tbody>
</table>
2. **DERIVATIVE PRODUCTS IN ASIA**

The Asian crisis exposed vulnerabilities in capital markets across Asia, which were mostly focused on bank financing and unregulated OTC derivative markets in the absence of hedging instruments for corporations. There are five main derivatives products traded in Asian markets:

- **Foreign exchange** products for major currencies are traded in Tokyo, Singapore, and Hong Kong mostly in OTC derivatives, and there are offshore markets mainly in Singapore for minor and non-convertible currencies (i.e. NDF instruments on the Chinese RMB). The combined Asian FX markets are large with turnover accounting for one third of worldwide markets.

- **Interest rate derivatives** in Asia are smaller and account for less than 5% of world markets with a stagnating trend in OTC markets and a migration towards ETD markets (i.e. Korea has recently shifted its government bond derivatives onto the exchange). Tokyo and Singapore are two dominant locations that are trading mostly JPY and US$ swaps (OTC) and futures (ETD). Local fixed income derivative markets have only recently been developed and remain small.

- **Equity derivatives** have witnessed the most rapid growth, often doubling every two to three years, they are mostly ETD markets with Korea, India, and Hong Kong showing the most impressive recent expansion. Index futures as well as options are the most widely traded products with large participation of institutional investors and significant foreign participation. Over 44% of worldwide ETD equity turnover is currently taking place on Asian exchanges. This is partly explained by extremely high turnover ratios of 40 times outstanding stock for futures and 150 times outstanding stock for options, as compared to an average global turnover of 25.

- **Commodity derivatives** have a long history especially in China, where the Soybean futures contract at the Dalian Commodity Exchange is the third largest derivatives contract across Asia (among the world’s 20 largest derivatives contracts). In addition, wheat, rubber, gold, and oil futures are large and are mostly traded on Chinese or Japanese specialist commodity exchanges. However, commodity derivatives account for less than 10% of turnover on the exchanges.

- **Credit derivatives** are among the fastest growing products, especially credit default swaps that account for half of this OTC market. It is estimated that 10% of the worldwide $6 trn credit derivative market is located in Asia, mostly in Tokyo and Hong Kong. Regulators have become concerned about these unregulated markets as they are less transparent and highly leveraged.
In summary, Asian derivative markets are growing very rapidly and are partially migrating from OTC to ETD markets. Foreign exchange turnover is very substantial in the main OTC markets, whereas equity derivatives are the fastest growing products on exchanges (table 2). Emerging markets have typically started from commodity and local interest rate derivatives and have subsequently added foreign exchange, credit, and equity derivative products. However, the OTC data are from the BIS triennial survey in April 2004, which is not updated frequently and often does not cover smaller markets, so that caution must be exercised in interpreting these data.

Table 2: Major OTC and ETD markets in Asia

<table>
<thead>
<tr>
<th>Daily Turnover (US$ bn)</th>
<th>OTC-FX</th>
<th>OTC-INT</th>
<th>ETD-INT</th>
<th>ETD-EQU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>154</td>
<td>31</td>
<td>63</td>
<td>17</td>
</tr>
<tr>
<td>Singapore</td>
<td>91</td>
<td>9</td>
<td>42</td>
<td>3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>70</td>
<td>11</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Australia</td>
<td>60</td>
<td>13</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Korea</td>
<td>10</td>
<td>1</td>
<td>13</td>
<td>50</td>
</tr>
<tr>
<td>Other Asia</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>% of world markets</td>
<td>33%</td>
<td>5%</td>
<td>3%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Sources: Triennial Central Bank Survey (BIS, 2004) and World Federation of Exchanges (2005)

Formalized exchanges have been leading the recent growth in Asian derivative markets and can be divided in three tiers: Exchanges in Australia, Hong Kong, and Singapore have already been demutualized and are among 16 listed exchanges worldwide, and they are considered the major Asian exchanges in addition to Japan which is moving towards demutualization in 2005. These exchanges offer a large variety of interest, FX, equity, and commodity products (table 3). Japan is currently implementing a revised Commodity Exchange Law and planning to enact an Investment Services Law that may help to integrate the large number of specialized exchanges. Australia has two demutualized exchanges that focus on interest futures (SFE) as well as equities and options (ASX) and it is also home to the fourth largest foreign exchange market in the world. The Singapore Exchange has established its base in the Eurodollar contract and has been trading mostly foreign interest rate derivatives but has recently stagnated. The Hong Kong Exchange had originally focused on commodity derivatives and has been rebuilt since its collapse in 1987 and is now predominantly trading equity derivatives.
The second tier exchanges are growing most rapidly, namely in Korea, India, China, and Malaysia and they are in the process of being demutualized. The Korean Futures Exchange has become the largest futures exchange in the world in terms of trading volume and was created in 2004 by merging the Korean Stock Exchange (focus on equity derivatives) and KOFEX (focus on fixed income derivatives). It offers 9 types of derivative products with relatively simple products, low transaction costs, and very advanced IT and internet trading. India is trying to emulate the Korean success story by focusing on retail trading of equity derivatives, although it is a commodity based economy and does not have any sizeable commodities exchange. Four years after the Gupta report recommended strengthening of the underlying cash market, trading in equity futures started in 2000, and interest rate futures were introduced in 2003. The OTC derivative markets expanded after deregulation in 2004, but volumes remain small on interest rate products and modest on FX derivatives. China experienced major problems in the 1990s and closed 27 of its 30 exchanges (box 2), and currently only allows commodity futures trading which is expanding rapidly. However, liquidity in cash markets and risk management procedures will need to be enhanced in order to reinvigorate trading of financial derivatives. Malaysia clamped down on derivatives after the Asian crisis and merged three exchanges into the Malaysian Derivatives Exchange, which is trading commodity and equity futures in about equal proportions, and doubled its trading volumes over the past two years. The holding company demutualized in 2004 and the participation of foreign institutions has increased to 40%.

The third tier exchanges remain largely dormant in the area of derivatives, namely in Thailand, Indonesia, and the Philippines. All three markets allow OTC derivatives trading by banks and have recently considered to (re)introduce ETD markets. After serious derivatives losses in the Asian crisis, Thailand has kept its offshore and derivative markets on a short leash, with OTC derivatives trading in the range of $30 bn in 2004. The Thailand Futures Exchange has been established in 2004 and hopes to start trading index futures in 2006, and the introduction of interest rate derivatives in being actively considered. Indonesia has established the Jakarta Futures Exchange and also introduced equity index futures at the Surabaya Stock Exchange in 2001. However, market infrastructure and investor interest have been little developed so that trading volumes have remained very low. Finally, OTC derivatives trading is allowed in the Philippines but the Manila Futures Exchange was closed after irregularities in 1997.
Table 3: Derivative products and turnover across Asia

<table>
<thead>
<tr>
<th>Index</th>
<th>Australia</th>
<th>China</th>
<th>Hong Kong</th>
<th>India</th>
<th>Indonesia</th>
<th>Japan</th>
<th>Korea</th>
<th>Malaysia</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Futures</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Options</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Options on futures</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
</tbody>
</table>

Stock

<table>
<thead>
<tr>
<th></th>
<th>Futures</th>
<th>Options</th>
<th>Options on futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Currency

<table>
<thead>
<tr>
<th></th>
<th>Futures</th>
<th>Options</th>
<th>Options on futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Interest rate

<table>
<thead>
<tr>
<th></th>
<th>Futures</th>
<th>Options on futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

Bonds

<table>
<thead>
<tr>
<th></th>
<th>Futures</th>
<th>Options on futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

Commodities

<table>
<thead>
<tr>
<th></th>
<th>Futures</th>
<th>Options on futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

| # of products traded | 12 | 1 | 6 | 5 | 3 | 10 | 9 | 5 | 0 | 9 | 0 |

Notes: Australia: Australian Stock Exchange (ASX) and Sydney Futures Exchange (SFE)  
China: Zhengzhou & Dalian Commodity Exchange, Shanghai Futures Exchange  
Hong Kong: HKEx  
India: National Stock Exchange of India (NSE) and Bombay Stock Exchange (BSE)  
Indonesia: Jakarta Futures Exchange (JFX), and Surabaya Stock Exchange  
Japan: TIFFE, Tokyo Stock Exchange (TSE), Osaka Securities Exchange, Tokyo Commodity Exchange  
Korea: Korea Stock Exchange (KSE) and Korea Futures Exchange (KOFEX)  
Malaysia: Malaysia Derivatives Exchange  
Philippines: Manila International Futures Exchange was closed  
Singapore: SGX-DT  
Thailand: Thailand Futures Exchange plans to open in 2006  

There appears to be a strong correlation between existing derivatives products in Asia (table 3) and the underlying derivatives infrastructure (table 4), which will be discussed in detail in section 6. In order to develop derivative instruments, countries need to put in place a number of preconditions that relate to market liquidity (including fixed income benchmarks), solid accounting and regulatory standards (including a derivatives law), modern infrastructure at exchanges (central counterparty), and a tax environment that creates a level playing field. It appears that Australia, Hong Kong, India, Japan, Korea, and Singapore have already widely established best practices in their underlying infrastructure, whereas China, Indonesia, Malaysia, the Philippines, and Thailand have still major obstacles to overcome, although significant progress is being made in all these countries to improve the existing financial infrastructure.
## Table 4: Derivatives market infrastructure across Asia

<table>
<thead>
<tr>
<th>Liquidity</th>
<th>Australia</th>
<th>China</th>
<th>Hong Kong</th>
<th>India</th>
<th>Indonesia</th>
<th>Japan</th>
<th>Korea</th>
<th>Malaysia</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed income benchmarks</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Fixed income liquidity</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Equity market liquidity</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td><strong>Regulation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derivatives law</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Securities lending</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Accounting standards</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td><strong>Exchanges</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearing and settlement CCP</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>ISDA netting opinion</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Demutualized exchange</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td><strong>Taxes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax harmonization</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Transaction costs and IT</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Investor base and NBFI</td>
<td>✔</td>
<td>❌</td>
<td>✔</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

### Notes:
- ✔ denotes best practice; ❌ denotes progress on existing deficiencies; and ❌ denotes major problems.
- 1./ Fixed income liquidity indicators and benchmarks are obtained from asianbondsonline.adb.org, which shows weaknesses in China (segmented markets), Hong Kong (small local currency issuance), Indonesia, Philippines, and Thailand (limited medium to long-term benchmark issues). 2./ Turnover ratios for fixed income instruments have also been obtained from HSBC (2004). 3./ Equity market liquidity indicators have been obtained from World Federation of Exchanges (2004), which revealed thin markets in Philippines, Indonesia, and Thailand. 4./ Information about laws on derivatives was obtained from individual country, with only Australia, Hong Kong, and India currently having distinct laws on derivatives. 5./ Securities lending data were obtained from Endo and Rhee (2005), showing restrictions in Malaysia and Philippines on short selling, with very little activity in Indonesia and Thailand. 6./ World Bank public documents on accounting standards (ROSC) and professional publications reveal adequate accounting standards aligned to IFRS standards only in Australia, Hong Kong, Indonesia, Malaysia, and Singapore, but major gaps exist in the Philippines. 7./ CCP information was obtained from industry sources and ADB, showing adequate functioning only in Hong Kong, Korea, and Singapore. 8./ ISDA netting opinions have been issued for all countries mentioned with the exception of China, but many countries have issues to resolve. 9./ Data from individual exchanges show their progress towards demutualization (2004). 10./ Data on taxation were obtained from PWC “Taxation on financial derivatives in Asia” (2003), which showed small stamp duties in effect in Hong Kong and Malaysia, and VAT being applied in China, Philippines and Thailand. 11./ Transaction costs for bond markets were obtained from ADB (2004) and additional market information on taxation. 12./ Institutional investor base and NBFI indicators are obtained from ADB, which shows weaknesses especially in Indonesia and Philippines.

### 3. Driving factors and benefits of derivative markets

Benefits of derivative markets may not be immediately visible, and moreover they may be tainted by the bad press that high profile accidents have attributed to derivative markets (box1). Starting with commodity futures, there are clear benefits for commodity producers to know future prices in order to reduce uncertainties which enables more efficient economic decisions. Foreign exchange derivatives provide invaluable hedging tools to corporations, and even to smaller firms engaged in international trade, as they can match the currency composition of their assets and liabilities. Interest rate derivatives allow both financial and non-financial institutions to seek the most attractive financing in international capital markets and to hedge against interest rate mismatch in their assets and liabilities. Finally, equity derivatives have usually reduced volatility and strengthened liquidity in equity markets, enhanced returns to institutional investors such as mutual or pension funds, and reduced the cost of equity listings for firms.
**Box 1: Benefits and Risks of Derivative Markets**

Asian derivative markets go back to 17th century rice trading in Japan and have grown rapidly over the last decade. Derivative contracts allow the trading of agricultural or financial instruments in the future at predetermined prices. Those standardized contracts that are traded at an organized exchange are called exchange-traded derivatives (ETD) and those customized contracts that are traded individually are called over-the-counter (OTC) derivatives. A few examples can illustrate the substantial developmental benefits that derivative markets can create for the economy:

The earliest innovation helped farmers to reduce uncertainty over future prices of their commodities, where buyers and sellers would contractually agree on next year’s price for standardized products such as corn, soybean, or wheat, aluminum, copper, or crude-oil. Producers have been able to reduce large cyclical swings and consumers have been able to rely on less volatile prices, which has increased economic efficiency. More recently, the Asian crisis revealed the need for a “spare tire” whereby corporations would not only rely on bank loans but also seek financing from debt capital markets. When issuers offer floating-rate debt, borrowers can use interest rate swaps, options, or futures to lock-in future interest rates at a fee, which can help them gain flexibility for future production and reduce volatility from economic cycles. Standardized futures contracts on agricultural commodities, metals, and interest rates are today commonly traded at over 20 derivative exchanges across Asia.

More recent innovations reveal the vast benefits that risk sharing in capital markets can create. While flood insurance has been a traditional insurance product, more extreme catastrophic events such as earthquakes require stronger balance sheets than insurance (or even reinsurance) companies can provide. Investors in capital markets can choose to buy so-called CAT bonds that carry high interest rates but may loose their principal in case a predefined catastrophic event occurs during the agreed duration. In the area of housing finance, consumers enjoy lower mortgage rates when banks can bundle a large portfolio of mortgage loans and sell structured products in capital markets that differentiate pricing for tranches with different credit risk. Various credit derivatives, foreign exchange derivatives, and more exotic options are today traded in mostly unregulated OTC derivative markets.

Various advantages and disadvantages of derivative markets have been studied in the literature. Concerns arise especially in the areas of accounting and transparency, leverage and corporate governance, as well as on counter-party and potential systemic risks in unregulated markets. An analogy may help to illustrate the trade-offs: Car insurance can be regarded as a derivative product where the insurance company makes a future contingent payment in case of car accidents in return for a premium paid by the car owner. By pooling the risk, insurance can lower the cost to car owners, and generate a profit for the intermediary. However, the protection might induce some motorists to become more reckless in their driving and ultimately drive up accident and premium rates. Nobody would argue that economies are better off without car insurance. Obviously, solid regulatory frameworks, strong risk management practices, and close supervision are indispensable.

- Market efficiency
- Risk sharing and transfer
- Low transaction costs
- Capital intermediation
- Liquidity enhancement
- Price discovery
- Cash market development
- Hedging tools
- Regulatory savings

- More leverage
- Less transparency
- Dubious accounting
- Regulatory arbitrage
- Hidden systemic risk
- Counter-party risk
- Tail-risk future exposure
- Weak capital requirements
- Zero-sum transfer tools
While OTC derivative markets are usually dominated by banks that intermediate risk for local institutional investors and corporations, the standardized exchange based derivatives markets are usually dominated by securities firms that intermediate risk for institutional and retail investors. Data is sparse on the use of derivatives by corporations, but surveys have shown that two thirds of large corporations in Asia are using fixed income or foreign exchange derivatives, which are mostly traded in OTC markets through banks. However, the Korea Exchange has initiated derivatives trading for foreign exchange and government bonds, where banks account for about one third of trading volumes and foreign investors account for about 10%. However, foreign investors account for 20% to 40% of trading in equity derivatives, which is conducted mostly between securities firms and local retail and institutional investors (chart 2). These data may underestimate the share of foreign investors, as they often trade through local intermediaries.

**Chart 2:** Market participants in Asian derivative markets (2004)

<table>
<thead>
<tr>
<th>Product</th>
<th>Banks</th>
<th>Securities</th>
<th>Institutions</th>
<th>Retail</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea FX Futures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea Bond Futures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HKG Equity Options</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea Equity Index Options</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HKG Equity Index Options</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea Equity Index Futures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HKG Equity Index Futures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Korea Exchange (Jan 2005) and Hong Kong Exchange (Dec 2004).

Naturally, commodity and equity futures can be standardized and traded on an exchange whereas the variety of needs and specifications (size, duration, currency) in interest and FX derivatives has traditionally favored OTC derivative markets, although recently benchmark securities have helped to standardize these products on exchanges as well. In summary, the main driving factors for derivative markets in Asia have been the substantive benefits from risk sharing in more complete capital markets, corporate demand for hedging tools, institutional needs for enhanced
liquidity in an environment of large cross-border flows and trade integration, as well as rapidly declining transaction costs in electronic trading. In many cases, the development of derivative markets has been an explicit policy objective, not only for the above mentioned inherent benefits but also because they are considered a prerequisite for more complex capital market products. For example, the development of asset backed securities (such as securitized mortgages) requires the existence of interest rate derivatives as benchmarks and effective hedging tools.

On the other hand, there are also more problematic pull factors that have been less desirable driving factors for derivative markets, such as the appetite for higher leverage and speculation, the potential for regulatory arbitrage, as well as accounting and transparency issues for off-balance sheet exposures. However, an appropriate legal and regulatory environment and a sound market infrastructure can alleviate the concerns that may arise from these pull factors.

4. **Risks and Lessons from Accidents in Derivative Markets**

Derivatives have played an important role in the Asian crisis: Foreign exchange derivatives were used to bring down the Thai and Indonesian currencies, total return swaps were used to speculate on cross-border interest rate differentials, and structured notes were used to circumvent accounting rules, disclosure requirements, and prudential regulations. All these instruments were traded in OTC markets with international banks. Numerous reports have pointed to the need for stronger regulation, more emphasis on risk management, and sound infrastructure at organized exchanges with central counterparty clearing. Moreover, as FX forwards have been used to undermine fixed exchange regimes, it has become evident that derivative products should not be licensed unless their cash markets have been well developed with market-determined prices. These critical policy issues will be discussed in more detail below.

A large literature has analyzed a number of accidents in Asian derivative markets, including Hong Kong (1987), Barings (1995), Shanghai (1995), Sumitomo (1996), Thai and Indonesian currencies (1997), Korea SK Securities (1998), and China Aviation Oil (2004), which all have revealed important lessons on how derivative markets can be misused. In the following, two cases are illustrated in more detail: The Shanghai Stock Exchange (box 2) was once the largest exchange in the world (daily government bond futures trading in 1995 was 4 million), but both
regulatory framework and market infrastructure were deficient, price manipulation was rampant, and futures trading at 27 exchanges was suspended in 1995. Chinese regulators have worked over ten years to rebuild trust in the system, to enhance risk management skills, and to establish a sound regulatory framework. Another recent example of China Aviation Oil (box 3) illustrates how a rising corporate star can disintegrate in non-transparent OTC derivative markets. This case strongly suggests to align the regulatory framework for OTC markets with ETD markets, to strengthen cross-border supervision, and to significantly upgrade the accounting and disclosure standards in all derivative markets.

5. **Policy Issues: Liquidity – Regulation – Infrastructure**

There are three critical policy issues that need to be carefully considered before derivatives markets can be successfully developed: how can liquid cash markets be expanded; how much regulation is needed in OTC and ETD derivative markets; and what infrastructure is necessary.

**Chart 3:** Three pillars for sound derivative markets
Box 2: Failure of Futures Exchanges: the case of Shanghai

There has been a history of futures exchanges that failed because of weak clearing houses and poor margin systems, for example the Hong Kong Futures Exchange went bust in 1987 after the stock market collapse, and the futures arm of the Moscow Central Stock Exchange failed in 1994. Less well known is the example of the Shanghai Stock Exchange, which became the world’s largest exchange that traded 4 million government bond futures in one day on February 23, 1995 and then collapsed where price manipulation caused over $10 bn of losses in just eight minutes. This case bears many valuable lessons on the preconditions that need to be met for the trading of derivatives.

China established the Shanghai Stock Exchange in 1990 and opened the trading of government bond futures through 50 brokerage firms to the general public in October 1993. In a short period, over 30 exchanges opened up and over 50 futures contracts were traded in a casino-like atmosphere. In 1994, hot money migrated from equity to futures markets for government bonds, which were traded mostly in Shanghai, but also in Beijing, Shenzhen, and Wuhan. New regulations and position limits were then announced by various regulators. Government bonds were issued as zero-coupon bonds with three or five year maturities, some at variable interest rates that were adjusted discreetly with so-called “inflation subsidies”, and they were settled with physical delivery that often caused shortages because open interest in futures markets far exceeded the physical amount of outstanding bonds. On 23. February 1995, the day before inflation subsidies were announced for illiquid bonds issued in 1992, one small brokerage (which was owned by the Ministry of Finance) took long positions in these bonds, that caused losses from short positions at the largest broker, Shanghai International Securities, which then tried to corner the market by selling short these futures in the amount of $26 billion, exceeding position limits by 20 times. Illegal transactions were continuing over the next three months, and the government then suspended all bond futures trading on 18. May 1995. The hot money then immediately returned to equity markets, which posted their largest gain of 31% on the same day.

Three critical lessons can be drawn from this case: First of all, a sensible design of derivative products is critical. As a prerequisite, there needs to be a well functioning and liquid cash market, where risk management has been tested, volatility is within reasonable limits, and both long and short positions can be efficiently traded. There also needs to be an economic rationale to establish new derivative products that focus on hedging (rather than purely speculation) and that do not create moral hazard (such as portfolio insurance prior to the 1987 stock market crash). The most important lesson from the Asian and Russian crises reveals that derivative markets can create systemic risk if prices of underlying instruments are not market-determined: for example, fixed exchange rates have been undermined by short FX futures positions (ERM, Thailand, Korea, and Russia), and administered commodity prices or interest rates invite speculation in derivatives that often lead to overshooting once policy constraints are removed (as was the case in Chinese commodity and bond futures markets). This first lesson would suggest that Chinese interest rates need to be fully liberalized and the two segmented bond markets need to be integrated before trading in government bond futures can resume.

Second, the market infrastructure at derivatives exchanges and clearing houses needs to be soundly developed. The governance of an exchange needs to set incentives for market participants to honor rules of conduct and enhance the stability of the trading system, and only qualified investors should be admitted. Demutualized exchanges are able to establish such incentives and establish rules of a self-regulatory organization (SRO), which recently have become strong trends, if not international best practice. Integrated clearing and settlement are equally important to reduce counterparty credit risk to a maximum extent, and there should be cash settlements rather than physical delivery. The exchange also needs to establish a sound margin system and strict position limits that are enforced in real time. In the case of China, it appears that governance and clearing functions need to be strengthened significantly and that margin requirements need to be raised to three-sigma levels.

Third, transparent legal and regulatory structures as well as a level playing field are important preconditions as well. Clear accountability for a lead regulator and for market participants needs to be established, and the legal framework must support strict enforcement. For example, the collapse of an investment trust (GITIC) in October 1999 revealed legal loopholes whereby GITIC was shielded because it supposedly did not have all regulatory authorizations. Strong coordination between regulators (local authorities, securities regulator, central bank, and finance ministry) is critical to close any loopholes and ensure strict enforcement of rules. Moreover, regulators need to provide a level playing field, especially on taxes, that would not artificially distort cash and futures markets.
Box 3: Transparency of OTC Derivatives: the case of China Aviation Oil

Chinese air travel has been booming for a decade and jet fuel imports have doubled over the past five years. China Aviation Oil Holdings Company (CAOHC), a state-owned company in Beijing, is the monopoly importer of jet fuel and in 1997 posted Mr. Chen Juilin to head its new Singapore subsidiary, China Aviation Oil (CAO). By 2001, CAO had prepared its initial public offering with its prospectus describing its business as oil derivatives trading, and its share price tripled after the IPO listing. Subsequently, CAO announced a half-dozen acquisitions under the slogan “Leveraging China, Going Global”. Chinese regulators had prepared an elaborate set of rules, including PBOC regulations that limit derivative transactions by state companies outside China to hedging, CSRC regulations that prohibit speculative derivative trading overseas, and State Council regulations that explicitly prohibit any OTC derivatives trading for state companies overseas. CAO itself had also invested in risk management systems, developed elaborate VAR models, and established three internal controls with senior traders having strict limits, a risk control committee, and an internal auditing department. CAO has won awards for its corporate governance, and Singapore investors honored CAO as “one of the most transparent listed companies” and widely admired Mr. Chen as the fourth highest paid CEO in Singapore. Its spectacular collapse with over US$ 550 million in derivative losses in November 2004 can only compare to the collapse of Barings in 1995.

Three factors have contributed to the collapse: first and foremost has been the lack of supervision from both home and host supervisors. CAO disregarded Chinese regulations and engaged in OTC derivatives trading of oil futures, taking short positions with are highly speculative (opposite of hedging), and misrepresenting its financial position with accounting gimmicks that extended loss-making futures contracts in order to avoid reporting incurred losses. Accounting standards were weak as IAS39 was not applied and derivatives positions were not marked to market. If these derivatives had been traded on an exchange, accounting and transparency would have been much stronger.

Second, the official mantra to justify non-regulated OTC derivative markets failed in this case, as self-regulation and internal risk management proved to be inadequate. CAO had developed elaborate VAR models that were built on historic oil price data, showing that prices rarely rise above $34, and that were unable to predict oil prices rising to $55 in 2004 with any reasonable level of confidence. Traders’ incentives created moral hazard to double up and ignore position limits, which increased short futures positions from 2 million tons of crude oil to 52 million tons, or the negative equivalent of about four years of China’s total jet fuel imports. All internal controls failed, and nothing was reported to the parent company until margin calls exploded. Several commercial banks collaborated, offering unsecured credit lines, cheap financing, low margin requirements, and moral suasion to keep the speculation going.

Third, the weakening of disclosure rules by the Singapore exchange and the poor assessment of CAO’s corporate governance contributed to the ultimate sin: after the Chinese central government refused to inject additional funds, the parent company CAOHC sold 15% of the CAO shares in a block trade to Deutsche Bank in late October 2004, which passed them on to institutional investors after having conducted “due diligence”. The $120 million proceeds were directly lent to CAO in order to cover overdue margin calls, but banks forced CAO to cut positions and realize losses of over $230 million. CAO told investors that its profits had reached a historic high. In November 2005, CAO had filed for bankruptcy with losses exceeding $550 million, and its assets estimated at $150 million. Subsequently, CAO has been trying to arrange a bailout with Chinese and Singaporean funds, and has asked its creditors to accept a haircut of 60%. Independent reports have been submitted to regulatory agencies pointing out areas for improvement. In March 2006, Singaporean courts imposed significant penalties on CAO executives.
The most fundamental observation is that cash markets need to be liquid, efficient, and integrated in order to allow for sound trading of related derivatives. In the presence of administered interest rates, segmented fixed income markets, and capital controls it is very unlikely that interest or FX derivative markets can develop, if at all, they might develop offshore (such as currency NDF markets in Singapore) or in parallel unregulated markets (OTC derivatives by conglomerates conducted in offshore locations). Moreover, many derivatives markets are settled in kind (rather than cash) and hence require a sizeable amount of underlying securities for settlement. Many examples in developed markets have illustrated that large derivative positions can be abused to “squeeze” the cash markets, unless large and liquid benchmark securities have been established. IOSCO reports (1993) point to the required coordination between cash and derivatives markets.

How large is relative liquidity in derivative as compared to cash markets? The following chart illustrates for the leading equity markets the ratios of daily turnover in cash and derivatives and shows that many developed markets have build liquidity in derivative markets that is larger than in cash markets (1:1 line). However, the most liquid derivative markets can have liquidity that is up to five times larger than in underlying cash markets (5:1 line), for example Korea. Those markets often have advanced IT, large online trading, small transaction costs, and a significant participation of retail investors. Further growth then appears to move markets along this corridor with proportional increases in cash and derivative markets turnover (chart 4).

**Chart 4: Equity Derivatives Turnover (2004, in US$ bn)**

![Chart 4: Equity Derivatives Turnover (2004, in US$ bn)](chart.png)
The literature has revealed that higher liquidity in derivative markets usually contributes to lower volatility in cash markets. However, there are several studies that have shown opposite results, especially when derivative markets are highly speculative and when major crises are occurring. One example is Korea, where volatility in equity markets has consistently been higher than in most other OECD markets despite the very well developed derivatives market (chart 5). Moreover, volatility in Korea has remained high in periods when derivative markets have grown most rapidly (2000-2002), which illustrates a potential downside risk from too aggressive and uneven growth in derivative markets.

**Chart 5: Equity Market Volatility**

The next major policy issue is how much regulation is required for derivative markets. There are three arguments why financial institutions and/or financial markets should be regulated: depositors need to be protected, the integrity of payment systems needs to be secured, and financial stability needs to be maintained which requires to limit contagion across markets. There are institutional and functional approaches to regulation. The main proponents for institutional regulation argue that banks require special attention because they are systemically important. As conglomerates with large insurance and securities subsidiaries have evolved, the emphasis has shifted to a level regulatory playing field as regulations have become more principles rather than rules oriented.
Anglo-Saxon regulators argue that the existing institutional supervision of banks does not require any additional functional regulation of derivatives markets. Instead, markets are encouraged to develop self-regulatory organizations (SROs) to maintain the integrity of the derivatives market. This approach appears to be consistent with the existing market structure in the US and the UK where OTC derivatives trading is dominant and the market is highly concentrated among banks. For example, one large US institution is currently holding one sixth of worldwide derivatives, which does and should attract regulatory attention with respect to systemic risk. On the other hand, many emerging markets have seen spectacular growth in ETD derivatives trading which is involving a mix of banks, securities firms, institutional, as well as retail investors. Hence, regulators have insisted on more functional regulation of derivative markets, because risks for retail investors as well as for systemic stability may be larger. In fact, many regulators have expressed a policy preference to channel derivatives trading from unregulated OTC markets to regulated ETD markets which have additional safety cushions because every trade requires the prior cash deposit for margins which is limiting leverage.

Regulators widely agree that exchanges perform two basic functions as operator of the market and as (self) regulator of the market. The Basel Committee and IOSCO issued recommendations in 1999 on the public disclosure of the trading and derivatives activities of banks and securities firms which also proposed principles for self regulation as well as regulatory oversight of SROs. The objectives of self regulation should be broadly comparable to those of statutory regulators, namely to protect investors, to preserve market integrity, and to maintain financial stability. Experience has shown that exchanges with powers for market surveillance and enforcement have been most effective SROs, in contrast to trade or industry associations which have often become ineffective mouthpieces of their owners. Overall corporate governance and guiding principles for derivatives trading have also been espoused by the Group of Thirty (1993). Their report recommends that participants approve derivatives activities at the highest decision making level, that positions are marked-to-market, that credit risk is mitigated through multi-product master-agreements that allow for close-out netting, and that sound accounting and disclosure practices are adopted. In Asian emerging markets, there is broad support for improving governance of market participants and for self regulation of the exchanges, whereas many regulators believe that vigilant regulatory oversight over derivatives is required to maintain financial stability.
There are three additional considerations that regulators have to weigh in order to establish an even playing field for derivative markets: First, an adequate legal framework for enforcement and the adoption of IFRS accounting rules (incl. IAS 39) are critical prerequisites for sound derivative markets. Second, capital rules for banks operating in OTC derivative markets need to be aligned with margin rules that are effective in ETD derivative markets, which in reality has put most ETD markets into a disadvantage. Third, taxes need to be harmonized for all derivatives and related cash products, because transaction costs are an important driver of liquidity that can shift and even destabilize markets. Recently, Korea announced that tax capital gains from derivatives will be taxed (previously exempted) in the same amount as cash market transactions, which led to a better balance between cash and derivatives trading.

Finally, the single most important risk management tool for derivative markets is to reduce exposure through close-out **netting arrangements**, ideally with a **central counterparty** (CCP) that interposes itself between counterparties to financial contracts traded in one or more markets, which have initially been developed by securities exchanges and have recently been adopted in some OTC derivative markets. Netting benefits, for example bilateral netting by US commercial banks, can reduce credit exposure from derivatives by over 80% (chart 6).

**Chart 6:** Netting benefits for US commercial banks (1996-2004, in %)

![Chart showing netting benefits for US commercial banks](source: OCC Bank Derivatives Report III/2004)
The BIS and IOSCO issued recommendations for central counterparties (CCP) in 2004 and emphasized significant benefits of a CCP by imposing more robust risk control on all market participants and by achieving multilateral netting of trades. However, a CCP also concentrates risks, which requires effective risk controls, financial resources, and oversight over a CCP because a failure could spill over to payments and other settlement systems. Therefore, a CCP is expected to have several safety cushions, including adequate capital and effective margin rules. Asian countries are quickly adopting these recommendations, and several CCP arrangements have been announced, most recently in the merged Korean Stock Exchange. In principle, these recommendations can be applied to OTC derivative markets as well, and the industry association ISDA has been active to develop master-agreements for bilateral close-out netting. However, major banks have so far opposed multilateral netting through a CCP because that would require them to post margins and hence increase transaction costs. This is a delicate decision for policy makers to balance the need for financial innovation and low transaction costs on one hand, while on the other hand trying to reduce risks that may undermine financial stability.

6. **ROADMAP TOWARDS SOUND DERIVATIVE MARKETS**

The analysis of benefits and risks of derivative instruments, the 20-year experience from OTC and ETD derivative markets, and the policy considerations discussed above lead to a roadmap that can facilitate the development of sound derivative markets. The following chart illustrates ten stylized building block which lead from cash markets to repo markets to ETD markets and eventually to OTC derivative markets. While there are always country specific differences, the following stylized building blocks should be developed:

i. First, there should be an efficient, liquid, and integrated cash market (either for bonds, equities, other assets, or commodities) that is broadly market determined rather than driven by administered prices. Segmented markets and access restrictions can lead to less liquid and less efficient markets. In bond markets, the development of on-the-run benchmarks can help foster liquidity. In addition, modern IT, trading platforms, and internet trading often enhance liquidity.

ii. There needs to be a compelling economic rationale to develop new derivative products. For example, credit derivatives are desirable in order to transfer credit risk to institutional investors, whereas exotic options may not be desirable if they mostly serve for retail speculation.
Then a derivatives law needs to be enacted that protects netting arrangements in bankruptcies and enables effective enforcement. In addition, appropriate regulation (functional and/or institutional) needs to be established which usually includes self regulatory organizations (SRO).

iii. Prior to trading of derivatives, both long and short positions should be allowed in the underlying cash market. For bond markets, repurchase agreements need to be established, which requires the development of securities lending, and often is combined with margin trading. Short positions may be limited to hedge net long positions, but they are critical to develop liquidity and avoid the primary motivation for derivatives as substitutes for short cash positions.

iv. Market participants that intend to deal in derivatives should be licensed and trained. They should be required to follow best practice governance and accounting standards and to hold sufficient capital for their respective risk positions. Also, intermediaries must be accountable to deal only with fit and proper clients who understand characteristics and risks of derivatives.

v. Tax regulations should provide a level playing field for all cash and derivatives trading. If any one market segment is exempted from taxes, it may initially help market development, but will not be sustainable if that market becomes a substitute for tax arbitrage reasons. Typically, capital gains taxes are considered more efficient and less distortionary than transaction taxes.

vi. The major institutional setup of a derivatives exchange will ideally be implemented through a single demutualized exchange. Typically, index futures are among the first products before options on individual assets are introduced. Safety cushions of the exchange must include appropriate capital and a sound margining system.

vii. Clearing and settlement of derivatives products should be executed through a single counterparty (CCP) with multilateral multi-product close-out netting arrangements. Typically the exchange or its subsidiary will provide these services, which may also cover OTC trading as it will further strengthen the prevalent OTC design of bilateral ISDA master agreements.

viii. Local accounting standards should be upgraded to IFRS, including mark-to-market principles as required under IAS39. Full disclosure of all derivative positions should be required.

ix. Subsequently, more tailored or innovative OTC derivative products may be designed, such as credit default swaps. Typically, intermediaries are banks which should receive specific regulatory clearance and should support their risk positions with adequate capital. Counter-party
credit risk management requires special emphasis, which is typically facilitated through ISDA master-agreements, the use of counterparty credit ratings, and the posting of collateral.

x. Finally, the **investor base** may be further broadened, for example by attracting a larger share of foreign institutional investors or by opening up new ETD markets for retail investors. This can be facilitated by strategic partnerships among exchanges, modern trading platforms, and reduced transaction costs, as well as by innovative products that meet new hedging needs.

In summary, solid product design, strong regulation, and sound market infrastructure are three key components for the development of sound derivative markets.

**Chart 7: Stylized building blocks for derivative markets**
7. **Potential Systemic Issues arising from Asian Derivative Markets**

Although the Asian crisis has exposed serious vulnerabilities in derivative markets across Asia, many of the same issues remain of concern today and require continued vigilance especially as policy makers encourage the development of deeper and more sophisticated capital markets. There are five particular issues that policy makers might wish to bear in mind:

- **Derivatives can undermine fixed prices:** Managed exchanges rates require very careful management of related derivative instruments, which had been a painful lesson for Thailand and Indonesia. The speculative attack on the Hong Kong dollar peg revealed the force of derivatives to which even well regulated financial systems can be exposed. Korea also realized in 2003 that attempts to stabilize exchanges rates with large trading partners can create moral hazard as risk management is undermined by artificially low volatility. Today, China is walking a tight line in gradually liberalizing its capital account and allowing market forces to determine its exchange rate, while at the same time permitting foreign exchange derivatives trading. Over time, investment banks are developing structured products that enable investors to bet on a relaxation of existing policy constraints, which could lead to pressure points especially if it is possible to establish onshore short positions against these policy constraints.

- **Rapid derivatives growth should raise red flags:** Credit derivatives are the fastest growing segment of the market, at a size of $12 trn in June 2005 as compared to $1 trn in 2001, which are expected to double their volume again this year. Credit default swaps are the most common OTC product, which requires the seller to pay if underlying corporate bonds go into default. Typically, banks are buying protection to hedge their loan exposure and lay off expensive risk under the new Basel accord, whereas non-bank financial institutions (such as insurance or pension funds) write protection in order to increase their returns. Hedge funds have also become large players in this market. ISDA has recently published new transaction standards after US regulators found major problems in documentation of credit derivatives at leading banks. Although the credit derivatives market in Asia has evolved rapidly, especially offshore in Singapore and Hong Kong, there is little data nor regulatory attention in this area. Experts are suggesting that this rapidly growing but nontransparent market is prone to see a major accident.

- **Public sector banks can become derivatives warehouses:** Foreign banks have often been leading innovations in this field, although some countries have charged public sector banks with
that task. For example, Korean Development Bank (KDB) has successfully developed OTC derivatives markets and has become a de-facto central counterparty. By June 2005, it generated one third of its net income from derivatives trading, whose notional volume exceeded three times its loan portfolio. About half of its derivatives position has been in FX forwards, of which a large part is used to convert cheap financing in JPY into KRW for Korean clients. However, it is doubtful whether public institutions should have a role in developing derivatives markets in order to secure cheap financing that can be used as a tool for its industrial policies. In any case, close system-wide monitoring of open foreign exchange derivative positions remains critical.

**Counterparty credit risk can be substantial:** The failure of a large derivatives counterparty has the potential to trigger system-wide failures, unless advanced risk management tools have been implemented. Bilateral netting based on ISDA master-agreements can provide substantial benefits and for instance reduced exposure of US banks by 85%. A central counterparty can further reduce exposure through multilateral netting. However, exchanges have become vital providers of liquidity, and their failure could have systemic implications, which requires careful risk management both for exchanges and its clearing members. Best practice involves cushions that consist of margin accounts, position limits, capital of members and the exchange, as well as risk mitigation through international excess-of-loss insurance. Regulatory oversight over exchanges is equally important, especially in rapidly growing markets such as India and Korea.

**Exchange-based trading is safer than unregulated OTC trading:** Several emerging markets have established an even regulatory playing field for both exchange-based and OTC derivatives trading, enforcing the same rules for accounting, disclosure, and transparency. In some cases, OTC trading has deliberately been shifted onto an exchange with a central clearing counterparty in order to reduce potential systemic risk and to increase transparency, for example futures trading on Korean government bonds. However, other Asian markets such as Thailand or the Philippines have enabled OTC derivatives trading without setting up derivatives exchanges, which requires special emphasis on disclosure and transparency for the licensed banks. Although some advanced economies manage OTC trading with limited regulation, it appears that emerging markets would be best served by developing modern exchanges with CCP infrastructure.
8. CONCLUSIONS

This chapter has illustrated that derivatives are an important component of efficient and complete capital markets that are evolving across Asia. Developmental benefits can be significant when uncertainty is reduced, risk is managed more efficiently, and financial resources become available at better terms, which all support economic growth. Derivatives are not only for banks because two thirds of large corporations currently require derivatives as hedging instruments.

Asian capital markets have become more balanced since 1997 as government bond markets have developed, foreign exchange trading has expanded, derivative markets have evolved, sophisticated insurance products have grown, and new financial products have been designed, such as asset-backed securities and securitized mortgages. All of these products are contributing to a more competitive financial sector that has a positive impact on the real economy.

High profile accidents in derivative markets across Asia have revealed how fragile many financial institutions still are and how the region’s financial stability could be undermined. Derivatives markets require sound regulation and supervision because of the highly leveraged trading, the concentration of risks, and likely cross-border and cross-market contagion effects. Policy makers have advocated the development of derivative markets on an even regulatory playing field with adequate safety cushions (such as multilateral netting, margins, and collateral) and have strongly recommended clearing and settlement through a central counterparty (CCP). Good governance, best practice accounting standards, and full disclosure are all indispensable.

Looking ahead, Asian derivative markets are already supporting more safe and efficient financial sectors across the region, as for example witnessed with collaboration on reserve management, contingency credit lines among central banks, and the evolving second Asian bond fund. Derivatives trading is increasingly migrating towards some of the world’s largest and most innovative derivatives exchanges, which are looking to develop new strategic partnerships. Dangers are still lurking in offshore and unregulated markets, especially in the less transparent credit derivative products. Although derivatives are inherently risky products, risk management is all about the balance between danger and opportunity, as expressed in the Chinese character Wei-Ji 危機
REFERENCES


China CSRC, 2004, “China’s securities and futures markets”, mimeo, April 2004


Group of Thirty (G30), 1993, “Derivatives: practices and principles”, July 1993


Hong Kong SFC, 2004, “Profile of the index futures market in Hong Kong”, Research Paper No. 16, 2004

India SEBI, 2002, SEBI advisory committee on derivatives, “Development an regulation of derivative markets in India”, September 2002

IOSCO, 2005, “Exchange demutualization in emerging markets”, April 2005


Monetary Authority of Singapore (MAS), 2000, “Financial Sector Liberalisation: going global”, presentation by DPM Lee Hsien Loong, April 2000, Singapore


PWC, 2005, “Building the OTC Market for Interest Rate Derivatives”, mimeo, 2005


UK FSA, 1999, “Regulation of wholesale cash and OTC derivative markets“, June 1999


World Federation of Exchanges, 2004a, Annual Report

