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on

economic statistics

**COMPILATION AND REPORTING OF
SINGAPORE'S CROSS-BORDER FINANCIAL DERIVATIVES**

Singapore Department of Statistics

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COMPILATION AND REPORTING OF SINGAPORE'S CROSS-BORDER FINANCIAL DERIVATIVES

I INTRODUCTION

1. The global derivatives market has been growing at a rapid pace with the increasingly widespread and extensive use of financial derivatives by investors and traders in recent times for both hedging and speculative purposes. Such developments, along with the emergence of new financial instruments and arrangements resulting from financial innovation, underscore the growing need for data on financial derivatives. In particular, the major role played by derivative contracts during the global financial crisis of 2008 highlighted the importance of tracking and monitoring information on financial derivatives by market participants, analysts and policy-makers.

2. In recognition of its growing significance in global financial markets, the International Monetary Fund (IMF) has been recommending the inclusion of financial derivatives as a major functional category for reporting in the financial account of the balance of payments (BOP) and in the international investment position (IIP) since 2000. The IMF has subsequently provided further conceptual updates and clarifications on the compilation of financial derivatives in the recently revised Balance of Payments and International Investment Position Manual, Sixth Edition (BPM6) published in 2009.

3. As an international financial and trading centre, financial derivatives have also been growing in importance in Singapore with the increasing emphasis on risk management following the financial crisis. To meet the growing needs of data users and address data gaps in Singapore's BOP and IIP, the Singapore Department of Statistics (DOS) invested considerable effort and resources into a major project to collect and compile statistics on cross-border transactions and holdings of financial derivatives. Recent developments in accounting standards have also facilitated the collection of data. With the adoption of the latest Financial Reporting Standard 39 (FRS39) by the Singapore Accounting Standards Council (ASC) with effect from 1 January 2005, companies in Singapore are now required to value financial derivatives separately and report derivative contracts in the profit and loss accounts at market values.

4. This paper introduces and explains the conceptual framework for the compilation of financial derivatives, and discusses the compilation methodology adopted by DOS. The paper also presents an analytical overview of Singapore's gross asset and liability positions in cross-border financial derivatives.

II CONCEPTUAL FRAMEWORK

5. Financial derivatives are defined as financial instruments whose values are derived from other financial instruments (such as equities and debt securities), indicators or commodities. It is through financial derivatives that the various financial risks, such as interest rate risk, credit risk, exchange rate risk, etc, associated to the underlying instruments can be traded in their own right in financial markets.

6. Financial derivatives can be traded by the direct purchase and sale of the derivative contracts or by creating new contracts that countervail the risks of the existing contracts. The derivative contracts are then settled by net payments of cash or by the delivery of the underlying instruments.

7. The BPM6 clarifies that financial arrangements such as fixed-price contracts for goods and services, insurance and standardized guarantees, contingent assets and liabilities, embedded derivatives and timing delays in the normal course of business, are not financial derivatives. In particular, a primary instrument such as a security, despite containing an embedded derivative, should be classified according to its primary characteristics in the BOP and IIP.

A) Types of Financial Derivatives

8. All financial derivatives can be broadly classified into options and forward-type contracts. In Singapore, there are four common types of derivative contracts traded in domestic financial markets, namely forwards, futures, options, and swaps:

- i. Forwards are over-the-counter (OTC) contracts where two counterparties agree to exchange an underlying item, which can be real or financial, at an agreed-upon contract price (strike price) on a specific date. Cash payments are made upon maturity or during the settlement of the forward agreements.
- ii. Futures work on the same principles as forwards, but are standardized and traded in organized exchanges. In addition, futures contracts are required to be marked to market, with both losses and gains being accounted for by the end of every trading day.
- iii. Options and warrants refer to option-type contracts giving the owner the right but not the obligation to buy or sell a financial instrument at a specific price by a specified future date. Options traded on organised exchanges usually grant rights over assets that are already available, while the exercise of warrants creates new securities which dilute the capital of existing bond or shareholders.
- iv. Swaps are contracts in which two parties agree to exchange payment streams based on a specified notional amount for a specific period. The most common

forms of swap agreements include “plain vanilla” interest-rate swaps and currency swaps.

9. Other derivatives include derivative contracts that combine several features of various derivative types but are too complex to break down into their constituent parts.

B) Valuation of Financial Derivatives

10. Similar to other financial instruments, it is recommended in BPM6 that financial derivatives be valued at market prices. Market values for forwards, futures and swaps are generally obtained from the difference between the agreed-upon contract price and the (expected) prevailing market price on the day of the settlement times the principal amount (appropriately discounted), or the present value of expected future cash receipts less expected future payments. For options and warrants, market values are obtained from either prevailing market prices traded in the financial markets or other fair value methods such as options models (e.g. Black Scholes Model) or present values if market prices are not available.

11. While the stock of financial derivative assets and liabilities are determined by the market values of such investments at the end of the reference period, transactions (flows) can arise during the period in different forms. Transactions in financial derivatives can be reported at the inception or creation of the derivative contracts through sales in secondary markets such as exchanges or OTC markets, ongoing servicing and at cash settlements whereby the parties meet prior obligations by making cash payments. Examples include cash received (or paid) upon maturity or settlement of forward agreements, and cash settlements constituting premiums paid and received from the exercise of option contracts. For ongoing servicing and cash settlements, there will be a decrease (increase) in a financial derivative asset (liability) if the contract is at an asset (liability) position at the time of payment or transaction.

12. In the case of forward-type derivatives, contracts often switch from an asset position to a liability position and vice versa between reporting dates. These switches are a result of changes in the prices of the underlying items from which the forward-type contracts derive their value. When such a switch in position occurs, the market value of the gross asset/liability position at the close of the previous accounting period should be revalued to zero, followed by a revaluation from zero to the market value of the gross liability/asset at the end of the present accounting period.

III DATA SOURCES AND COMPILATION METHODOLOGY

13. DOS initiated and launched the project to collect and compile data on cross-border transactions and holdings of financial derivatives in 2007. Data are collected and compiled from both administrative source and surveys, in accordance with the recommendations and guidelines set out in BPM6.

14. All data on cross-border investments conducted via the Singapore Exchange (SGX), Singapore's domestic stock market, are obtained directly from SGX. This includes both non-resident holdings of local derivatives as well as resident investments in foreign derivative contracts. The use of administrative data from SGX helps to reduce the reporting burden of companies surveyed by DOS for information on financial derivatives.

15. Data on derivative contracts transacted between residents and non-residents through both OTC derivatives markets and overseas exchanges are collected through enterprise surveys. Instead of launching new surveys, DOS decided to leverage on existing enterprise surveys to collect the relevant information for statistical purposes in consultation with various stakeholders and survey respondents.

16. Besides the collection of data through enterprise surveys, DOS also survey fund managers, nominees and custodian companies to obtain information on investments made through financial intermediaries by both retail and institutional investors. The questionnaires for all surveys have been carefully designed to ensure that there is no double counting in the process of data compilation.

17. The surveys on both enterprises and financial intermediaries collect detailed data on cross-border derivative transactions and holdings by the various contract types and counterparty economies. Survey respondents are also requested to provide valuation changes due to market price and exchange rate movements. To minimise reporting burden, respondents are allowed to report the net amount for contracts with the same counterparty and those that are carried out at net values in the respondents' accounting records and financial statements in accordance with FRS39.

18. In view of complexities involved in the computation of data on financial derivatives, DOS considers it both necessary and prudent to comprehensively review the new set of statistics before dissemination to data users. DOS has been collecting and analysing the survey data on cross-border financial derivatives from reference year 2006, and has successfully compiled the new data series for reporting in Singapore's BOP and IIP.

IV KEY FINDINGS

19. Singapore's asset and liability positions in financial derivatives with non-residents increased from 2007 to 2011 (see Table 1). As at end-2011, Singapore's gross asset position in cross-border derivatives amounted to \$160 billion, while liabilities totalled \$100 billion. Both derivative assets and liabilities peaked in 2008 before declining significantly at the end of 2009 during the economic downturn following the global financial crisis. Substantial amounts of underlying securities were written off during the financial crisis, resulting in significant reductions in holdings and unwinding of positions in financial derivatives by both resident and non-

resident investors. As the world economy recovered in 2010 amid signs of stabilisation in the global financial system, cross-border investments in derivative assets and liabilities rebounded. Throughout the financial crisis and ensuing global recession, Singapore continued to record net asset positions in cross-border derivatives over the years.

20. The deposit-taking corporate sector (or banking sector) accounted for the majority of investments in financial derivatives. Resident banks held between 79 and 87 per cent of total cross-border derivative assets, and accounted for 72 to 84 per cent of total cross-border liabilities from 2007 to 2011. With the exception of sharp declines in 2009 as the Singapore economy went into recession in the midst of continued uncertainties in global financial markets, the stocks of both derivative assets and liabilities in the banking sector have generally been increasing in recent years.

21. In comparison, the non-bank corporate sector saw relatively moderate movements in derivatives positions during the period. After growing significantly in 2008, stocks of cross-border derivative assets and liabilities in the non-bank sector fell in subsequent years before recovering in 2011 with the manufacturing and commerce (wholesale and retail trade) sectors constituting the bulk of derivative contracts. These sectors have been heavily involved in global trade and were highly exposed to external conditions and risks in the form of price and exchange rate volatility, among others. The continued strong position in the stock of financial derivatives in these two sectors also reflects Singapore's growing importance as a treasury management hub for multinational corporations (MNCs), as well as the expansion of offshore commodity trading activities in Singapore.

TABLE 1: STOCK OF FINANCIAL DERIVATIVES BY SECTOR
AS OF YEAR-END (\$ MILLIONS)

	2007	2008	2009	2010	2011p
Financial Derivatives Assets	105,054	175,989	110,093	142,671	159,772
Deposit-taking corporations, except the central bank	91,552	148,833	86,993	121,086	133,589
Others (non-bank sector)	13,502	27,156	23,099	21,585	26,183
Financial Derivatives Liabilities	97,275	165,230	82,619	89,786	100,166
Deposit-taking corporations, except the central bank	75,674	138,417	59,302	66,866	74,997
Others (non-bank sector)	21,601	26,813	23,317	22,920	25,168

Figures may not add up to totals due to rounding

Source: DOS

22. Singapore's cross-border derivative assets and liabilities by contract types as of end-2011 are shown below in Charts 1 and 2. Similar to other major financial centres such as Hong Kong, swaps have traditionally accounted for the largest shares of both derivative assets and liabilities (even in the run-up to the global financial crisis), mirroring Singapore's position as a global foreign exchange trading hub.

CHART 1: FINANCIAL DERIVATIVES ASSETS BY CONTRACT TYPE
AS OF END-2011p

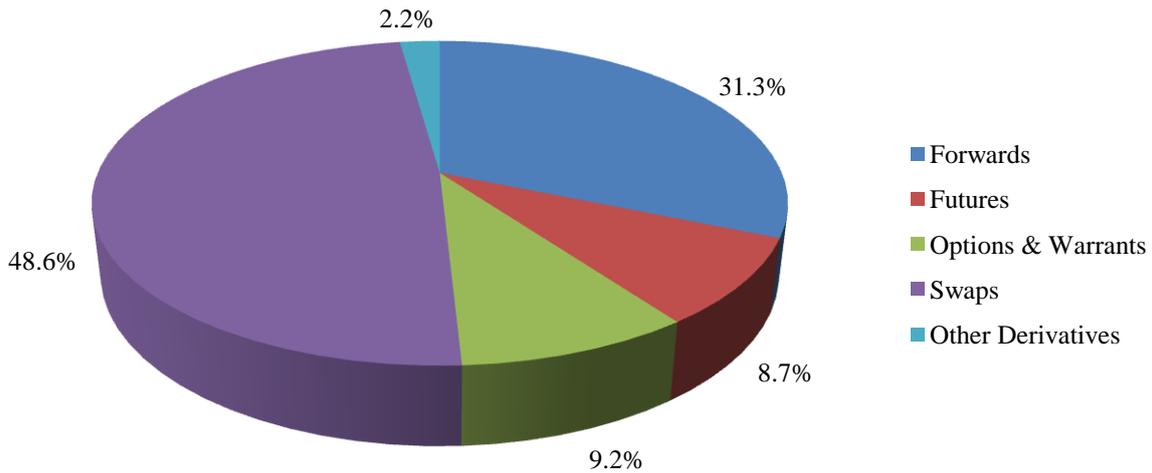
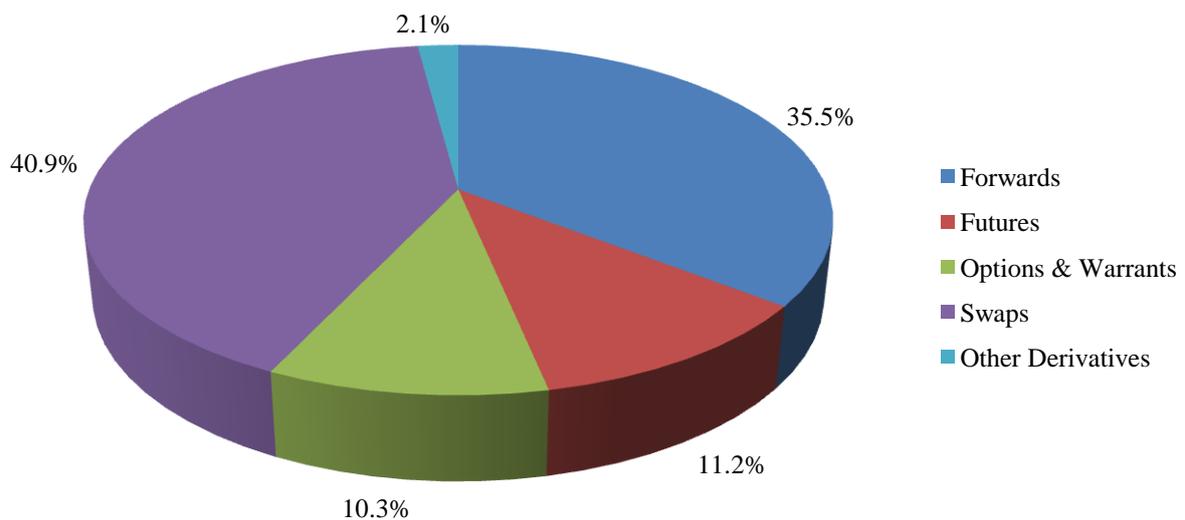


CHART 2: FINANCIAL DERIVATIVES LIABILITIES BY CONTRACT TYPE
AS OF END-2011p



Source: DOS

23. The incorporation of data on financial derivatives has had a modest impact on Singapore's total foreign assets and liabilities (see Charts 3 and 4). Gross external assets will be revised upwards by 4.1 per cent to 7.4 per cent and external liabilities by 4.2 per cent to 8.5 per cent between 2007 and 2011. Singapore's net IIP vis-a-vis the rest of the world will record higher net asset positions throughout the series, with upward revisions ranging from 1.5 per cent to 7.9 per cent.

CHART 3: SINGAPORE FOREIGN ASSETS 2007 - 2011p

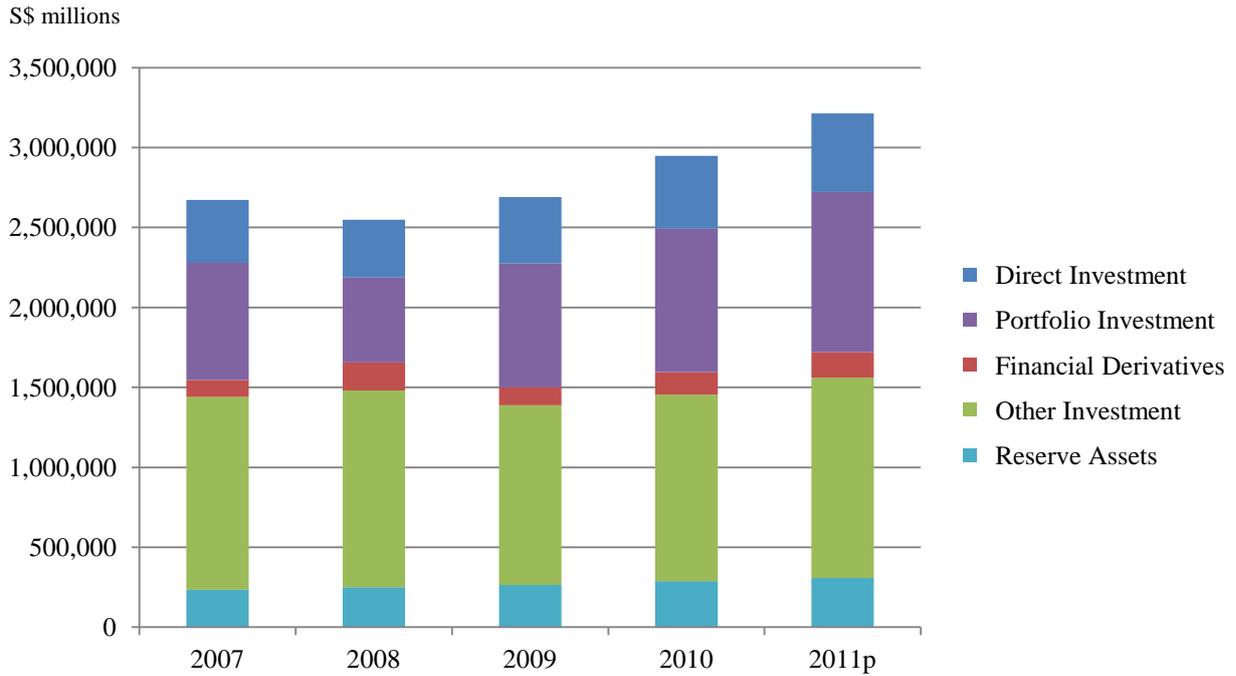
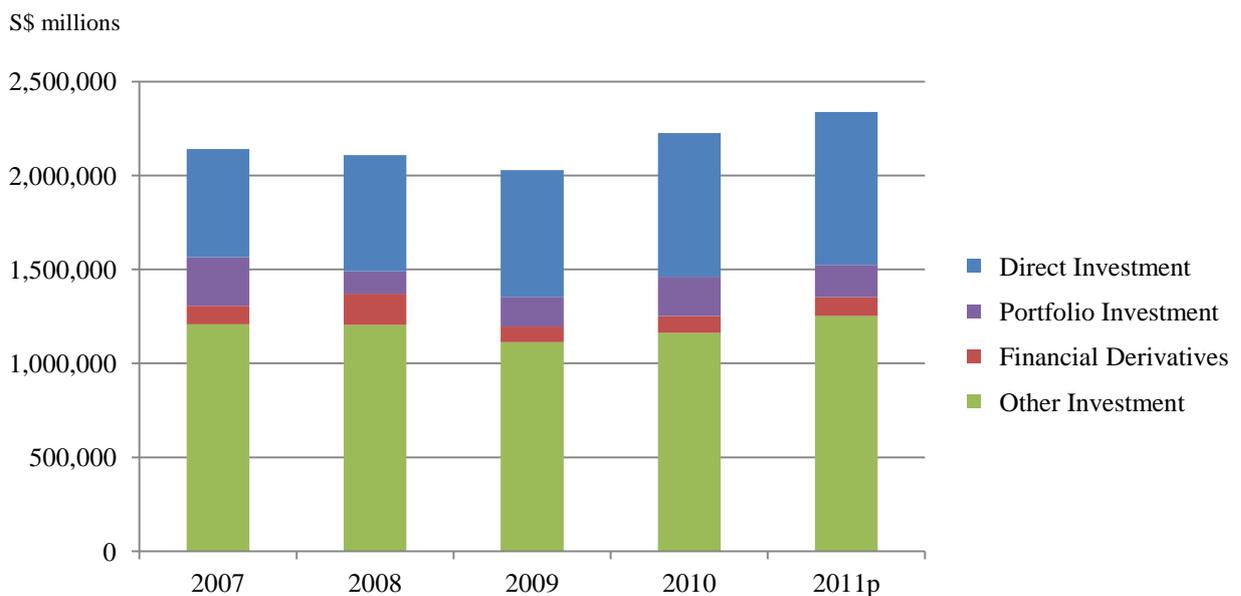


CHART 4: SINGAPORE FOREIGN LIABILITIES 2007 - 2011p

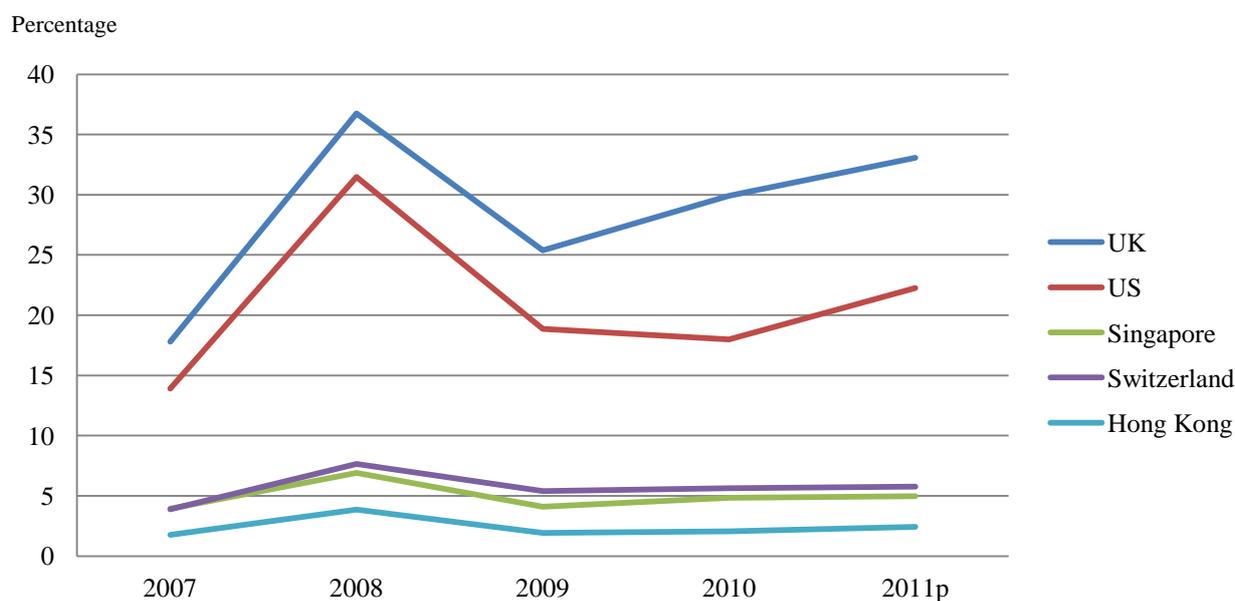


Source: DOS

24. In relation to selected economies and global financial centres, Singapore's cross-border derivative assets constituted between 3.9 per cent and 6.9 per cent of total external assets from 2007 to 2011, slightly lower than Switzerland's share of foreign assets (ranging from 3.9 per cent to 7.6 per cent) while markedly higher than Hong Kong (between 1.8 per cent and 3.9 per cent). In contrast, the United Kingdom (UK) and United States (US) recorded relatively significant holdings of financial derivative assets, which amounted to 18 per cent to 37 per cent and 14 per cent to 32 per cent of their total foreign assets respectively.

25. Similarly, Singapore's shares of derivatives relative to total foreign liabilities were generally greater than Hong Kong while lower than those of the UK, US and Switzerland. Singapore's derivative liabilities ranged from 4.0 per cent to 7.8 per cent of external liabilities, significantly lower than the UK (at 17 per cent to 35 per cent) and US (12 per cent to 26 per cent) and less than Switzerland (up to 8.5 per cent). Hong Kong's relative holdings of derivative liabilities were much lower, accounting for between 1.5 per cent and 4.5 per cent of total foreign liabilities during the period.

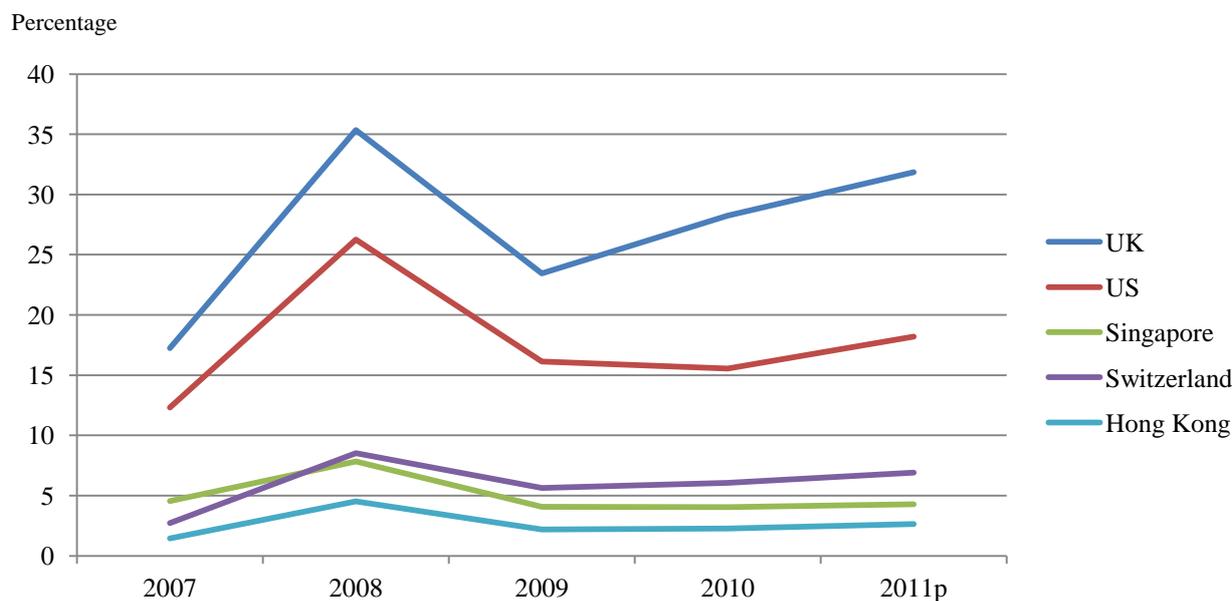
CHART 5: DERIVATIVE ASSETS AS A PERCENTAGE OF TOTAL FOREIGN ASSETS OF SELECTED ECONOMIES (AS OF YEAR-END)



Data published as at June 2012

Sources: DOS, UK Office of National Statistics (ONS), US Bureau of Economic Analysis (BEA), Swiss National Bank (SNB), and HK Census and Statistics Department (C&SD)

CHART 6: DERIVATIVE LIABILITIES AS A PERCENTAGE OF TOTAL FOREIGN LIABILITIES OF SELECTED ECONOMIES (AS OF YEAR-END)



Data published as at June 2012

Sources: DOS, ONS, BEA, SNB, and C&SD

26. All five economies exhibited similar trends as their respective holdings of financial derivatives relative to total foreign assets and liabilities increased from 2007 to 2008, coinciding with increased exposure to cross-border derivatives from growing global trade and rising international capital flows. As the world economy went into recession along with the contraction of global trade in 2009 following the financial crisis, the total amount of derivative assets and liabilities held by these economies fell significantly compared to aggregate cross-border investments. The relative contributions of derivatives for most economies have grown steadily since 2009.

V CONCLUSION

27. The rapid growth of Singapore's derivatives market underlines the increasing sophistication of the domestic capital market and the growing importance of financial derivatives for both risk management and speculative purposes.

28. The successful compilation and incorporation of data on cross-border derivatives in Singapore's BOP and IIP will significantly enhance the relevance and analytical usefulness of Singapore's international economic accounts. The new data series on financial derivatives was released in the BOP with the publication of the Economic Survey of Singapore for 2011, and will also be reported in the IIP with effect from the release of IIP 2011.

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Statistics Singapore Website

The *Statistics Singapore Website* was launched by the Singapore Department of Statistics (DOS) in January 1995. Internet users can access the website by connecting to:

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- **Statistics**
which provides key data on Singapore's economy and population.
- **News**
which covers the Performance of Singapore Economy, the Consumer Price Index, the Wholesale Trade Index, Business Receipts Index for Service Industries, Retail Sales and Catering Trade Indices, Manufacturing Performance, Singapore External Trade, Tourism Sector Performance, Real Estate Information and Employment Situation.
- **Publications – Papers & Analyses**
which provides papers on economic and social topics.
- **Themes**
which presents official statistics compiled by DOS and the Research and Statistics Units in the various ministries and statutory boards according to themes. Within each theme, relevant statistics and related press releases, publications and references are provided.

Statistical resources are available via:

- **Publication Catalogue**
which lists the latest editions of publications released by DOS at <http://www.singstat.gov.sg/pubn/catalog.html>. All softcopy DOS publications are available for free downloading. Statistical tables of DOS publications in Excel format are also available.
- **Advance Release Calendar**
which covers key Singapore economic indicators.

The website also provides a convenient gateway to international statistical websites under the "Statistical Resources" section:

- **Guide to International Statistics**
which covers international databases, classifications and links, and statistical terms and definitions.
- **IMF Dissemination Standards Bulletin Board**
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Besides the usual monthly, quarterly and annual data, STS includes also seasonally adjusted data series for key economic indicators providing for a better analysis and understanding of current economic trends. The STS also offers:

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