

**TOWARD THE ENHANCEMENT OF DERIVATIVES
TRADING IN THE CARICOM SUB REGION**

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ABSTRACT

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International evidence seems more and more to suggest that capital market development is correlated with, and perhaps even causes, economic growth and development. Derivatives have in recent times been a major feature of financial development worldwide, but the Caribbean as a whole, and the CRICOM sub region in particular, is lagging behind in this regard. The authors of this paper investigate the feasibility of formalizing derivatives trading in the CARICOM sub region as a means of enhancing the capital markets of the countries of the sub region. Both conventional “paper form” and exotic derivatives are considered. A comprehensive review of existing literature is used to gather theoretical background information about derivatives trading in emerging economies. Interviews with representatives of the financial sector in the CARICOM sub region are conducted to determine the nature and extent of current derivatives trading, any past activities and the prospect for future trading in that region. Recommendations are made about the future development of the derivatives market.

KEYWORDS: Derivatives, Derivatives trading, Derivatives exchanges, Over-the-Counter trading
JEL CLASSIFICATION NUMBERS: G20, O10, O54

1. Introduction

International evidence seems more and more to suggest that capital market development is correlated with, and perhaps even causes, economic growth and development (Fischer 2003). The objective of this study is to determine the feasibility of developing the capital markets of the CARICOM sub region through the enhancement of derivatives trading in the two largest financial markets of that region, those of Trinidad & Tobago and Jamaica. The recommendations made in this study should prove vital to government, the business community and academics alike.

Derivatives are financial instruments that have no intrinsic value; their returns are linked to, or derived from, some other product or underlying asset. Derivatives are financial instruments that do not confer ownership, but rather a promise of ownership (Hird and Lott 1996). They hedge against the risk of owing things that are subject to unexpected price fluctuations.

Derivatives are now considered one of the basic tools for enhancing the efficiency of capital markets. The two main reasons for the use of derivatives are the high and variable levels of market volatility and limited ability to adequately manage risk. Derivatives allow investors to manage their risks more effectively, promote price discovery, and increase transactional efficiency, it allows firms to manage, predict and control their revenue and expenses by locking in prices and interest rates ahead of time. The future is uncertain and risky for businesses and risk can be eliminated or minimized by the use of derivatives. The use of derivatives in market-based economies allows for more efficient allocation of resources, thus investment projects become more productive, leading to higher rates of economic growth. Derivatives products like swaps (especially interest rate swaps) are capable of reducing the costs of firms' borrowing by allowing them to borrow in accordance with their respective comparative advantage (Bhaumik 1998). Furthermore, derivatives products can reduce the need by firms to hold idle precautionary balances, thereby, reducing the fraction of funds held unproductively (Hentschel and Smith 1997).

The derivatives market in the region is fairly new and small and there is no secondary data available. We set out to obtain primary data through in-depth interviews with

representatives of the financial institutions. A major limitation in conducting these interviews was the hesitance of the interviewees to reveal very specific information on the topic (such as, the dollar value of transactions and the proportion of their portfolio consisting of derivatives). These interviews allowed us to ascertain the nature and extent of current derivatives trading, any past activity and the prospect for future trading in the region. This field survey was complemented by a comprehensive review of existing literature, which was used to gather background theoretical information about derivatives trading in emerging economies. We distilled from this the benefits and risks associated with the use of derivatives, the regulation of derivatives markets, the advantages and disadvantages of differing structures of derivatives markets, in particular exchange-traded derivatives as opposed to over-the-counter derivatives trading and explored the possibility of other/exotic types of derivatives, which may be relevant to the region. Based on these analyses, recommendations are then proposed as to how the derivatives market can proceed in the future.

The rest of this paper is as follows: section 2 summarizes the results of a survey of institutions involved in derivative trading in Jamaica and Trinidad & Tobago. In section 3, possible features of the regulatory framework for derivatives trading in these countries are discussed. In section 4 derivatives trading in an organized exchanged is compared to over-the-counter trading, while in section 5 the requirements for a properly functioning derivatives exchange are considered. In section 6, we look at special types of derivatives, which may be of interest to Caribbean investors and in section 7 we conclude the paper and propose recommendations on the way forward for derivatives trading in the CARICOM sub region.

2. The Derivatives Market in Trinidad and Tobago and Jamaica

Trinidad and Tobago and Jamaica have the most developed and best functioning stock markets in the Caribbean sub region and were the only two where we could objectively verify that some amount of derivative trading, albeit rudimentary and even primitive, was taking place. There is no formal printed document on the structure and functioning of this market. To obtain such information, interviews

were conducted among ten institutions in Trinidad & Tobago and Jamaica. We were unable to interview individual investors because Brokerage houses were unwilling to supply their names for privacy and security reasons. Conducting these interviews was not a simple task since the respondents were not enthusiastic about revealing information about their derivatives trading activities.

It was generally agreed by those interviewed that derivatives trading was a specialized activity known almost exclusively and only by the handful of people who participate in it. Five institutions indicated that less than ten percent of their portfolio is made up of derivatives. Those interviewed all expressed the opinion that the commercial banks were the major, if not the only, players in the local derivatives market. The purposes for which derivatives are used are to hedge interest rate and the immunization of portfolios.

The most common used derivative products are forward exchange rate contracts (forward exchange rate swaps and options), cross-currency swaps, interest rate swaps, oil options and swaps, and bond options. One firm in Jamaica admitted to trading on a very limited scale in classic European/American type options, but this is clearly not at all common. Derivative products are utilized to hedge against exchange-rate risk, currency risk, and interest rate risk and to combat the local mismatch in bond maturities. When asked if they would trade for hedging or speculative purposes the responses were mixed. When asked of the likelihood of trading in specialized derivatives such as weather, commodities and energy derivatives, the responses were again mixed but they all agreed that there was the prospect for special derivatives especially for commodity and energy. All activity is carried out over-the-counter trading, which is preferred to having an organized exchange. They believe there are very too few Caribbean investors and corporations who will participate in derivatives trading to make the creation of a formal exchange worthwhile. If, however, a formal exchange is to be used, respondents preferred an overseas exchange or a Caribbean wide exchange.

None of the institutions interviewed has a derivatives trading desk and one of the banks interviewed has conducted only one derivatives transaction thus far. Clients include top local corporates, banks, insurance companies, governments, and companies from the manufacturing sector. Before taking a 'position' in a derivative

contract, the institutions perform “appropriateness” tests on potential clients. These appropriateness tests include examination of their financial statements, market capitalisation, and sales per year. The banks also try to educate their clients on the benefits and dangers of using derivatives to manage (or hedge) risk. The institutions profit from derivative transactions through the bid-offer spread and embedded fees. For example, multinational corporations operating in Trinidad and Tobago that use derivatives to manage (hedge) risk usually rely on their headquarters (located outside of Trinidad and Tobago) to perform this function.

When some institutions enter into a derivative contract (on behalf of their clients) they trade on an already established derivatives exchange, and trades are confirmed via the telephone system. Upon entering into a derivative contract, the institution (often a bank) takes an equal and opposite position in the international market. This ensures that all market risk is hedged and the only risk the institution accepts is counter-party or credit risk.

The ISDA Master Agreement governs all trades. ISDA (International Swaps and Derivatives Association) is a global trade association representing participants in the privately negotiated derivatives industry (www.isda.org). The Financial Services Commission (FSC) requires that institutions disclose their derivative trading activity, but there is no evidence of a separate regulatory framework for derivatives trading. The Securities & Exchange Commission (SEC) in Trinidad & Tobago does not make it mandatory to declare derivatives trading activity.

The view was expressed that the potential danger of using derivative contracts locally involves the size of the market itself. Because the market is so small, if one participant defaults the entire system may be de-stabilized (*systemic risk*)². Therefore in order for the market to develop in this region, there needs to be adequate regulation (self-regulation or governmental regulation) governing trading activity and dissemination of relevant education and training of market participants (none of the employees at the trading institutions are trained in derivatives).

Derivatives are issued as paper contracts where investors must sign a document attesting that they are familiar with derivatives. There is no central depository for

² This may become a problem if there is a vast increase in the number of market participants utilising derivatives products and default by one participant affects other related industries and/or the underlying cash market.

derivatives. The major clients for derivatives are individuals, corporations, and non-financial institutions, the latter being interested mainly in yield. There is no screening or performance evaluation of clients but they are expected to have a clear understanding of derivatives. Respondents believed that a Clearinghouse would have a positive effect on derivatives trading. There was also an indication that there is a need for short selling.

Respondents expressed the view that market participation could be improved with education. Educating investors and potential investors as well as increasing the attractiveness of the derivatives is the key to improving the market. The existing structure and functioning of the derivatives market would improve as a consequence. Derivatives trading, respondents generally believe, will improve the efficiency of the capital market by making it more competitive. Because of the increasing need to hedge more people will turn to the derivatives market.

There is no evidence or record at present in the CARICOM sub region of trading in specialized derivatives such as weather, commodity and energy derivatives, although those questioned thought it was a good idea. They felt, however, the moment for that had not yet arrived since the crop of investors is risk averse and may not be willing to take the bet. They also have to be educated and the market has to be more developed.

Table 1 below summarizes the key features of the derivatives market in Trinidad & Tobago and Jamaica:

Table 1

Key Features of Derivatives Market in Jamaica and Trinidad & Tobago

Uses	More often for hedging as opposed to speculation.
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Market participants	Commercial banks, top local corporates, insurance companies, governments, and manufacturers.
Contract types	Forward exchange rate swaps and options, cross-currency swaps, interest rate swaps, bond options, and oil options and swaps.
Infrastructure	Telephone system
Regulation	ISDA Master Agreement
Training	No specialised training in derivatives
Dangers involved	Counterparty risk and possibly systemic risk

3. Regulation of Derivatives Markets in Jamaica and Trinidad & Tobago

The objectives of derivatives regulation are to ensure the integrity of markets, to deter manipulation by agents, and to protect participants from losses arising from fraud or the insolvency of counter-parties. The evidence seems to suggest that the derivatives markets in Jamaica and Trinidad & Tobago are highly unregulated. However no market is ever truly unregulated (Greenspan 1997). The self-interest of market participants generates private market regulation. Whether markets should be regulated or not does not seem to be the appropriate question, but rather if government intervention will weaken or strengthen private regulation (Greenspan 1997). There exists a moral hazard problem associated with government intervention - if private market participants believe that government is protecting their interests, their own efforts to protect their interests may diminish. If the incentives of private participants are weak or they lack the capabilities to pursue their interests, then government intervention may improve regulation.

The characteristics of the market should determine, if any, the optimal form of government regulation (Greenspan 1997). Market characteristics include the types of instruments traded, the types of market participants, and the nature of the relationships among market participants. The behaviour of market participants, that is, migrating to and from government-regulated to privately regulated markets -

should signal to government regulators whether or not the costs of intervention exceed the benefits. Greenspan also states that if participants migrate towards private regulated markets, government regulators should consider changing the form of regulation or should pursue less regulation in order to improve the cost-benefit trade-off without compromising public policy objectives.

What is the optimal balance between governmental regulation and self-regulation? The two forms of regulation should be compared simultaneously by evaluating their competencies and flaws (Lazzarini and Mello 2001). Those in favour of governmental deregulation stress on the costs associated with government intervention, ignoring the shortcomings of self-regulation, while those supportive of governmental regulation tend to disregard the costs of self-regulation. Proponents of government regulation also suggest that the presence of market failures justifies intervention, sometimes overlooking the feasibility of the proposed change (that is, more governmental or self-regulation).

Lazzarini and Mello (2001) compare the two regulatory mechanisms by focusing on the regulatory failures of both - that is, how each mechanism creates inefficiencies. The authors rely on Coase's insistence that market failures do not necessarily justify market intervention:

"...and solutions have costs and there is no reason to suppose that government regulation is called for simply because the problem is not well handled by the market or the firm..." (Coase 1960, p.18)

They stress the importance of studying the least costly mechanism to moderate market failures and the feasibility of implementing the proposed change (more regulation or self-regulation). The institutional environment of the particular country (for instance, how politics can influence the credibility of governmental regulation) needs to be considered and there should be the avoidance of 'one-size-fits-all' recommendations.

There are four types of failures associated with governmental regulation: 1) the costs to run regulation bureaus, to collect information and to monitor markets, 2) the credibility of the proposed mechanism 3) rent seeking behaviour by constituencies directly or indirectly affected by the regulation, and 4) constraints on financial

innovation (Lazzarini and Mello 2001). Problems associated with self-regulation include: 1) agency problems in the organisational structure of the exchange; and 2) non-socially optimal provision of goods (Lazzarini and Mello 2001).

There is no a priori optimal balance between governmental regulation and self-regulation. This balance depends on country specific conditions, especially the country's institutional environment (Lazzarini and Mello 2001). Also, constituencies profiting from the regulatory framework sometimes oppose changes that enhance social benefits. However, governmental regulation, when feasible, should compliment self-regulation attempting to both reduce market failures and the shortcomings of self-regulation. Governments should impose rules to mitigate agency problems within exchanges; and self-regulation can help prevent governments from advocating counterproductive government rules (Lazzarini and Mello 2001).

4. Comparison of Over-The-Counter Trading and Exchange Trading

Market participants expressed a net preference for over the counter trading as opposed to trading on an organized exchange. Is this tenable?

An over-the-counter (OTC) contract is a bilateral transaction between a client and a financial institution, negotiated privately between the parties, whereas, an exchange-traded contract is a transaction where a specific instrument is bought or sold on a regulated exchange³. OTC contracts are tailored to meet individual needs of the parties involved and may be based on commodities, instruments and/or maturities/delivery dates that are not available on an exchange. OTC derivatives markets, including those in the CARICOM sub region, possess the following features (International Monetary Fund 2000):

- decentralised management of counter-party (credit) risk by individual institutions;
- no formal centralised limits on individual positions, leverage, or margining;
- no formal rules for risk and burden sharing;
- no formal rules or mechanisms for ensuring market stability and integrity and for safeguarding the collective interests of market participants.

³ See Table 2 below for a summary of the key features of exchange-traded and OTC derivatives.

Exchange-traded contracts are engaged within a centrally regulated market in which a large number of buyers and sellers come together to transact in a competitive, transparent and open environment. Derivatives exchanges make more information publicly available, credit systems and capital markets are more responsive, with uniform repayment regulations and market surveillance, transaction costs are lower, forward prices are more accurate and resources are better allocated (Chang, Kaplan, and Knapp 1999, Peck 1985).

Derivatives exchanges can help make markets more liquid. Risk-averse participants (banks, farmers, processors, and traders) can offset risk or transfer it to other participants willing to accept the risk-return ratio, whereby, attracting more participants to enter the derivatives market. In turn, the volume of trades is increased creating a more liquid market.

Derivatives exchanges facilitate the efficient determination of prices in the underlying cash (or spot) market by providing improved and transparent information on both current and future prices for an asset. Price-discovery produced by the derivatives exchange gives market participants better knowledge when making decisions about future production, processing, and trade.

Derivatives exchanges write the specifications for contracts and set standards for grading, measurement, methods of transfer, times of delivery, and contractual obligations. This standardisation makes the execution of trades easier and stimulates higher trading volume than does the spot market. Exchange-traded contracts are standardised with regard to quantity or 'lot' size, quality/grade, and delivery/settlement months (International Monetary Fund 2000).

OTC derivatives instruments are lightly and indirectly regulated since the justifications for regulating exchange-traded contracts are irrelevant for OTC contracts, which are principal-to-principal agreements between supposedly sophisticated counter-parties. Investor protection in OTC contracts is not considered as important since counter-parties deal mostly with highly rated and well-capitalised intermediaries in order to minimise counter-party risk. Additionally, there is minimal risk of manipulation in OTC derivatives markets, since contracts do not

serve a price-discovery role, as do exchange-traded derivatives. Even though OTC contracts are essentially unregulated, they are affected indirectly by national legal systems, regulations, banking supervision, and market surveillance.

OTC derivatives markets, unlike exchanges, do not have a formal structure. Instead, OTC markets consist of an informal network of bilateral relationships with no physical central trading place. There is no central mechanism to limit individual or aggregate risk taking, leverage, and credit extension, and risk management is completely decentralised (International Monetary Fund 2000). Official surveillance of OTC derivatives markets is limited. The supervision of financial institutions and market surveillance helps to promote the smooth functioning of OTC derivatives markets, by seeking to ensure the overall soundness of the institutions that comprise these markets.

Table 2 below provides a summary of the key features of exchange-traded and OTC derivatives

Table 2
Key Features of Exchange-Traded and OTC Derivatives

	Exchange-Traded	OTC
Trading practices	Central market place. Trading under defined rules and regulation. Access is only via exchange members.	Direct contracts between counterparties, often via brokers .
Transparency	Exchange provides continually updated information about prices and volumes of contracts traded.	Very little publicly available information about the prices of recently agreed contracts. Indicative prices are often posted on brokers' screens.
Credit risk	Minimal credit risk since the exchange clearinghouse acts as the counterparty to all trades. Most exchanges insist on initial margin deposits and daily marking to market. Netting different positions is easy.	Counterparty credit risk is an important consideration. Margins, regular revaluation and posting of collateral can be agreed, but are not obligatory. Similarly, there is no netting of positions with different counterparties, but netting of positions with the same counterparty can be agreed.
Contract types	Standardisation of contracts and expiry dates. There are a small number of contract types, and individual contracts are of small and fixed size. Maturities, and times to expiry of options, are shorter on average than OTC markets.	Products are flexible and can be tailored to users' specifications. There is a proliferation of contract types, but there is also "plain vanilla" contracts, which are more standardised.
Liquidity	Liquidity created by standardisation of contracts, a wide range of market	OTC contracts are more often held to maturity than exchange-traded contracts.

	participants, and a concentration of contracts at short maturities.	
Market participants	Wide range of market participants.	Almost exclusively a wholesale market.

Source: Reproduced from [Bank of England Quarterly Bulletin](#) (2001). (Summer), p.174.

5. Requirements of a properly functioning derivatives exchange⁴

Economic and non-economic reasons (including such emotional intangibles as national pride) motivate the establishment of derivatives exchanges in preference to OTC trading arrangements (Tsetsekos and Varangis 2000). This is despite the noted preference for OTC trading in Jamaica and Trinidad & Tobago. For an exchange to be truly effective, however, certain preconditions must be met. These include well-functioning cash markets, a large number of traders and speculators, a legal structure that includes a system of property rights and enforceable contracts, well-functioning credit institutions, the support of the government and policymakers, adequate financial resources (particularly for the clearinghouse), and the absence of competing derivatives products and exchanges (Leuthold 1992). Many of these pre-requisites are simply not met in the case of Jamaica and Trinidad & Tobago, largely because of the smallness of the markets.

Regulatory operations in emerging markets need to be improved to ensure prompt financial disclosure, which is essential for investors to make informed decisions. This involves the use of internationally recognised accounting standards (commonly called Generally Accepted Accounting Principles, GAAP) and credit rating agencies⁵. All material information should be available to investors at the time of offering, and investors should be well informed of any material changes in a company's status. As capital markets in emerging markets develop there should be minimum standards and registration systems for market professionals, securities issuers and investment companies (Inter American Development Bank 1995).

Before the establishment of a derivatives exchange, local currency debt and equity markets should be promoted in order to encourage growth of the local organised stock exchange (Inter American Development Bank 1995). Such exchanges in

⁴ Much of what is discussed here in reference to exchange-traded derivatives applies also to OTC trading, but is of considerably greater significance for the former.

⁵ The very first Caribbean rating agency (CariCRIS) was launched in late 2004. Its effectiveness is yet to be established.

emerging economies generally lack adequate trading systems, clearance and settlement mechanisms and depositories. Therefore, in order to develop capital markets in emerging economies, these need to be addressed.

The design of the formal structures and systems created to ensure the efficient trading of exchange transactions is important. The microstructure of the derivatives exchange⁶ may become a form of competitive advantage to the degree that it motivates, facilitates, or enables price discovery and eliminates asymmetric information (Tsetsekos and Varangis 2000). The microstructure is important for several reasons. First, it ensures the smooth execution of transactions. Second, it allows for the creation and dissemination of market information - trading activity and price determination are sensitive to institutional arrangements.

Derivatives exchanges can own their own clearinghouse, or other exchanges or financial institutions, such as banks, can own it. Derivatives exchanges also need to be able to self-regulate by monitoring trading activities, ensuring contract execution, resolving disputes, enforcing rules and sanctions, and promoting professional conduct in order to increase investors' confidence (Van der Bijl 1997).

The success of a derivatives exchange depends, in part, on the choice of products to be traded. The main types of commodities traded include interest rates, currencies, individual stocks, and stock indices. The more common derivatives used for these products are options and futures, which are almost non-existent in the Caribbean. These products need to have the following characteristics to be traded: a sufficiently high level of price volatility to attract hedgers or speculators; a significant amount of money at risk; a significant number of domestic market participants; a large number of producers, processors, and banks interested in using derivatives contracts; and a weak correlation between the price of the underlying asset and the price of the already-traded derivatives contract(s) in other exchanges (Tsetsekos and Varangis 2000). Volatility is not a major feature of the markets under consideration here.

5. Special Types of Derivatives and CARICOM investors

⁶ The microstructure of a derivatives exchange includes trading mechanisms, clearing arrangements, the regulatory structure, and the choice of derivatives to be traded.

Market players who responded to our questionnaires were lukewarm about the special derivatives, like weather and catastrophe derivatives, although the Caribbean is disaster prone because of the size of the countries and their geographical location. The recent devastation of Grenada, for instance, and the threat hurricane Ivan posed to the other islands, is an indication that the islands are vulnerable to the weather.

Weather derivatives

Weather risk has adversely affected economies of different backgrounds. An estimate by meteorological research institutions shows that more than 80 percent of the business activity in the world is weather dependant.⁷ Although these business activities are different, their one similarity is that their company is highly dependant upon prevailing weather conditions⁸. Weather conditions affect a company's productivity, sales and ultimately profits. Companies have increasingly sought to hedge these risks. A weather hedge enables weather sensitive sectors to achieve weather-dependant result stabilization.⁹ The Caribbean is one of the most weather sensitive geographical locations in the world.

Weather derivatives are different from conventional derivatives in that there is no underlying asset or price of an underlying asset. Some initial thought has been given to using precipitation, sunshine and snowfall as the underlying but most weather hedges to date have used temperature¹⁰. One cannot put a price on the weather so the purpose of weather derivatives cannot be to hedge the price of the underlying. "A weather derivative is not based on underlying physical prices, but on physical data-usually temperature levels- that affect volume."¹¹ For many buyers and sellers, volume variance can be as detrimental as price variation¹². Weather sensitive sectors are liable to great volatility, even if prices remain unchanged, due to change in

⁷ Lloyd's List Insurance Day, "Hedging Your bets to Beat Weather"

⁸Muller and Grandi 2000, "Weather Derivatives: A Risk Management Tool for Weather -sensitive Industries", Geneva papers on Risk and Insurance, Vol. 25, No. 2, pp 273-287.

⁹ "Andrea Muller "Integrated Risk Management-A Holistic Risk Management Approach for the Insurance Industry"

¹⁰ Ibid and L. Clemmons, "Weather hedges Shield Companies from Inclement Sales" in Weather Risk

¹¹ "A cure for Power Price Spikes" in Weather Risk

¹² "What is Weather Risk Management?"- WRMA

demand or volume¹³. Weather derivatives hedge volume/demand changes and not price. The pricing of these derivatives is not standardized. It is worth noting that no pricing models have been published thus far.¹⁴

Weather derivatives include swaps, caps, floors and collars. Weather swaps are privately negotiated financial contracts, which protect against weather uncertainties over a period of time. They are over the counter instruments and can be tailored to both parties' specific needs and objectives. Weather floors allow parties to enter a long or short position. They offer protection at a predetermined level and they allow the buyer to benefit from favourable weather conditions. The buyer pays a cash premium upfront for his protection, all risks are predefined and the premium paid will always be the maximum loss or cost to the buyer. Weather collars offer protection on adverse weather conditions while the buyer gives up some potential benefit from favourable conditions by selling a cap. If the weather index moves within the specified range of weather outcomes, the buyer neither receives nor pays to the counter party. If the index falls below the collar's lower limit the buyer will be reimbursed for the difference. If the index goes above the collar's upper limit the buyer must pay the difference. Benefits of hedging weather are to manage weather-driven earnings volatility, increase earnings stability- improve competitive position, enhance credit profile, lower overall cost of capital and avoid weather-induced revenue shortfalls. Capital investment returns are assured and budget targets are achieved.

Catastrophe derivatives

In addition to weather related disasters, the Caribbean is prone to other catastrophes like volcanoes, tidal waves, insect infestation, diseases and the like. Recent natural disasters in North America (Hurricane Katrina) and the world over caused mass destruction and incurred billions of dollars in damages. Such events make the people of the Caribbean realize just how susceptible the islands are to these and even worse disasters. Significant losses from these natural disasters are a major concern to the insurance industry whose financial capacity has been diminished by losses mainly

¹³ Muller A. and Grandi M. - "Weather Derivatives- A Risk Management Tool for Weather Sensitive Industries"

¹⁴ "Black-Scholes won't do" in Weather Risk

because these risks are not widely diversifiable in an insurance context. An alternative to this is the introduction of catastrophe derivatives with payoffs that depend on indices that measure insured losses from catastrophes in specific geographical regions. An independent statistical agent determines a loss ratio. The listed perils include hurricanes, tornadoes, storms, floods, wind, water, volcanic eruptions, explosions and civil disorders. Catastrophe or CAT derivatives are derivatives insurers use in the event that payoffs from disasters are huge and cannot be recovered by reinsurance.¹⁵

Several instruments have been used that may be of interest to the Caribbean investor. Catastrophe or Act of God Bonds are bonds that require bondholders to forgive some or all payments of interest or principal if catastrophe losses are greater than the trigger amount. The payoff in the event of a disaster would be the payments, which would have gone to bondholders. Contingent surplus notes are notes that an insurer has purchased the right to issue in the future at present terms in exchange for cash. These are contingent upon specific events taking place.

Catastrophe options are standardized contracts, which give the buyer the right to a cash payment if a specified index of losses for a specific period reaches the price. Insurers who want this form of securitization can purchase CAT options from investors. Catastrophe equity puts are put options that enable stock insurers to sell shares of their stock to investors at pre-negotiated prices when losses exceed the levels specified by the option. This has the advantage of reducing the price of reinsurance; reducing the problem of moral hazard, contracting costs, counter party risk on the insurer's side. They are easier to negotiate than reinsurance, they relieve the insurer of credit risk and they offer attractive investment opportunities. Additional benefits of hedging using index-based derivatives are that it could reduce tax costs, and other costs related to managing underwriting risks. It however has the shortcoming that it has considerable basis risks¹⁶, that is, the losses in the insurer's

¹⁵ The insurance industry faces the problem of risk transfer, one way to counteract this is by insurance securitization i.e. transfer of insurance risks to the financial market and trading them as standardized securities.

¹⁶ Basis risk occurs because the indices reflect an aggregate amount of national or regional losses. They are not necessarily strongly correlated with losses recorded by individual insurers on their portfolio of cat risks.

books may not be highly correlated to the indices underlying the contacts so that little underwriting risk can be eliminated.¹⁷

Commodity derivatives

The economy of the Caribbean region is based on commodity trade in such items like bananas, sugar, spices, aluminium and petroleum. In recent times commodity prices have been subjected to great volatility and producers face individual price and income risk. Countries, which rely heavily on commodity export face, export earnings risk, which, in turn, may affect growth. The development of commodity derivatives is one way to spread these risks. Prices in the commodity market have decreased significantly over time and there is little hope of increasing sales to counterbalance this. There is the additional problem of not being able to remain competitive to the price of imports and the increasing costs of production.

Prices are not the only problem faced by these producers; there is the problem of erratic weather and changes in technology (which may be unaffordable to some) and new discoveries. Although these problems affect both developed and developing countries, it is more serious for developing countries like those of the Caribbean. This is especially so since most of these countries produce only a small part of the world's output and are therefore dependant on the decisions of the larger producers.

Trinidad and Tobago, Jamaica, Suriname, Guyana, St Kitts and Nevis and St Vincent are all dependant on a commodity for 20-49% of their export earnings. These commodities are crude natural petroleum, Bauxite and alumina, gold, sugar and banana respectively. St Lucia is 10-19% dependant on banana for export earnings.¹⁸

Uncertainty of prices and the failure of international agreements have led to an interest in commodity derivatives, which are intended to transfer risk between traders and producers. The derivative contracts are usually indexed on a commodity price. These instruments offer price stability for agricultural products. Protection may be for a few months but metals and energy commodities protection may be extended to a few years. For example, an oil company may be able to use a swap to

¹⁷Harrington, Mann, Neihus, "Basis Risk with Catastrophe Insurance derivative Contracts".

¹⁸Page Sheila, Hewitt Adrian, "World Commodity Prices: still a problem for developing countries?" pp 11-12.

lock in prices for a period of three years. A farmer may be guaranteed a minimum price for his bananas. An exporter and a buyer may agree upon a fixed price for a certain volume of spices, and credit is then extended to the exporter-which is decreased as exports are made. The buyer can in turn hedge price risk on the option market or sell the commodity for future delivery.

Commodity derivatives are designed to reduce uncertainty in revenues, not to eliminate falls or sudden spikes. They can be used with traditional financial tools to enhance financing¹⁹. Commodity derivatives can help eliminate credit risk, which is a problem for developing countries. Evidence shows that credit risk poses a serious problem for long-dated instruments than shorter dated ones. Economic conditions needed for commodity derivatives are for the commodity and futures prices to be closely correlated and the standardization of commodity size, grade, quality, place of delivery, month of maturity so that contracts can be homogenous. Furthermore, there should be a system of grading that allows for the inclusion of a wide variety of commodities to be included in the contract. Hughes-Hallet and Ramanujam (1990) point out that commodity derivatives hedge only price risk, leaving quantity risk uncovered. Revenue risk is hedged using buffer stocks.

Commodity derivative instruments include commodity swaps, which are agreements to pay at fixed intervals, a fixed amount of cash in exchange for a variable amount of cash. The variable amount of cash is determined by the market price for a set quantity of a commodity. These are typically used to lock in the price of a commodity in the medium and long term. Commodity linked loans are described as a typical fixed rate loan and a swap contract where the interest or repayment are linked to the market price of a commodity. Finally there are commodity linked bonds, the forward type in which coupons or principal is linked to the market price of a commodity and the option type in which the is the right to buy or sell a certain commodity at a preset price.

Table 3 provides an overview of financial instruments used to manage commodity risk:

¹⁹ Page Sheila, Hewitt Adrian, "World Commodity Prices: Still a problem for developing countries?"

Table 3

An Overview of Financial Instruments to Manage Commodity Risk

Instrument	Description	Advantages and Disadvantages
Commodity Swap	<p>A swap contract on a certain commodity.</p> <p>An agreement to pay at fixed intervals, a fixed amount of cash in exchange for a variable amount of cash and vice versa.</p> <p>The variable amount of cash is determined by the market price for a set quantity of a commodity.</p> <p>A typical use is for locking in a price of a commodity for the medium and long term.</p>	<p>No deliveries of physical commodities are involved.</p> <p>Transactions are purely financial.</p> <p>The market not very active.</p>
Commodity linked loan	<p>A loan where the interest or repayment amount or both are linked to the market price of a certain commodity.</p> <p>Can be viewed as a combination of a conventional fixed loan and a commodity swap.</p>	<p>A loan can be regarded as effectively denominated in a commodity.</p> <p>If used by a commodity producer, the credit risk of the loan is lower than conventional loan. A producer can repay the loan even if the price of the commodity falls significantly.</p>
Commodity linked bond	<p>(Forward type) A bond in which coupons or principal or both are linked to the market price of a commodity.</p> <p>(Option type) A bond to which the right to buy or sell a certain commodity at a preset price.</p>	<p>(Forward type) Advantages similar to commodity linked loan.</p> <p>(Option type) Useful for commodity producers to reduce the cost of financing.</p>

Source: Toshiya Masuoka, Asset and Liability Management: Modern Financial Techniques in: Managing Commodity Price Risk in Developing Countries. C. Duncan, The World Bank, (1993), Pp. 99-101.

Energy Derivatives

Energy derivatives the underlying assets like natural gas, crude oil etc operates similarly to commodity derivatives. In fact, sometimes they are referred to as commodity derivatives and not energy derivatives. Commodity price risk plays a dominant role in energy firms, and derivatives have become common in helping these firms and investors manage the risks from this high volatility. For more than twenty years, businesses in the natural gas and petroleum industry have used derivatives to reduce exposure to volatile prices, limit need for cash cushions and finance investment. These contracts have grown tremendously. For example, energy contracts have grown from approximately 17,000 contracts per month in 1982 to 7 million per month in 2000.²⁰

Managers in these industries use derivatives to achieve certainty about the prices they pay or receive. Another risk faced by these industries is basis risk, i.e. when one or both parties face a spot market price that is different from the price in the reference market. Haushalter, Geczy et al. found that users of commodity derivatives had less price sensitivities than non-users.

Table 4 shows the possible petroleum and natural gas risk and the risk management strategies, which can be used to overcome them.

Table 4
Petroleum and Natural Gas Price Risks and Risk Management Strategies

Participants Employed	Price Risks	Derivative Instruments
Oil Producers	Low crude oil price	Sell crude oil future, buy put option
Petroleum Refiners	High crude oil price	Buy crude oil future or call option
	Low product price	Sell product future or swap contract
	Thin profit margin	Buy crude oil future and simultaneously sell product future (buy a crack spread)
Storage operators	High purchase price or low sale price	Buy or sell futures
Local Distribution Companies	Unstable prices	Buy future or call option, buy
	Wholesale prices higher	basis contract

²⁰ Energy Information Administration, “Derivatives and Risk Management in Energy Industries”.

(Natural Gas)	than retail	
Power Plants (Natural Gas)	Thin profit margin	Buy natural gas future and sell electricity future
Airlines and Shippers	High fuel price	Buy swap contract

Reproduced from “Derivatives and Risk Management in Petroleum, Natural Gas, and Electricity”,
Energy Information Administration 2002

6. Conclusions and Recommendations

The objective of this study was to assess the feasibility of conducting derivatives trading in the CARICOM sub region. We have come to the realization that derivatives trading done in this region are in a primitive stage. It is done with the conventional derivatives and it is done over the counter, with the occasional specialized contract. After observation of the market and speaking to key people it is safe to conclude that at present the market should stay as is at least in the very near future.

It seems that investors and top executives are not ready or adequately prepared to allow the development and expansion of derivatives trading. Whatever the reason, whether fear of failure, uncertainty of the direction in which to proceed or non-preparedness to make the first step is unknown. For these fears to be reduced or eliminated it would require time, capital investment and extensive training. The establishment of a Caribbean exchange could help eliminate these fears and spread risks associated with such a venture. This has the additional setback that very few Caribbean-wide agreements to date have been successful. However there is hope with the introduction of the CSME for the development of a Caribbean exchange, although there are also great costs associated with this.

Limited understanding of derivatives trading on the part of dealers and directors of institutions can become a hindrance to the development of the market. Furthermore, for a local derivatives exchange to operate efficiently it is imperative for employees to have sufficient education and training in the use of derivatives. At present, none of the institutions interviewed have employees with professional expertise in derivatives.

The following recommendations are proposed to ensure the continued growth and enhanced efficiency of OTC derivatives trading in Trinidad and Tobago.

Recommendation 1: Enhance education and knowledge among all market participants

Education and confidence enhancing strategies, in a context of active competition, are some of the most efficient self-regulating mechanisms of derivatives markets (Gibson and Zimmermann 1996). There should be promotion of attaining ‘professional expertise’ in derivatives by the Central Banks of the region, by financial institutions already trading in derivatives as well as by those financial institutions interested in using derivatives products, and by end users. The pricing of derivatives products and management risk models require managers to have sufficient educational training in finance and quantitative methods used for asset pricing. Thus, it is essential professionals attend specialized courses in financial management and derivatives.

Recommendation 2: Reinforce information standardization and disclosure at all levels of the derivatives industry.

Credit and liquidity risks are affected by perceived uncertainties arising from accounting and information disclosure procedures (Gibson and Zimmermann 1996). This prevents market participants from effectively measuring credit or liquidity shocks that can impact the entire financial system (*systemic risk*). Therefore, the publication of complete information on derivative products’ specification, trading activity and harmonizing accounting standards should be enforced.

Recommendation 3: Ensure performance measurement and financial compensation schemes of employees are incentive-compatible.

Efficient self-regulation of derivatives markets can be achieved in part by designing appropriate incentives for derivatives dealers and managers (Gibson and Zimmermann 1996). Performance assessment should be compatible with the long-run objectives of the firm. In order to reduce *agency risk*, the design of incentive-compatible compensation schemes, monitoring (reporting) structures and risk control systems need to be appropriately implemented. Remuneration packages should be delinked from the revenues generated from trading activities (Bhaumik 1998) in order to prevent dealers and managers from assuming unnecessary risk.

Recommendation 4: Introduce government regulating mechanisms (only if self-regulating mechanisms fail).

Before external regulation is introduced the following factors need to be considered (Gibson and Zimmermann 1996). First, there should be a full cost-benefit assessment of the explicit and implicit costs and benefits to be derived before the introduction of external regulation. Second, there should be *harmonization* in the legal treatment of identical functions performed by different products and/or institutions, and the rules governing market segments. Third, regulation needs to be dynamic in order to adapt to changes in market structures and financial product innovation.

Recommendation 5: The Central Bank of Trinidad and Tobago should have a more active role in the domestic derivatives market

The Central Bank can become more active in the local derivatives market by assessing and informing market participants about the impact of derivatives trading on underlying economic factors and their effects on monetary and exchange rate policies (Gibson and Zimmermann 1996).

Recommendation 6: Pursue credit risk reduction mechanisms (such as netting and settlement agreements).

Credit risk can be mitigated using bilateral or multilateral netting of contractual payments due on settlement dates, and of unrealized losses against unrealized gains if counter-party default arises (Gibson and Zimmermann 1996). Netting reduces counter-party risk as well as credit exposures, thereby, reducing the likelihood of systemic risk materializing (Group of Thirty 1993).

Recommendation 7: Introduce derivatives products that can be used to manage risks in the petroleum and natural gas industries, and other commodity-based industries.

Trinidad and Tobago is heavily dependent on natural resources such as petroleum and natural gas for export revenue, and risk managers in these industries can use derivatives to achieve certainty about the prices they pay and receive (Energy Information Administration 2002). Increasing pipeline capacity, increasing storage capacity, and making other physical and economic changes to the delivery system itself can reduce volatile price movements in these industries. But, derivatives can provide a less costly approach to manage price risk.

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