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Financial Innovations Involving the Greek Drachma

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Abstract

During the last decade, a number of new financial instruments and derivative products related to the Greek drachma have emerged in local as well as international capital markets. The paper analyzes the characteristics of these financial instruments which are traded in organized exchanges and over-the-counter (OTC) markets, and evaluates the conditions under which they have evolved. Drawing from legislative and industry developments in the European Union (EU) and the United States, the paper also examines the effects and implications of such developments for local markets and for the conduct of monetary and foreign exchange policies and argues for the need for sound macroeconomic policies.

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GLOSSARY

BCD - (Second) Banking Coordination Directive
BELFOX - Belgian Futures and Options Market
BIS - Bank of International Settlements
CAD - Capital Adequacy Directive
CFTC - Commodity Futures Trading Commission
CME - Chicago Mercantile Exchange
DTB - Deutsche Terminboerse
EBRD - European Bank for Reconstruction and Development
EC - European Community
ECSC - Eurocurrency Standing Committee
EEC - European Economic Community
EFTE - Special Tax on Bank Transactions
ETBA - Hellenic Bank for Industrial Development
EU - European Union
FASB - Financial Accounting Standards Board
FDIC - Federal Deposit Insurance Corporation
FRA - Forward Rate Agreement
FRN - Floating Rate Note
IAS - International Accounting Standards
IASC - International Accounting Standards Committee
IOSCO - International Organization of Securities Commissions
ISD - Investment Services Directive
ISMA - International Securities Markets Association
KLOFFE - Kuala Lumpur Options and Financial Futures Exchange
KOPSI - Korean Stock Price Index
LED- Large Exposures Directive
LIFFE - London International Financial Futures Exchange
MEFFSA - Madrid Financial Futures Exchange
MIF - Italy's futures market
MOFEX - Madrid Financial Options Exchange
MTO - Market Telematico delle Opzioni
NPC - notional principal contracts
OECD - Organization for Economic Cooperation and Development
OTC - over the counter
OTOB - Austrian Futures and Options Exchange
RTGS - Real-Time Gross Settlement
SEC - Securities and Exchange Commission
SIM - Securities Intermediary Companies
SRD - Solvency Ratio Directive
UCITS - Undertakings of Collective Investments in Transferable Securities

SUMMARY

In an environment of rapid globalization and financial innovation, capital market liberalization was introduced in Greece in the early 1990s and financial innovations started to take place in the country's financial sector during the last few years. In the internationalization of the local market, the volume of equity issuance increased rapidly as local equity issues offered the prospect of higher returns and investors were willing to tolerate varying degrees of risk. At the same time, the growing need for a risk transfer mechanism spurred the development of equity- and currency-hedging instruments. The domestic mutual fund industry also rapidly took off, and with the subsequent disintermediation, domestic financial institutions started offering over-the-counter foreign exchange options and participated in new product design, copying mostly the innovation pattern of the more advanced European and U.S. capital markets. Participation in coupon stripping schemes and government paper restructuring by local banks, foreign exchange swaps, and tax arbitrage have already become products available to even medium-size investors.

This paper evaluates the conditions under which the new drachma-related financial products and processes have evolved in the local over-the-counter market and the organized exchanges in Europe. It attempts further to assess the effects of the first Greek drachma derivative products for local markets and for the conduct of monetary and foreign exchange policies. Increased volatility, deregulation, and international competition have forced financial institutions to engage in financial engineering to satisfy the investment needs of their clients. As financial institutions and investors face the continuous challenge of properly balancing risks, the use of new financial instruments has been proven rewarding for market participants but increasingly complicating for financial management. Furthermore, as deregulation continues and financial ingenuity flourishes, certain government policies can be circumvented, especially tax enactments, and expectations regarding the beneficial effects of policies may be frustrated.

I. INTRODUCTION

The tremendous growth of financial transactions in the United States in the early 1980s led to a wave of innovations in financial products and processes which quickly spread outside its borders.² Before that time, only a few traditional hedging products—such as forward contracts—were used and very few futures and options exchanges operated outside the United States. The subsequent extraordinary growth in European financial transactions, including the issuance and trading of Euromarket securities, was accompanied by the deregulation of financial markets in the United Kingdom and several other European countries.

In this environment of rapid financial innovation, Greece had maintained a rigid set of capital and foreign exchange restrictions which had effectively sealed off local capital markets from international investors. Capital market liberalization did not take place in Greece until the early 1990s, and financial innovations started to play an important role in the financial sector of the country only during the last few years. Owing to the prevailing capital and foreign exchange restrictions, Greece initially participated in the international derivative markets only indirectly and through the established exchanges in Europe and the United States. More recently, and under the deregulation of member states' capital markets prescheduled by the European Economic Community (EEC), local markets have witnessed the creation of a wide range of new financial instruments and processes. In early 1996, Greece's Capital Markets Committee, which is the competent authority for the Greek capital markets, approved the legislative framework for the establishment of an organized exchange for derivative products in Athens.

In the process of internationalization of the local market, the volume of equity issuance increased rapidly as local equity issues offered the prospect of higher returns and investors were willing to tolerate varying degrees of risk. At the same time, trading activity increased, intermediation became more effective, while the growing need for a risk transfer mechanism spurred the development of equity- and currency-hedging instruments. The domestic mutual fund industry also rapidly took off and with the subsequent disintermediation, domestic financial institutions started offering OTC foreign exchange options and participated in new product design, copying mostly the innovation pattern of the more advanced European and U.S. capital markets. Participation in coupon stripping schemes and government paper restructuring by local banks, foreign exchange swaps, and tax arbitrage have already become products available to even medium-size investors. These innovations, along with plans by the National Bank of Greece—the country's biggest commercial banks—to have 24-hour dealing rooms around the world, are also expected to enhance the internationalization of the Greek drachma.

² With the term "financial innovations" we will refer to the changes in the form of financial products, services, and processes offered by financial institutions.

With the exception of a few cases of Greek drachma-related derivative contracts, the local OTC market has mainly focused on the cross-currency portion of derivatives. In other words, domestic financial institutions participate in cross-currency swap contracts or trade in futures and options abroad, but few of them involve the drachma. However, in the absence of local organized markets for derivative instruments, drachma-related derivatives have appeared in organized markets in Frankfurt, Luxembourg, and London. These developments provide the impetus for our current research.

The objective of this paper is to evaluate the conditions under which the new drachma-related financial products and processes have evolved in the local OTC market and the organized exchanges in Europe. Because of their ability to affect the efficiency (many derivative products have no direct link with production or with the savings and investment process), stability (by offsetting or magnifying risks) and equity (investor protection against risk) of the financial system, the newly introduced financial instruments and processes in the local market have become the focus of attention of local and international investors, intermediaries and regulators. The paper attempts to trace the beginnings and evaluate the effects of the first Greek drachma derivative products that have recently appeared in both organized exchanges in Europe and OTC markets.

The paper is organized as follows: Section II describes recent financial innovations involving the Greek drachma, including OTC activity, Euro-drachma, fixed income securities, and organized-exchange derivative instruments. Section III outlines the incentives for financial innovation in Greece, including domestic economic conditions and legislative provisions, as well as international financial and institutional developments. Section IV presents some of the implications for local markets and prospects for the evolution of financial instruments involving the drachma. Section V concludes by stressing the benefits from the internationalization of domestic capital markets.

II. RECENT FINANCIAL INNOVATIONS INVOLVING THE GREEK DRACHMA

A. The First New Products and Processes

In the presence of foreign exchange and capital restrictions and the absence of a local specialized exchange, the financial innovation process in Greece was rather insignificant in the 1980s. The first signs of drachma-related financial derivatives activity appeared with the 1993 liberalization, when Egnatia Bank and the Athens branch of Midland Bank provided foreign exchange options involving the local currency. Their move was publicized in the local financial press and, today, information on premia for drachma against the U.S. dollar, the deutsche mark, and the ECU is quoted daily.

Despite the fact that liberalization of capital movements and derivative transactions took place only during the last few years, a variety of domestic legal entities had been involved in hedging activity and derivative-related transactions since the mid-1980s, with the approval of domestic authorities. When certain local industrial companies which were using copper, lead, and aluminum as key inputs in their production processes realized that price movements in these commodities exposed them to serious market risks when bidding for projects requiring a price commitment of two to three months, a demand for risk hedging was created. Given the high inflation rate in Greece during that period, such hedging needs were acute and a partial solution was provided by the purchase of commodity futures and options contracts. A representative sample of special permissions provided by the Bank of Greece to companies which were involved in hedging activity is presented below:

- In 1986, the Bank of Greece permitted the Hellenic Cable Company of Messolongi to buy foreign exchange against Greek drachmas, in order to engage in futures contracts in lead, copper, and aluminum with the London Mercantile Exchange (Monetary Policy Committee decision No. 297/6). A similar decision was taken for the Voiotia Cable Company by decision 303/6.
- In 1987, with Monetary Policy Committee decision No. 377/4, the Bank of Greece generalized the special permissions for all industrial companies to engage in hedging operations in foreign metal and commodity organized exchanges and specifically in futures and options contracts.
- In 1988 (Monetary Policy Committee decision No. 387/7), commercial banks were permitted to issue letters of guarantee for industrial companies engaging in hedging activity in metals, commodities, and precious metals with organized exchanges.
- In 1992, with Monetary Policy Committee decision No. 503/5, permission was extended by the Bank of Greece to commercial companies to engage in hedging activities up to 50 percent of the earlier year sales.

As these regulatory actions indicate, the liberalization of 1993-94 in the area of derivatives was not sudden but followed a rather gradual evolution, albeit controlled by local authorities. The foreign exchange controls of the 1980s decelerated the financial innovation process but they did not completely prevent local business entities from engaging in derivative transactions.

B. OTC Activity

In addition to the traditional foreign exchange forward contracts which were used by domestic entities even before the 1990s, OTC activity in the early part of the decade had primarily focused on foreign exchange swaps, and secondarily on Forward Rate Agreements (FRAs) and the issuance of the Greek drachma-linked foreign currency options. Following the

taxation of repurchase and reverse repurchase agreements and mutual funds in 1994, the local institutions discovered, albeit with some delay, the development of off-balance sheet items which allowed higher returns due to the presence of high positive interest rate differentials between the domestic and foreign currencies and an inherent preferential tax treatment for foreign exchange transactions. By 1995, Alpha Credit Bank, the leading institution in the area of derivatives reported off-balance sheet levels exceeding that of its total assets.

Coupon stripping of government paper and FRAs are a more recent innovation in the local markets. Commercial banks were engaged since 1994, in purchasing the underlying bonds from local mutual funds and other institutional investors and then selling the pooled series of coupons to clients according to their maturity preferences. In addition to satisfying a market demand for specialized products, the motive here was the combination of the tax free status of the instrument and the reluctance of the government to be involved in the issuance of securities with similar interest and maturity characteristics. Moreover, accounting and valuation inconsistencies made stripping popular among commercial banks since they allowed the reporting of additional profits, without having to appropriately reduce the value of the underlying bond. Following the first government auction of treasury paper for distribution in the primary market in July 1995, Xios Bank started offering three-year fixed-income products under the name "Xios 36." While the bank was undertaking significant interest rate risk by offering such products, the move satisfied the demand in the market for medium-term fixed-income products. The reluctance of the government to issue fixed-interest bonds guaranteed a market, especially since interest rates had started to stabilize.

FRAs are rather limited, while currency options in the OTC market are more frequent. On a continuous basis, currency swaps and the Greek drachma FRAs are offered by local institutions. Currency options for the drachma/U.S. dollar, drachma/deutsche mark, and drachma/ECU rate are published daily in the local financial press and are listed on Reuters and Telerate pages. Table 1 shows representative quotations of drachma-related swaps, FRAs, and OTC options.

Among all OTC products, however, the instrument that attracted heavy attention by domestic and foreign investors was the combination of foreign exchange transactions which became known in the local markets as a "synthetic swap." In this arrangement, drachma lenders were brought together with foreign currency borrowers in an intermediation process that resulted in mutual benefits due to the prevailing high interest rate differentials between the drachma and major currencies, especially the Japanese yen, and to the existing differential tax treatment of investment proceeds between domestic and foreign instruments. These products

Table 1. Foreign Exchange Swaps, FRAs, and Greek Drachma-Related Options

A1. One-year currency swap points (bid-ask points), July 31, 1995 1/					
	drachma per U.S. dollar	drachma per deutsche mark	drachma per French franc	drachma per pound sterling	drachma per ECU
National Bank of Greece	1873-2015	1590-1690			
Commercial Bank of Greece	1862-1998	1602-1702	350-379	2559-2772	2386-2566
Citibank-Athens	1800-1950	1540-1660			
Bayerischce-Athens	1927-2047	1607-1706			
A2. Bid-Ask spreads in the Swap market (In percent) 1/					
Maturity in months	1	2	3	6	
<u>Drachma per U.S. dollar</u>					
National Bank of Greece	0.06	0.16	0.31	0.58	
Commercial Bank of Greece	0.06	0.15	0.30	0.56	
Citibank-Athens	0.07	0.22	0.30	0.50	
Bayerischce-Athens	0.06	0.16	0.29	0.49	
<u>Drachma per deutsche mark</u>					
National Bank of Greece	0.04	0.16	0.29	0.56	
Commercial Bank of Greece	0.06	0.16	0.30	0.56	
Citibank-Athens	0.06	0.16	0.30	0.56	
Bayerischce-Athens	0.05	0.15	0.29	0.55	
B. FRAs 2/					
	3-month		6-month		
	FRAs	Bid-Ask rates	FRAs	Bid-Ask Rates	
	1x4	14.18-15.18	1x7	14.14-15.14	
	2x5	14.04-15.04	2x8	13.98-14.98	
	3x6	13.76-14.76	3x9	13.79-14.79	
	4x7	13.58-14.58	4x10	13.61-14.61	
	5x8	13.41-14.41	5x11	13.45-14.45	
	6x9	13.33-14.33	6x12	13.33-14.33	
	7x10	13.18-14.18			
	8x11	13.03-14.03			
	9x12	12.87-13.87			
C. Over-the-Counter Options					
	<u>Call Options</u>				
Strike price (Drachma per unit of foreign currency)	1-month	2-months	3-months		
U.S. dollar (spot rate 235.50)					
246	1.30	3.28	5.21		
250	0.65	2.17	3.84		
252	0.44	1.74	3.26		
Deutsche mark (spot rate 159.52)					
164	1.36	2.89	4.43		
166	0.81	2.12	3.44		
168	0.45	1.50	2.67		
	<u>Put Options</u>				
U.S. dollar (spot rate 235.50)					
236	3.24	4.13	4.66		
235	2.82	3.74	4.29		
234	2.44	3.37	3.93		
Deutsche mark (spot rate 159.52)					
160	1.76	2.16	2.37		
161	2.20	2.56	2.73		
162	2.71	3.00	3.13		

Note: For each currency and maturity, the spread shown is calculated as the difference between the bid and ask reported by each bank, with respect to the average of the bid and ask levels.

1/ Source: Reuters, Pages NGBA, CNGD, CATG, BVGR, and own calculations.

2/ Source: Reuters, Pages BVGS, August 23, 1995.

3/ Source: Alpha Credit Bank, August 17, 1995.

were perceived by local investors as an alternative to traditional drachma deposits and repos. The growth of transactions related to this product was significant in the 1994-95 period and caused considerable rechanneling of funds away from traditional deposits and repos.³ Disintermediation, declining bank reserves, and excess liquidity triggered action by the Bank of Greece, which in the middle of 1995 expanded the reserve requirement base to include foreign exchange deposits not taken into account previously. One year later, and under the persisting excess liquidity, the Bank of Greece took additional measures in the same direction.

The treatment of synthetic swaps, however, is still an unsettled issue owing to the fuzzy accounting rules present in most off-balance sheet items. Despite a higher surcharge tax rate on foreign currency lending (20 percent versus 15 percent imposed on the domestic interest rate), the considerable interest rate differential on foreign currency compared with drachma lending made that disadvantage insignificant. During mid 1995, typical 30-day rates were 15 percent and 1 percent on the drachma and the Japanese yen, respectively. This implied a surcharge of 2.25 percent and 0.2 percent for drachma and yen lending, respectively. Thus, the spot purchase of yen against drachmas and the simultaneous forward selling of foreign currency proceeds locks in, in the absence of foreign exchange risk, a yield which is significantly higher compared with the usual drachma deposits.

Following the rapid growth of synthetic swaps, the following disclosure issues are of relevance to the authorities:

- Whether the financial institution engaged in synthetic swaps really acts on a customer's account or for its own account.
- Whether the institution assumes the underlying foreign exchange risk in its effort to promote these transactions.
- Whether the innovation should be treated as a generic off-balance sheet item not subject to reserve requirements or be treated as a pure substitute of traditional drachma deposits, and thus be brought under an equivalent tax and reserve requirement treatment. A relevant issue is whether the drachma lending side of these transactions should carry the existing 4 percent bank surcharge (known with its acronyms as EFTE) as is the case for all drachma loans. One would expect that equal treatment by extension of EFTE to synthetic swaps or removal of it on all drachma loans should reduce the incentive for these transactions. To the extent that the gap between domestic and foreign rates remains high, and the local currency is not expected to devalue, these transactions will continue to thrive.

³ See, Ericsson and Sharma (1996) for the effect of synthetic swaps on the evolution of broad monetary aggregates.

C. Euro-drachma Fixed Income Securities

A characteristic of the local market is the absence of a substantial amount of fixed-income drachma bonds with maturities over one year. By the end of 1996, the Greek government had auctioned two fixed coupon issues with maturities of three years. Since 1994, however, certain supranational organizations started engaging in Euro-drachma bond issuance. A series of the Greek drachma-denominated fixed coupon Eurobonds were issued by the International Bank for Reconstruction and Development, European Bank for Reconstruction and Development (EBRD), European Investment Bank, and the International Finance Corporation, with maturities ranging from three to five years. These issues were called Marathon bonds (Table 2).

Supranationals have traditionally issued various eurocurrency bonds in international capital markets. In its classical form, the supranational entity is backed by share capital contributed principally by highly rated nations. The entity is then using this base to borrow on the best terms and passes the benefits to less creditworthy borrowers. Although it helps the internationalization of the respective currencies, the rationale behind such issuances is increasingly called into question especially in cases like Greece which has repeatedly used international capital markets on its own account and has successfully raised funds in the traditional currencies, such as the U.S. dollar, the deutsche mark, the ECU, the pound sterling, the Japanese yen, and even the Portuguese escudo.⁴ Following the supranational issues, however, commercial banks with AAA rating, such as Bayerische Bank, and even AA2 rated entities, such as Abbey National, tapped the Euro-drachma market by issuing similar bonds, thus establishing a new market known as the Marathon Bond market.

The supranational issues are listed on both the Athens Stock Exchange and the Luxembourg exchanges while Cedel and Euroclear are used for settlement of transactions, thus establishing transparency and a new basis for capital market information. The proceeds of the supranational issues were used for financing projects in Greece, after converting the drachmas into U.S. dollars or deutsche mark using swap agreements. The high coupons, limited issuance amounts and their scarcity in the international capital markets considerably raised the attractiveness of these Euro-drachma bonds.

Worldwide, in 1994, straight fixed-rate issues were affected by unsettled market conditions, which showed a trend reversal during the second quarter of that year (BIS, 1994). In Greece, following the May 1994 currency crisis and the sudden increase of interest rates, the issuance of Marathon bonds ceased for more than a year. In 1995, the International

⁴ In a five-year Floating Rate Note (FRN) issue on May 26, 1995, the Hellenic Republic raised Esc 17.5 billion. The issue is subject to U.K. law and is quoted in the Luxembourg organized exchange. The note was issued at 100.15 percent and its interest is indexed to six-month Lisbor plus 100 basis points.

Table 2. Marathon Bonds and Notes

Issuer	Book Runner	Amount (In billions of drachma)	Coupon (In percent)	Issue price (In percent)	Offer Price ISMA Closing January 9, 1997	Maturity (In years)	Maturity Date
Bonds							
EIB	ETBA	10	17.50	104.600	113.25	5	03/08/1999
EIB	ETBA	20	15.21	100.000	...	5	03/15/2000
IBRD	Midland Bank	15	15.50	100.875	...	3	04/14/1997
IFC	UBS	10	15.25	100.875	109.75	5	05/11/1999
EBRD	ETBA-Midland	10	15.25	101.150	105.50	4	05/19/1998
BV	Bayerische	10	15.50	100.625	101.13	3	05/19/1997
ABBEY	Banker's Trust	10	15.75	100.625	104.38	3	05/16/1997
Notes							
SBC-Australia		10	Zero Note	...	...	1	07/02/1997
IBRD		20	10.25	...	...	5	12/28/2001
SBC-Australia		11.9	Index Linked	...	...	6 months	05/15/1997
Merrill Lynch		5	14.5	100.000	...	1	07/22/1997
National Westminster Bank		6	0.5 1/	...	...	3	05/23/1997
IFC		100	FRN	100.400	...	2	08/25/1998
Lehman Brothers		4.8	0.5 1/	...	...	1	04/18/1997
IFC	National Mortgage Bank of Greece	40	FRN 2/	100.100	...	3	12/15/1998
IBRD		20	FRN	...	...	3	09/07/1998
EIB		75	FRN 3/	100.000	...	5	03/15/2000
EBRD		40	FRN	100.100	...	5	12/24/2001

Source: Reuters and local financial press.

1/ Index-linked issues with a coupon of 0.5 percent

2/ One-month Athibid -40 basis points.

3/ Three-month Athibid -40 basis points.

Finance Corporation issued an Athens Interbank Offered Rate (Athibor)-linked, three-year, Dr 100 billion FRN. Following this FRN issue, however, the interest of supranational and other financial institutions shifted to variable rate notes and away from fixed rate issues.

Despite the fact that there are no transactions of these bonds in the Athens Stock Exchange and the bid-ask spreads quoted on an OTC basis by Midland Bank, Bayerische Bank, and Alpha Credit Bank are relatively high, they were the only medium-term, fixed-coupon drachma-denominated instruments that provide information for the shape of the yield curve for maturities over one year, until the Greek government launched three-year bonds in November 1996.

D. Organized Exchange Derivative Instruments

Two well known groups of drachma-related derivative products which have traded in organized markets since 1995 are Bayerische's drachma warrants, Morgan Stanley's index warrant consisting of a basket of local blue chip stocks of the Athens Stock Exchange and Merrill Lynch's stock index warrants which were launched in July 1996. In addition to these instruments, drachma-denominated bonds have been issued with characteristics resembling those of derivative instruments and returns mainly linked to the exchange rate of the drachma against other currencies.

Currency and index warrants

Bayerische Vereinsbank's one-year warrant of March 1995 was listed on the Frankfurt and Munich exchanges and was the first Greek drachma related derivative product listed on an organized exchange. In addition, a Dr 120 billion deutsche mark/drachma and a Dr 75 billion U.S. dollar/drachma European type warrants were issued. A total of 4 million mark/drachma and 2.5 million dollar/drachma warrants were issued by the bank. Each warrant controlled Dr 10,000 and the minimum negotiable amount was 100 warrants. The reference exchange rate was Bank of Greece's fixing rate displayed on Reuters page CBOG. In Table 3, we present the relevant information of this product on May 29, 1995, as it was quoted by the issuing bank on Reuters. By that time the drachma/deutsche mark call warrant with a strike price of 0.5715 had lost more than 50 percent of its value, when compared to the prices on February 9, 1995. In contrast, the 270 put dollar warrant had increased by more than 100 percent.

Following the establishment of the Automated Trading System in the Athens Stock Exchange in 1992, Morgan Stanley's Hellenic Blue Chip Warrant Index was the first, and still is the only, available derivative product based on Greek stocks listed on the Athens Stock Exchange. In Table 4 we show the relevant information of the issue, as quoted by the bank on Reuters. The derivative is of an American type and was issued on July 28, 1994 with a strike price of DM 100 and a three-year maturity.

Table 3. Listed Greek Drachma Warrants in the Frankfurt Exchange

	Strike Price	Expiration			Bid	Ask	Gearing	Premium (in percent)
Drachma per deutsche mark								
Drachma C	0.5715	04.03.96	802762	EU	1.12	1.72	36X	-4.5
Drachma P	0.5555	04.03.96	802763	EU	0.82	1.42	43X	12.2
Drachma P	0.5263	04.03.96	802764	EU	0.03	0.63	98X	15.6
U.S. dollars per drachma								
U.S. dollar C	270	04.03.96	802765	EU	1.80	2.40	94X	20.0
U.S. dollar C	280	04.03.96	802766	EU	0.91	1.51	149X	24.5
U.S. dollar P	270	04.03.96	802767	EU	17.21	17.81	13X	99.9
	Drachma per deutsche mark		U.S. dollars per drachma		Deutsche mark per drachma			
Spot prices	0.6164		224.99		162.23			

Source: Reuters, page BVWL, May 29, 1995.

Note 1: C=Call Option, P=Put Option. The Gearing (also known as the leverage indicator) is a measure of the leverage attained by acquiring exposure to one unit of the underlying asset through a warrant as opposed to trading it directly in the market. It is defined as: (Greek drachma per deutsche mark Spot Price per Dr 100)/(Warrant Price x Warrant Ratio).

Note 2: The Premium (also known as Agio) is a measure of the excess cost of acquiring the underlying asset through the exercise of a warrant as opposed to buying or selling at the current market price. It is expressed as a percentage and defined as:

for Calls: $[\text{Strike} + (\text{Warrant Price Underlying} \times \text{Warrant Ratio}) - \text{Spot Price}] / \text{Spot Price of Underlying}$
for Puts: $[\text{Spot Price Underlying} + (\text{Warrant Price} \times \text{Warrant Ratio}) - \text{Strike Price}] / \text{Spot Price Underlying}$

Both gearing and premium are used by the investors to rate the quality of the warrant.

Table 4. Greek Drachma Warrants

	Strike	Bid	Ask	Premium (in percent)	Reference
Drachma Hellenic Blue Chip Warrant 1/ Greek Stock Call 2/ OTE Euro Warrant 3/ ING Baring Financial Products Greek Stock Call Warrant 4/	DM 100 Dr 1,000 Dr 5,000 \$1,250	3,373 190.7 527 11.86	3,983 200.7 545 12.86	4.4 ... ... ...	... ... 3,870 ...

1/ Issued by Morgan Stanley Ltd on July 28, 1994 at the price of Dr 4,060 or 26.85 percent of the underlying portfolio's value. The DM 27 million (Dr 4 billion) American-style warrant was issued on a basket of nine Greek blue chip stocks. The warrant matures in July 28, 1997. The quotations are as of May 29, 1995 (Reuters page MSJF).

2/ Issued by Merrill Lynch in January 1996 and expires in 1998. The quotations are as of August 6, 1996 (Reuters page MERU).

3/ Issued by Merrill Lynch and expires on November 24, 1997. The quotations are as of August 6, 1996 (Reuters page MERU).

4/ Launched by ING Baring Financial Products, this American-style warrant was placed by Sigma Securities, S.A. on October 8, 1996. The warrant was issued at the price of \$12.50 per warrant (also payable in Greek drachmas) with a minimum trading size of 100 warrants. The new instrument was listed in the Luxembourg Stock Exchange and the underlying basket of stocks consisted of Alpha Credit Bank (25 percent), Ergo Bank (20 percent), National Bank (25 percent) Commercial Bank (15 percent), National Mortgage Bank (7.5 percent), and Ionia Bank (7.5 percent). The warrant expires on October 8, 1997. The issue is governed by U.K. laws and its depository is Chase Manhattan Bank (Reuters page BWB). The quotations are as of January 9, 1997.

A total of Dr 4 billion of warrants were issued at an issuance price of Dr 4,060 or 26.85 percent of the stock basket's value. The underlying basket consists of the following stocks: National Bank of Greece, 12.5 percent; Alpha Credit Bank, 12.5 percent; Ergo Bank, 12.5 percent; Commercial Bank of Greece, 12.5 percent; 3E, 15.0 percent; Intracom, 12.5 percent; Delta, 7.5 percent; Titan, 7.5 percent; and Michaniki, 7.5 percent.

As designed, the warrant's value at a given point in time would be equal to the value of the underlying basket and the fixing rate of the Greek drachma/deutsche mark (times 100). Ten months after its issuance, the product's value had lost almost a third of its value, primarily due to the decline of the value of the underlying stocks and the devaluation of the drachma against the mark during the relevant period.

Bond derivatives

Except for a few cases, bond derivative products denominated in drachmas did not exist until 1995. The first one was a one-year bond issued by Lehman Brothers on behalf of the EBRD on April 11, 1995. The issue amounted to Dr 15 billion, and was part of EBRD's ECU 3 billion Euro Medium-Term Note Program intended for distribution to Greek institutional investors. The so called Capital Appreciation Bond, which was listed on the London Stock Exchange, carried a coupon of 0.75 percent and its redemption value would include 100 percent of the face value and an additional 25 percent of an Index whose value was to be determined as follows:

$$\text{Index} = (\text{Number of days where Dr/ECU is within RANGE during the calculation period}) / (\text{Number of days in the calculation period})$$

The calculation period starts two calendar days before settlement and ends at maturity date. The upper and lower bands of the RANGE were specified as follows:

$$99.00 \text{ percent} \times \text{Spot Rate} < \text{Dr/ECU} < 1.051 \text{ percent} \times \text{Spot Rate}$$

with the spot rate being the Bank of Greece midmarket fixing rate as quoted by Reuters on page CBOG.

The second bond derivative product was issued by the Hellenic Bank for Industrial Development (ETBA) was a one-year fixed rate bond at the rate of 13.5 percent, in addition to an option right embedded in the final yield. Specifically, in addition to the minimum fixed rate, the bond carried a European call option whose value was based on the U.S. dollar/Japanese yen rate and was listed on the Athens Stock Exchange. According to the design of the instrument, the investor would benefit from possible appreciation of the dollar against the yen according to the factor:

$$((A-B)/A) \times F$$

where: A: US\$/yen rate, applied two working days before expiration on December 21, 1995; (Reuters Page SAF5).

B: Strike rate

F: Fixing rate of the drachma/U.S. dollar rate, as determined by the Bank of Greece fixing, two working days before the option's expiration.

Following these two bond derivatives, Lehman Brothers International Ltd., Merrill Lynch and National Westminster Bank issued during the 1995-96 period drachma-linked bonds, drachma-denominated medium-term notes, and capital appreciation bonds with a variety of embedded options. None of these instruments, however, exceeded the level of Dr 10 billion while their maturities did not exceed the two-year period.

Athibor-related instruments

In the absence of any other relevant rate, the Athibor has been used as an index for short term interest rates since its establishment in early 1994. The index has already been used on the pricing of contracts, including contracts in organized exchanges. By design, the participating banks were required to quote bid-offer rates to Reuters within a given maximum spread of 200 basis points.⁵ Between 11:45 a.m. and 12:00 noon local time, Reuters calculates at a random point in time the averages of bid and offer rates, thus creating the Athibor and Athibid for maturities of one, two, three and six months. By the end of 1995, the index included nine- and 12-month maturities. Both Athibor and Athibid have already been used as interest rate indices for listed financial instruments. In March 15, 1995, the European Investment Bank issued Dr 20 billion capped FRNs at par, due in the year 2000, at three-month Athibor minus 0.40 percent, paid quarterly. The cap was set at 30 percent and the repricing was on a quarterly basis. The notes are already listed on both the Athens and Luxembourg stock exchanges. A similar issue was launched in July 1995 by the World Bank at Athibor minus 40 basis points with the proceeds to be swapped in deutsche mark, with the help of the National Mortgage Bank of Greece as lead manager.

Since 1995, there has been a discussion in the local financial press on how to make the Athibor index more representative of the local money markets. Among the changes that have already taken place, the reduction of the maximum spread to 100, exclusion of the three lowest and three highest rates before averaging, and expansion of the coverage to 16 banks

⁵ Reuters, pages ATHIBOR for offer rates and ATHIBOS for bid rates of all 13 participating banks (Bank of America, Banque Paribas, Bayerische Vereinsbank, Citibank, Commercial Bank of Greece, Alpha Credit Bank, Ergo Bank, Euromerchant Bank, Ionic Bank, Midland National Bank of Greece, National Westminster Bank, and Xiosbank).

have been the most important ones. Moreover, a special mechanism for calculating the index in periods of financial crises has been established so that at any point in time, the level of the indicator would be available to market participants.

There is wide acceptance of Athibor as the key interest rate indicator for local as well as international money markets. The indicator continues to be used in the pricing of the Greek drachma-denominated FRNs and coverage of overnight (O/N) maturities should be expected to take place within the next few years.

III. INCENTIVES FOR FINANCIAL INNOVATION

Several factors have played a key role in driving financial innovation in Greece during the last few years. Among the major motives are increased volatility in money, capital, and foreign exchange markets; disintermediation; new technology; increased competition; and deregulation. Following a brief discussion of the macroeconomic causes, we proceed with a presentation of the deregulatory steps taken during the last few years, as well as the new regulatory environment that has emerged from this process. We argue that most of these regulatory steps were taken as a result of the integration of the local capital markets with that of the EU and were incorporated into domestic legislation through the obligatory translation of EU Directives. This view is strengthened by the fact that these developments also took place in similarly structured markets, such as Spain, Portugal, and Ireland (Finn, 1994).

A. Macroeconomic Stimulus

Following the liberalization of capital markets in the early 1990s in Greece, market volatility has induced market participants to pursue a more active role in the management of risk, a process which has led to the demand for new financial instruments. Given the stage of financial development in Greece, risk management is mainly achieved indirectly, especially through cross-currency derivatives. As shown in Table 5, the period of the early 1990s was characterized by high exchange rate volatility, in particular with respect to the U.S. dollar.⁶ Moreover, the interest rate spread between the minimum and maximum levels for the three-month T-bills varied between 1 percentage point and 9 percentage points during the 1990 to 1995 period.

The Greek drachma/U.S. dollar volatility exceeded that of the mark by a factor higher than 3.7 in 1994 and a factor of 2.2 in 1995. Such a variation in the relative volatility of the drachma against the main two currencies (dollar and mark) indicates that a matched position consisting of the dollar and the deutsche mark, evaluated in terms of the drachma, is riskier than a position of mark alone due to the underlying instability of the dollar/mark rate volatility.

⁶ For the purposes of this paper, foreign exchange volatility is measured as the standard deviation of the percentage changes in the value of drachma in overlapping ten-day periods.

Table 5. Foreign Exchange and Interest Rate Volatility

(In percent)

	1991	1992	1993	1994	1995
A. Foreign exchange volatility calculated as the standard deviation of overlapping 10-day returns of daily observations.					
U.S. dollar	2.61	2.56	1.75	1.64	1.83
Deutsche mark	0.44	0.67	0.71	0.44	0.83
French franc	0.43	0.71	0.71	0.51	0.74
Pound sterling	0.73	1.96	1.48	1.01	0.99
Swiss franc	0.87	1.34	1.05	0.82	1.31
Belgian franc	0.43	0.65	0.78	0.48	0.76
Netherlands guilder	0.43	0.66	0.68	0.46	0.81
Italian lira	0.42	2.10	1.5	1.15	2.29
Danish krone	0.46	0.68	1.01	0.53	0.58
Irish pound	0.42	0.65	2.01	0.96	0.80
Austrian schilling	0.44	0.67	0.71	0.44	0.83
Swedish krona	0.70	2.60	1.70	1.49	1.62
Norwegian krone	0.46	1.01	0.57	0.56	0.50
Canadian dollar	2.75	2.62	2.15	1.79	2.14
Australian dollar	2.70	2.96	2.60	2.35	2.35
Japanese yen	1.87	2.24	2.21	1.62	2.26
Cypriot pound	0.82	0.57	0.53	0.50	0.32
ECU	0.40	0.61	0.53	0.45	0.25
Spanish peseta	0.77	1.36	1.83	0.77	0.96
Portuguese escudo	1.04	1.14	1.35	0.67	0.56
Finnish markka	2.27	2.71	1.71	1.20	0.83
B. Spread between minimum and maximum interest rates of three-month treasury bills					
	1	2.25	1.5	9.75	2.65

Source: Monthly Bulletin of the Bank of Greece and The WEFA Group

Note 1: For each calendar year, exchange rate volatility is calculated as the standard deviation of the respective currency rate on n-10 observations. Exchange rates used are the Bank of Greece fixing rates of the respective currency against the drachma.

Note 2: Interest rates refer to monthly observation of three-month treasury bills.

Increased disintermediation, which was primarily the result of deregulation of the banking industry, and introduction of institutional investment legislation led to the demand for hedging instruments for institutional investors' portfolios (Table 6). The key legislation was Law 1969/1991 and the subsequent amendments which set the standards for the development of the mutual fund and closed-end fund industries.

Coupon stripping of government securities became fashionable in 1994, primarily due to the absence of risk-free zero-coupon issues, dated accounting practices, and the fact that tax laws had left a variety of loopholes for exploitation. Moreover, improvements in communication technology have helped local market participants in exploring global markets.

Following the introduction of modern capital market legislation, competition among domestic market participants was enhanced. This applies to commercial banks, domestic and foreign, and institutional investors. As shown in Table 7, competition became more intense in the early 1990s compared to the late 1980s. The number of branches per 100,000 people increased by almost 34 percent in the nineties, compared with less than 8 percent during 1985-1990 in the proceeding five-year period. The competition was fierce also for institutional investors and in particular among mutual fund companies. During the period 1985 to 1995, the number of mutual funds per company had more than quadrupled, thus reaching economies-of-scale comparable to international standards.

It is noticeable that the competition in the mutual fund industry is in effect driven by the competition among commercial banks. With the exception of a few mutual fund companies managed by insurance companies (Nationale Nederlanden, Interamerican, Helvetica), the vast majority of them are controlled by local commercial banks or branches of foreign banks.

In cooperation with the banking sector, mutual funds provided the required demand for the introduction and enhancement of foreign exchange-related products, as well as the demand for innovative financial schemes—such as those related to coupon stripping and the hedging of interest and foreign exchange risk. It is not accidental that the first Greek drachma-related, OTC foreign exchange option contracts were introduced by relatively new commercial banking institutions, such as Egnatia Bank and Alpha Bank, both of which are active in the mutual funds industry. Some of these products are analyzed in the following sections.

B. Deregulation in the 1990s

A major stimulus to local financial innovation in the 1990s was the gradual deregulation of the financial system that came mainly as a result of the adoption of prescheduled European Community legislation. After the incorporation of Law 1969 in 1991 which aimed at modernizing capital markets in accordance with European Directive 85/611 and the transformation of the second Banking Directive into Law 2072 of 1992, the local financial markets started showing signs of revival. In mid-1992 all foreign exchange controls

Table 6. Mutual Fund Growth and Disintermediation

	1990	1991	1992	1993	1994	1995	1996
Net Assets (in billions of Greek drachmas)	147	171	223	874	1,355	2,441	3,790
Deposits with commercial Banks (in billions of Greek drachmas)	7,806	8,857	9,688	10,552	13,095	15,090	17,250
Mutual fund assets as a percentage of:							
deposits with commercial banks	1.9	1.9	2.3	8.3	10.3	16.2	22.0
GDP	1.1	1.1	1.2	4.1	5.7	9.2	13.0
Composition of mutual fund assets by fund type (in percent)							
Growth funds	97	81	45	15	10	6	3
Fixed income and money market funds	3	17	49	71	79	90	95
International funds	0	2	6	14	11	4	2
Memorandum item:							
GDP (in billions of Greek drachmas)	13,143	16,231	18,678	21,106	23,756	26,484	29,249

Source: European Community, European Commission, *Economic Trends*, No 5/6, May/June 1996; Association of Greek Institutional Investors; and Ionian Bank

Table 7. Number of Institutions in Greece During the Decade 1985-1995

	1985	1990	1995	1996
Commercial banks	33	38	41	41
of which:				
foreign banks	19	18	20	20
Total number of bank branches	1030	1136	1575	...
of which:				
foreign branches	43	54	83	...
Number of branches per 100,000 residents	10.4	11.2	15.0	...
Mutual fund management companies	2	6	27	32
Associated managed funds	2	7	121	150
Number of managed mutual funds per managing company	1	1.2	4.3	4.8

Source: Association of Greek Institutional Investors and local financial press.

and restrictions on current transactions were abolished, and a critical mass of deregulatory actions towards full liberalization of long term capital movements was in place during 1993. Presidential Decree 96 of March 1993, at first, and especially Decree 104 of May 16, 1994, which was issued as a preemptive strike against mounting devaluation expectations against the drachma, abolished all remaining short-term capital and foreign exchange controls despite the fact that the initially planned schedule called for full liberalization at a later date. The liberalization of short-term capital movements and the unification of financial markets with those of the EU created new conditions for more efficient financial services in the domestic money and capital markets. The short-term effects of the liberalization were revealed in the form of market pressures and the formation of devaluation expectations which prompted drastic interventions by the Bank of Greece.

The operational side of Presidential Decree 104 was implemented by the Bank of Greece and took the form of Governor's Acts 2302 and 2303, which were issued in May 1994. These acts established the operational details for the financial and banking sector. The critical regulatory levels for short-term foreign exchange movements were set at ECU 1,000, ECU 10,000, and ECU 20,000, with each limit linked to a category and purpose of transaction. The upper limit of ECU 20,000 was imposed on hard currency that could be legally exported with a simple declaration at customs.

The financial liberalization was swift and thus bound to generate higher levels of foreign exchange and interest rate volatility combined with hedging strategies and speculative initiatives. During the first weeks of the new regime and in reaction to market pressure, interbank rates reached 180 percent at the peak, and the declining trend in interest rates was put on hold for months. The Bank of Greece proceeded with a large-scale restoration of liquidity by using a series of foreign exchange swap agreements against drachmas. By the end of May 1995, the government had to renew maturing debt issues and in doing so, it offered three-month treasury bills at the administratively set rate of 25.5 percent compared with 16 percent on the previous issue of a month earlier. In addition to that, a special one-month zero coupon bond was issued with a yield of 27 percent.

Institutional investors, primarily Undertakings of Collective Investments in Transferable Securities (UCITS) specializing in foreign asset portfolios, played a major role in facilitating the significant capital outflow during the May 1994 crisis. What partially helped the successful management of the speculative attack was the high cost in the Greek drachma-based assets and the borrowing and legal restrictions for UCITS under Law 1969/91 which, according to EC Directive 85/611/EEC, placed certain diversification restrictions on the underlying portfolio of an authorized UCITS. The second reason was the fact that up to that point, no drachma deposits existed in foreign-based centers in the form of Euro-drachma accounts.

The behavior of depository institutions and institutional investors and the reaction of the authorities brought a new climate to local markets. For the first time, commercial banks started using the central bank's Lombard facility which had existed for more than a year, but

had been dormant. On May 27, a form of an indirect credit control was imposed by requiring credit institutions to automatically report all new credit extensions in excess of Dr 20 million. Liquidity pressure in the foreign exchange market was reduced by the Bank of Greece with an initial \$500 million swap in U.S. dollars and deutsche mark, in addition to the initial sharp increase in short-term interest rates.

Even though market pressures decreased significantly within the same month, the crisis took a few months before it was completely over. During that time, market participants became more involved with short-term capital movements and realized the need for foreign exchange and interest rate risk control. The utilization of a whole range of new financial products for risk management and hedging became more apparent than in the period before liberalization. As a result of the liberalization, capital market activity has become more important than current account activity for investors, borrowers, and regulators.

C. Legislative Framework for Derivative Instruments

A legal reference to derivative instruments was first made with the introduction of Presidential Decree 96 in March 1993 in an indirect and general way (Annex I of Presidential Decree 96). The Decree introduced the liberalization of capital movements and adapted Directives 88/361/EEC and 92/122/EEC into Greek Law. In application of this Decree, Act No. 2201/7.5.93 of the Governor of the Bank of Greece allowed Greek residents to deal in derivative instruments traded in international markets. As explained in the following sections, the reference to such instruments in the local legal framework is not sufficient for achieving the level of operation efficiency required by derivative markets.

Indirect references

Given the fact that the derivatives market is new for the Greek financial system, the existing regulatory framework makes only indirect reference to these financial instruments. These indirect references are made in two presidential decrees related to the Athens Stock Exchange, the only organized exchange in Greece for equity and bond listings.

The first, Presidential Decree 348/1985, is based on EC Directive 80/390/EEC which harmonized the prospectus requirements for securities listed in an organized exchange. Article 7, paragraph 3 of the Decree exempts, partially or in whole, shares resulting from the exercise of a warrant's right following the publication of a prospectus. Articles 9, 10, and 15 of the same Decree specify the prospectus requirements for warrants. The second indirect reference is made in Presidential Decree 350/1985, which implemented EC Directive 79/279/EEC, and which deals with the harmonization of the listing terms of equity and bonds. Article 4, paragraph 9 restricts the listing of warrants in the Athens Stock Exchange to only those whose underlying shares are listed in the Exchange or which are simultaneously introduced for listing. However, despite the fact that legislation for warrants is referenced in Presidential Decrees 348 and 350 of 1985, there has not been any issuance of these instruments in Greece yet. This gap was closed when Morgan Stanley first in 1995 and

subsequently Merrill Lynch in 1996, in cooperation with the local brokerage firm of Devletoglou Securities S.A., introduced a stock index, industry-specific, and equity warrants related to stocks listed in the Athens Stock Exchange (Table 4).

Characterization of derivatives as securities

In Greek legislation, the regulatory framework for classifying financial instruments and derivative products is not clear, as is currently the case with most countries. Greek legislation requires that for warrants on debt and equity instruments which are issued by Greek entities to be listed on the Athens Stock Exchange, the underlying instrument itself is listed on the Exchange. In that case, warrants are classified as transferable securities. In a more advanced market, such as the United States, there are guidelines for the characterization of derivative products as transferable securities, and under that qualification they are subject to federal regulation by the Securities and Exchange Commission (SEC), while those deemed to be commodity contracts are subject to federal regulation by the Commodity Futures Trading Commission (CFTC).

In Italy, the term “securities” is defined as including term contracts on financial instruments connected with securities, interest rates, and currencies, including those related to indices on these securities, interest rates, and currencies (Valieri and San Bonifacio, 1994). These types of contracts include futures, options, swaps, caps, collars, and floors. In contrast to the Italian legislation, the U.S. federal and state securities laws generally recognize that swaps are not securities, despite the fact that in general swaps, caps, floors, and similar financial contracts raise several regulatory and income tax issues. According to Haroldson and others (1994), these issues can be classified by the timing of income generation, the character of the income, the source of payments under a contract, and the circumstances under which these contracts may be integrated with related financial assets or liabilities.

The question of whether derivatives can be classified as transferable securities has important implications for existing European legislation and in particular the UCITS Directive. However, for the purposes of the more important question of what the appropriate disclosure rules are, the issue remains open and it is likely to occupy different regulatory fora for a long time. These issues are currently the focus of attention in Greece, given the fact that the Capital Markets Committee is currently planning the establishment of a derivatives exchange in Athens.

D. The Solvency Ratio and Capital Adequacy Directives

A substantial portion of regulatory requirements on Greek credit institutions is the result of the implementation of EC Directives. Under the supervision of EU authorities, the exposure of banks and investment firms to derivative products is indirectly regulated by three

different Directives,⁷ which set the capital standards of the respective entities. These are the Solvency Ratio Directive (89/647/EEC), The Capital Adequacy Directive (93/6/EEC) and the Investments Service Directive (93/22).

In regards to OTC derivative instruments, the Solvency Ratio Directive (SRD) (89/647/EEC) addresses the issue of credit risk inherent in off-balance sheet exchange and interest rate instruments for capital adequacy purposes. This Directive came into effect through the Bank of Greece Governor's Act 2054/91 in January 1991. The 1996 amendment of the Directive to include commodity and metal derivatives provides the required common reference in EU countries for the uniform treatment of all derivative financial instruments.

The market risk of OTC and exchange traded derivatives is dealt with Directive 93/6/EEC, known as the Capital Adequacy Directive (CAD), as long as such derivatives are part of the trading book of a financial institution. This Directive was implemented in Greece by Law 2396/96 in April of 1996. The CAD takes into account the market risk of derivative instruments. Unless derivative positions are held outside the trading book, the CAD applies the same building block methodology for measuring specific and general market risk for equity, debt, and foreign exchange positions.

For options on debt instruments, interest rates, swaps, and warrants, the difficulty is the asymmetrical and nonlinear relationship between the price of the option and that of the underlying instrument. As a prescription, CAD requires the reporting of options on a delta weighted basis and the classification of the resulting position in a relevant band or zone. In addition to delta risk, traded options pose more risks for an institution. These risks are often complex to measure and the Directive leaves the issue to the discretion of the national authorities. In its latest attempt in 1996, the Basle Committee has introduced a methodology for accounting for gamma and vega risks.⁸ This treatment, however, will not be included in the harmonized EU regulation until a formal revision of the CAD takes place. The new capital adequacy framework utilizes the value-at-risk methodology and is expected to be implemented in the EU by the end of 1997. Until then, national supervisory authorities in the EU will have to devise their own methodology for measuring and accounting for nondelta risk.

⁷ Communication by Mario Monti to the Commission on derivatives, capital movements, and the debate on financial regulation, issued to the press, Brussels, April 12, 1995.

⁸The gamma risk relates to the rate of change of the respective option's delta with respect to the price of the underlying asset, while the vega risk relates to the rate of change of the value of the option with respect to the underlying asset's volatility. The delta risk of an option position is defined as the rate of change of its price with respect to the price of the underlying asset.

E. Institutional Investors' Activity

Article 6 of Presidential Decree 433/93, which is based on Articles 19-25 of the UCITS Directive, allows UCITS to invest in derivative instruments under the restrictions specified in Article 11 of Greek Law 2166/93 and Article 70 of Law 1969/91. In accordance with these restrictions, the Capital Market Committee provides authorization to a UCITS that intends to invest in derivative instruments, as long as they are used for the efficient management of a fund or the ultimate objective of the investment is hedging of foreign exchange or other risks. Under these stringent requirements, the institutional investors' involvement in derivative transactions is quite prohibitive. Despite the legal restrictions, however, the industry's behavior was affected by the particular exchange rate and interest rate policy pursued by the authorities during the first half of the 1990s. The high real interest rates in the 1990s have led to a drastic rechanneling of funds away from equity products and toward Greek drachma-denominated Greek government bonds (Table 6). The concentration of fixed-income portfolios in such instruments reduced the need for interest rate risk hedging since the average duration of the underlying asset was minimized by the FRN nature of these bonds.

In the process of development and rapid growth, domestic mutual funds played a vital role in being a key counterparty to banking entities in almost every aspect of the financial innovation activity of the 1990s. In addition to being one of the major foreign exchange swap counterparties, certain mutual funds (such as those of Citibank) have already designed and offered products whose returns were based on the Athens Stock Exchange index and Athibor.

The second important group of institutional investors is that of the listed closed-end funds. Investments in derivative instruments for this type of regulated collective investment scheme in Greece is also limited for hedging purposes, as specified in Article 14 of Law 2166. Their importance and their role in the financial innovation process, however, has been limited by regulatory constraints and by their concentration in locally traded stocks. It is interesting to mention that during 1995-96 the vast majority of the 22 listed stocks of these closed-end funds traded at discounts exceeding 10 percent.

F. Tax Issues

Taxation has often been cited as a triggering mechanism for financial market arbitrage and cause for innovation. Any given financial instrument may be subject to taxation under more than one statutory regime depending on the nature of the taxpayer, the purpose for which the instrument is held, and the taxpayers' choice of certain characteristics of the instruments. Despite developments in tax rules relating to derivative financial instruments traded in major financial markets in the past few years, a significant degree of uncertainty and ambiguity still remains (Fink, 1994; Siegel, 1994; Stals, 1994). The derivatives tax regime in Greece is also characterized by uncertainty, in addition to the prevailing ambiguity in accounting and valuation matters. Draft legislation prepared by the Ministry of Finance in October 1996 introduced a 15 percent tax on income and gains from derivative transactions

for physical persons and legal entities. However, according to a proposed amendment of Greek Law 2238/94, interbank derivatives as well as non-Greek residents are excluded from this tax liability. The intention to tax derivative products and techniques may, however, disrupt the development of Greece's derivative markets and even push the bulk of local derivative dealings to main foreign financial centers.

A recent survey of the tax treatment of derivatives across Organization for Economic Cooperation and Development (OECD) countries (OECD, 1994) recognizes that profits and losses (P&L) in derivative products depend upon the accounting principle adopted by a country with the main difference arising from the use of either the accruals principle or the prudence principle for each derivative instrument. There are cases of countries where the principles differ between instruments or between counterparties involved in the transactions. The main tax issue in option contracts, for example, is whether losses and, particularly, profits should be recognized even when unrealized. The mark-to-market approach, suggesting immediate recognition of both profits and losses, even if unrealized, is less favorable to the taxpayer from the income tax perspective. The prudence approach suggesting nonrecognition of unrealized profits, but recognition of unrealized losses, is more favorable to the taxpayer, as it decreases taxable profits. However, this latter approach encourages counterparties to engage in "window dressing" activity during the periods of regulatory reporting or before any prescheduled public disclosure.

In the United States, the U.S. Final Regulation 1.446-3, already in effect since December 1993, addresses the timing and character of taxable income and deductions for notional principal contracts (NPC). NPCs governed by these regulations include a variety of financial agreements: interest rate swaps, currency swaps, and interest rate caps and floors. The regulations are intended to provide a clear representation of the income and deductions from NPCs by prescribing accounting methods that reflect the economic substance of such contracts. This is achieved by dividing NPC payments into three broad categories: periodic, nonperiodic, and termination payments (Siegel, 1994).

Similarly, Australia's relatively new but well developed derivatives markets are now governed by tax legislation distinguishing between types of income from financial contracts. In achieving the objective of greater certainty of financial arrangements taxation, the Australian government proceeded in 1994 with a specific code addressing the tax treatment of the majority of derivatives in use today (Stals, 1994). The new code on financial arrangements adopts comprehensive provisions based on economic substance rather than legal form and provides clear, consistent, and predictable tax laws.

In addition to the general tax regime which applies to all financial instruments issued by nongovernment entities, the legislation covering the taxation of financial transactions in Greece is contained in Law 1083 of 1980, which imposes a special transaction tax (EFTE) equal to 4 percent on the interest rate charged on all lending transactions of resident banks. Under the provisions of this general law, however, all transactions involving foreign currency purchases and sales are exempt from this special transaction tax. Indeed, all foreign exchange-

related instruments and transactions are exempt from this tax obligation, even though they constitute the core of the derivatives business in Greece. Such preferential treatment will inevitably affect the local derivatives market, by discouraging the development of financial innovations involving the Greek drachma. It is also important to notice that since the existing tax law is relevant only to bank-related transactions, the regulation does not apply to nonbank activity and thus, as long as nonbank counterparties are involved in the creation, selling, and buying of drachma derivatives, there is no tax obligation.

The impact of such a policy on the market can be crucial, given the fact that the foreign exchange-products market has started developing, while the drachma-products market is still in its infancy. These arguments could justify the exemption of derivative products from the transaction tax. However, this choice would discriminate against the "traditional" (nonderivative) banking products and counterparties would have an incentive to combine traditional products, e.g., to swap loans or borrow under option-like terms, in order to avoid the transaction tax. In our opinion, this possibility provides sufficient justification to tax authorities for the repeal of the transaction tax on all banking activities.

The issue of derivatives taxation should inevitably be seen in conjunction with a framework of accounting and valuation standards which has not yet been clearly established even among well developed markets. The lack of accounting standards is a serious impediment in developing a tax code relating to the income tax aspect of derivatives, which is much more important than the transaction tax aspect.

G. International Environment and Effects on Domestic Developments

International financial market developments

A number of fundamental changes in the international financial markets have led to the explosive growth of the derivative markets in the 1980s and 1990s. These changes have also affected the development and gradual implementation of drachma products in investors' portfolios. While an exhaustive list of factors that have boosted such a growth will be difficult to compile, this boom may be interpreted as a result of and a stimulant to the growth and internationalization of underlying securities markets, with no clearly defined direction of causation (Witschi and Holzer, 1994). By any standards, the growth of these new instruments has been spectacular (Table 8). Such a rapid growth has obviously raised questions regarding their effects on financial efficiency and systemic risks. The concerns that were raised regarding these effects, as well as the reduction of transparency of market participants' balance sheets, have led to three major supervisory reviews of derivatives, namely that of the Bank for International Settlements (BIS), the U.S. regulatory agencies, and the Bank of England. In the well publicized G-30 report, however, it is argued that the conclusions reached regarding the regulatory implications for systemic risk due to derivatives cannot be easily sustained. These reviews maintain that the amount of capital to support derivatives exposure is a matter of judgement for the individual institutions, depending on their appetite for risk and their ability

Table 8. Markets for Selected Derivative Instruments, Notional Principal Amounts Outstanding at Year-end

(In billions of U.S. dollars equivalent)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Exchange-traded instruments	583	727	1,306	1,768	2,290	3,519	4,634	7,771	8,863	9,185
Interest rate futures	370	488	895	1,201	1,455	2,157	2,913	4,959	5,778	5,863
Interests rate options	146	122	279	388	600	1,073	1,385	2,362	2,624	2,742
Currency and stock market index futures and options	67	117	132	179	235	289	336	450	461	580
Share of non-U.S. markets (in percent)						39.4	42.3	44.5	46.4	47.9
Over-the-Counter (OTC) instruments	500	867	1,330	2,402	3,450	4,449	5,346	8,475	11,303	17,713
Interest rate swaps	400	683	1,010	1,503	2,312	3,065	3,851	6,177	8,816	12,811
Currency and cross-currency interest rate swaps	100	184	320	449	578	807	860	900	915	1,197
Other derivative instruments	--	--	--	450	561	577	635	1398	1,573	3,705

Source: Bank for International Settlements.

to measure and manage it. It can be argued, however, that the stability of the financial system should not be jeopardized by those few institutions whose appetite for risk exceeds an appropriate level (Dale, 1994).

In addition to these developments, a series of legal, tax, and market restructuring actions took place during the last few years in most countries which are active in derivatives markets. In the EU, the German derivatives market has developed at an extraordinary rate since 1985, just after the Bundesbank liberalized the German capital markets. Depending on whether the parties to a transaction are classified as a credit institution, an insurance company, an investment company, a business enterprise, a private investor, or a public sector entity, different regulatory rules apply (Kusserow, 1994). Due to the peculiarities of the German law, Borsentermingeschäfte are only enforceable if both parties are capable of engaging in options and forward transactions (Article 53 of the German Civil Code).

In other EU countries, financial and commodity derivatives markets developed quickly, like in Italy where a regulatory framework was put in place in the early 90's (Valieri, and San Bonifacio, 1994). Law 1 of January, 1991 established the Securities Intermediary Companies (SIM) and provided regulations regarding brokerage and trade activities in securities, credit instruments and related markets. Portugal followed in 1995 with the establishment of the regulatory framework for the derivatives exchange in the city of Porto.

The regulatory developments that have taken place in many European countries are mainly a response to a new situation that has been created in international financial markets. While most derivatives legislation within European countries during the 1990s is linked to European Directives, the seeds of such development can be traced to an emerging competition between the United States and European financial industry. In the process of creating an international "level playing field," regulatory authorities are cooperating in order to enhance financial efficiency, while preserving a uniform and prudentially acceptable environment for their supervised entities.

Recent BIS surveys, however, show that trading in financial derivatives started exhibiting signs of saturation in 1995 with the problem equally spread among the three main types of contracts: interest rates, stock indices, and currencies. The relative stagnation of derivatives markets, which has led to accentuated competition between exchanges, is attributed to reduced volatility in capital markets. Trading on derivatives exchanges outside the United States exceeded trading on U.S. exchanges in 1993 and that gap grew larger in 1994. However, the recent delisting of the 30-year German government bond by the Deutsche Terminboerse (DTB) and the suspension of London International Financial Futures Exchange's (LIFFE) Euro-dollar option contract are new signs of deceleration in the derivatives markets growth. Finally, the anticipated replacement of European currencies with the single currency (euro) is expected to impose additional pressures on the derivatives industry by the end of the century. The changeover to the new currency in the EU will require attention to legal, operational, and conceptual issues, which need to be addressed by competent authorities and market participants.

European Union and U.S. regulations

In the emerging global competition of European and U.S. financial industries, a point of main concern related to derivatives is preventive supervision along with the establishment of a regulatory framework for capital standards of institutions competing in the international field. After the Basle 1988 Accord, which established minimum capital standards to account for credit risk in 1993, the Basle Committee issued supplementary proposals on capital adequacy for market and interest rate risks, covering open positions in debt, equity, and foreign exchange. In addition to these positions, the Basle proposals extend to capital adequacy standards on an institution's debt and equity derivatives.

At the European side, specific regulatory actions which took the form of EU Directives have followed the Basle prescription towards the establishment of a "level playing field" within the EU. The key Directives that indirectly deal with new financial products and processes are the Second Banking Directive 89/647, the UCITS Directive 85/611, the CAD 93/6 and the Investment Service Directive (ISD) 93/22. At the U.S. side, the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 prescribes a removal of barriers to nationwide banking and branching for domestic banks and a gradual phasing out of the barriers for foreign banks by the year 1997.

Given the degree of intercountry integration and cooperation between banking and investment entities required when it comes to the development of new financial products and services, the proposed legislation on Financial Services Competitiveness Act of 1995 (H.R. 1062) is expected to have an impact on EU-related institutions engaging in derivatives business. H.R. 1062 is designed to provide broader power to U.S. banking institutions. A major point of concern for U.S. and EU banking authorities is that H.R. 1062 would apply different and more favorable rules to U.S. uninsured wholesale banks than to uninsured wholesale branches and agencies of EU banks. Specifically, section 109 of the bill would allow investment bank holding companies to own uninsured wholesale financial institutions that are affiliated with securities firms without requiring a separation wall. Given the fact that only a bank incorporated under the laws of the United States may become a wholesale financial institution, foreign banking organizations with uninsured branch and agency operations in the United States would have to convert their branches and agencies into subsidiaries. The establishment of a subsidiary, however, implies a separate costly recapitalization and restructuring.

The existing legislation in the EU already contains general provisions aiming at a high standard of internal control and risk management systems. Article 13, paragraph 2 of the Second Banking Coordination Directive (BCD) obliges Member States to ensure, via the competent authorities, that all credit institutions "have sound administrative and accounting procedures and adequate internal control mechanisms." Moreover, the Large Exposures Directive (LED) and the CAD complement the BCD with specific rules for monitoring interest rate risk, the risk of undertaking financial positions, and the concentration risk.

In contrast to the general provisions for accounting, risk measurement, and disclosure for EU financial markets, U.S. legislation has proceeded with derivatives-specific procedures by establishing disclosure requirements for market participants. The new guidelines came as a response to a number of studies and findings in the early 1990s. Following the initial Financial Accounting Standards Board (FASB) Statement 105 on the disclosure of information about financial instruments with off-balance sheet risk and financial instruments with concentrations of credit risk, and FASB Statement 107 on the disclosure of financial instruments' fair value, FASB Statement 119 of October 1994 amended earlier statements by expanding the instrument coverage and by requiring all entities (even those with total assets below the \$150 million threshold) to disclose information about the fair value of their financial instruments.

IV. IMPLICATIONS, PROSPECTS, AND FUTURE DEVELOPMENTS

A. Regulatory Implications for Organized and OTC Derivative Markets

The financial innovation process of the last decade points to the conclusion that international financial efficiency achieved through the proliferation of derivative products is a double-edged sword. While the benefits of such developments are real and cannot be disputed, the speed with which disturbances and mistakes can be transmitted across markets and national territories is alarming for supervising entities. A recent joint study by three U.S. federal banking supervising authorities, (Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, and Office of the Comptroller of the Currency, 1993), has identified six different types of risks in connection with derivative instruments: credit risk, market risk, settlement risk, operating risk, legal risk, and aggregation risk. Until recently, the only portion or risk that was taken into account by EU regulation was that of credit risk through the SDR. Directives 93/6 and 93/22 seem to have taken care of all remaining risks with the exception of aggregation or systemic risk and, to a minor extent, operating risk. Excessive regulation of derivatives markets, however, may adversely affect their overall growth process.

There are two perspectives from which relevant regulatory implications can be analyzed. The first is based on the view that in modern global financial systems regulatory authorities should deal directly with the possibility of an increase in systemic risk at the national and international level. The second focuses on disclosure and accounting deficiencies in derivatives transactions and argues for the design of a new financial statement for all entities involved in derivative business.

The issue of systemic risk⁹

Financial innovation increases competition and market efficiency. At the same time, however, innovation comes with responsibilities for financial institutions which need to follow prudent risk management practices. According to McDonough (1995), there should be at least four basic principles that need to be satisfied. They can be summarized as: active oversight by senior management, presence of sound risk identification and reporting systems, stressing of internal controls and separation of duties, and finally, establishment of well-defined limits on risk taking. The list of incidents in the past few years which involved spectacular losses due to derivatives is impressive: Barings Bank, Orange County, Mettagesellschaft, Kashima Oil, etc. (Kuprianov, 1995). In all these well publicized cases, there was a failure in the design or implementation of one or more of these principles. In response to this wave of failures, Moody's and Standard and Poor's rating agencies took an initiative for improving external transparency in derivatives activity by assigning specific ratings to reflect an institution's creditworthiness in relation to its derivatives risk exposure.

With the exception of the G-30 report in 1993, almost all relevant studies that deal with the question of systemic risk tend to conclude that this risk has increased with the growth in the volume of derivatives. None of these studies, however, provides remedies for hedging against such a risk. Goldstein and others (1993) report that financial institutions engaged in derivative dealings are exposed to essentially the same kind of risk—credit, liquidity, and legal risk—as when they are carrying out their other activities. In the area of systemic or interconnection risk, in particular, derivative instruments have a tremendous ability to enhance the linkages across market sectors in ways which are not always transparent. As a result, spillover effects due to a disturbance in one market segment may be difficult to identify or measure and ultimately control.

Systemic risk has often been cited as a possible threat to financial systems because of the immense volume of OTC derivative instruments today, especially where appropriate clearing arrangements do not exist. The growing linkage of various markets in a cross-border and cross-market way through derivative positions imposes a higher interconnection risk in cases of disruptions in a given market. The growing tendency of concentration in some derivatives markets further increases systemic risk in the sense that a failure of a major derivatives counter party would be detrimental to the market. The latest report on systemic risk—made public in November 1994 by the Eurocurrency Standing Committee of the central banks of the Group of Ten countries—argues that the observed growth of derivatives is unlikely to affect the conduct of monetary policy in normal circumstances (ECSC, 1994). The

⁹ By the term "systemic risk," we refer to the risk that a disturbance caused by a group of participants in a particular sector of the derivatives market generates disturbances throughout the financial system.

same study also makes the point that although the new financial products are capable of magnifying market volatility and possibly affect the short-term tactics of monetary policy in periods of stress, they are not likely to affect the long-term objectives of monetary policy.

In addition to a well-established netting mechanism, maintaining open lines of communication with supervisors seems to provide a good hedge against the spreading of a derivatives-linked breakdown. As a matter of fact, the work of the Basle Committee and IOSCO (International Organization of Securities Commissions) is heading toward global supervision, albeit very slowly. Global supervision, however, can only be achieved through the cooperation among banking, securities and insurance supervisors so that exchanges of information can freely flow between supervising authorities of different affiliates within a conglomerate. As explained in the following section, however, there are cultural issues, national sovereignty issues, accounting and payment system issues, and even basic disclosure issues that will prevent the utilization of such information in the formation of public policy toward systemic risk.

Disclosure, accounting, and the need for a new financial statement

Financial innovation is an ongoing process and, as a consequence, supervision and regulation must continuously adapt. The incentives for international harmonization and supervision in a globalized market for derivatives are obvious but the issues involved are conceptually, technically and, in certain cases, even ethically complicated (Cullen, 1994).

Even though country-specific legislation is already in place for the major European market players, harmonization at the EU level has not been achieved despite concerted efforts. Disclosure and accounting standards have already been established in the United States with FASB Statements 105, 107, and 119 of 1994 (Carpenter, 1996 and Edwards and others, 1995). In addition to independent concerns by investors, a number of studies on this issue have attracted interest and become the reference point for legislative actions. In June 1993, concerns regarding the settlement and systemic risk of derivatives was brought on to the front stage by regulators (Phillips, 1993) with the July 1993 study by the Group of Thirty calling for disclosure of information about derivatives' financial risk.¹⁰ Disclosure and accounting of derivative instruments has attracted increased attention of EU fora since 1995. These developments are expected to lead to a regime which resembles that of the U.S. FASB rules.

¹⁰ Even before that (January 1993), the joint study of the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency, entitled "Derivative Product Activities of Commercial Banks," conducted in response to questions posed by Senator Riegle on derivative products, had already contributed to concerns of competent authorities.

The reporting and additional disclosure required by International Accounting Standards 32 (IAS) will enhance the understanding of on-balance-sheet (recognized financial assets and liabilities) and off-balance-sheet (unrecognized) financial instruments related to an institution's financial position, performance, and cash flows. The standard requires disclosure about the nature, terms, and extent of an institution's use of financial instruments, and the purposes that they serve. At present, the FASB and the IASC both have covered how to improve disclosure about financial instruments but are still working on the appropriate standards for recognition and measurement, particularly of off-balance-sheet financial instruments. Therefore, for recognition and measurement of derivative instruments, the guidance continues to be based on national standards and the *Proposed IAS on Financial Instruments: Exposure Draft E48*.

Derivative instruments should be disclosed on the face of the balance sheet as contingent items, following the grand totals for assets and liabilities and equity, and in notes to the financial statements under the heading "Commitments and Contingencies." Disclosure is necessary for derivative contracts that may materially affect the institution's financial position. Such disclosure should include: (i) purpose for holding the instruments; (ii) accounting policies and methods used for measuring the derivatives; (iii) amounts of the different types of commitments, current exchange rates, and maturities; (iv) unrealized gains/losses of derivative instruments; and (v) information on the risks incurred, on an overall basis and for each group of instruments.

International harmonization of disclosure and accounting standards, however, becomes a very complicated matter when issues of cultural dimension or national sovereignty are involved. Dealing with such internal culture issues is a challenge for institutions and supervising bodies. The treatment of bankruptcy and the attitude toward monopolies and conflicts of interest varies significantly across countries. It is interesting to note that while in some countries bankruptcy is dealt with certain formalized legal procedures, in other countries the reference to such procedures is known as "reorganization," a difference that is indicative of the attitude toward an economic or financial entity going out of business. In a world of conflicting cultures, regulatory agencies are often involved in the unwinding of transactions with multiple netting arrangements and linkages across different regulatory regimes, legal approaches, and cultural perceptions. This is a risk that needs to be identified and dealt with by national supervisory authorities. Moreover, communication across all those involved in the process is a key aspect of the internal culture issue.

Significant differences also exist in terms of attitudes to conflict of interest issues and public disclosure of information. The conflict of interest that prevails in the U.S. markets and underlies the Glass-Steagall Act is not present in other countries. Until the regulatory separation of banking and investment activities is dealt with, such conflict of interest issues will constitute a barrier in the work toward global supervision. In terms of disclosure of information, while in the United States there is a strong tradition of public availability of relevant information which has resulted in greater public participation in capital market issues, the attitude in most European countries has not been so open. The lack of consensus on

disclosure has been widely discussed and documented in international fora. The problem, however, can only be addressed by standardization of disclosure that draws on an entity's internal risk measurement system.

Once all cultural and conflict of interest issues are resolved at the national level, there still remains a phase of international harmonization. An area where accounting guidelines are behind in the specification of standards for reporting derivative instruments. Moreover, the establishment of a well designed system for international payments—a task that is expected to occupy the attention of competent authorities throughout the remaining years of this century, and perhaps well beyond it—constitutes a major issue for international regulation and supervision. It is becoming increasingly accepted that the presence of well functioning payment mechanisms is vital for the avoidance of systemic risk.

In our opinion, the problem requires a new design for financial statements that incorporates an enhanced disclosure format for derivative products. Based on the specification of new requirements, we envision a separate statement that combines the following attributes:

- It escapes from the off-balance sheet trap by allocating, first, derivative positions into equivalent "primitive" balance sheet items. The work of the Basle Committee and the EU Directive on Capital Adequacy has already taken certain steps in this direction for the trading books of financial institutions. At a second stage, value-at-risk figures would be disclosed along with the underlying statistical parameters.
- The statement exposes the magnitude of total capital for financial conglomerates and contains measures and indicators for aggregate exposure and market concentration. The disclosure of such indicators according to harmonized rules can be helpful in identifying both firm-specific and systemic risks.

Thus, the necessary information to manage risk exposure would be recorded in off-balance sheet accounts and disclosed in notes to the financial statements. Additional schedules or statements could also be presented in a separate economic report to facilitate the internal decision making process as well as the needs of external users.

Improved disclosure according to traditional accounting standards or adopting a friendly market supervision through the allowance of internal "in-house value-at-risk" models will simply postpone the solution of a relatively new and serious problem. The concept of "Assets," "Profits," and "Losses" may not always be meaningful in the new environment even though such traditional accounting terms have helped us until today in our decision-making processes. Some of the new concepts that relate to derivative businesses are already in place: "value-at-risk" positions, "current" and "potential" exposure of derivatives portfolios are just some of them. What is needed is the extra step for establishing common methodologies for quantification of these concepts so that they become the elements of the new "Economic

Statement" of an institution. In some respects, the quantification stage has already proceeded despite criticism. The measurement of market risk using value-at-risk models subject to a ten-day holding period and a 99 percent confidence interval is already a proposal by the Basle Committee, while similar quantifications are already incorporated in EU's CAD for certain classes of financial risk.

Despite IASC's hesitant attitude in moving towards fair value reporting, a substantial number of large financial intermediaries rely for investment decisions on current and potential future exposure, on "value-at-risk" methodologies, and on "fair value" representation of all positions, including those of derivative products. On-balance sheet reporting of derivatives using fair value methods could be a valuable aid to authorities when assessing the risk exposure of financial entities. As numerous national accounting standards have moved in the direction of fair value recognition, it is quite likely that international standards will eventually move in the same way. In addition, current general practices of financial institutions should also be a guide in establishing such international standards. The danger of ignoring the prevailing decision making processes of key players in the market is that any other form of harmonization may be backward looking and subject to criticism and doubt by the supervised entities.

In a world driven by financial conglomerates, global supervision is becoming a necessity, unless national authorities are willing to bar or contain the expansion of global finance with the traditional or even refined capital controls. It has also been suggested (Henderson, 1996) that the harmonization of derivatives regulation is unnecessary and can await the convergence of financial regulatory systems. Instead of such pessimism, it seems wiser to adopt the view that if technical advances have resulted in a hypersensitive financial environment, it should be technology that should be used in containing systemic risks. Our position, the establishment for all relevant entities of a new "economic statement" that goes beyond the traditional balance sheet and income statement, is consistent with the solution of global supervision based on technology.

B. Implications for the Conduct of Monetary Policy

The implications of the presence of derivative products on the conduct of monetary policy can be analyzed in the context of the interest rate and exchange rate channels of transmission (Deutsche Bundesbank, 1993, 1994, and 1995). Such an analysis would involve the tracing of the effects on real economic activity, and specifically the substitution, income and asset effects. In the end, in order to derive positive implications, one would have to resort to empirical analysis, something that the existing accounting and disclosure systems and available data do not allow. Until this is possible, only certain general implications can be drawn. The effects of derivative instruments could be classified into four categories: (i) transmission mechanism and effectiveness of monetary instruments; (ii) measurement of monetary aggregates; (iii) additional constraints in the conduct of monetary policy; and (iv) systemic (financial) risk. In particular,

a. The introduction and use of derivative instruments may alter the monetary transmission mechanism and thus make monetary management much tougher for at least two reasons:

- monetary relations may become unstable due to the possible distortion of monetary aggregates' measurement (especially, bank variables) and therefore predictions may become less accurate, and
- the extent of changes necessary in monetary measures may be much greater, when derivatives are widely used, in order for a certain policy to be effective. This is particularly true when interest rate movements necessitate changes beyond interest rate levels that are hedged.

This emerging inadequacy and/or inability of the existing monetary policy instruments to effectively attain intermediate and ultimate targets could be dealt with by having monetary authorities' continue to monitor how monetary relationships are changing overtime, both in terms of quantitative impacts and lag structures.

b. The increased use of derivatives affects the traditional measurement of monetary aggregates. Since a great number of derivative instruments could directly or indirectly impact on bank deposits of end-users of such instruments (for hedging and speculative purposes), the traditional measurement of M1 and M2 may no longer be representative of money supply developments in a country with a wide use of derivatives.

This distorted representation of monetary aggregates may mislead policy makers in their decisions. Such a distortion could be dealt with by the introduction and monitoring of broader measures of money supply, like the enhanced M3 or M4, or the abandonment of money targets for other targets such as inflation or interest rates.

Also, derivatives can enhance the operational efficiency of financial markets, liquidity, nominal price stability, and return on financial instruments that create ready substitutes for traditional monetary instruments.

Furthermore, since derivatives are considered off-balance sheet items for banks, measurement of bank reserves may also be distorted and, in turn, reserve management may become difficult. Also, reserve requirements may be significantly different than they would be if these instruments were accounted for. Consequently, depending on the extent of the derivatives' use, capital adequacy and liquidity in the economy may become difficult to track.

c. The additional constraints on the conduct of monetary policy arise from the fact that monetary policy actions affect not only the easily observable on-balance sheet items but also the undisclosed off-balance sheet items of financial entities.

Changes in monetary policy may drastically affect market conditions, and therefore, may significantly alter risk exposures of end-users of derivatives, as well as of financial institutions providing such instruments. Note that the impact of such policy changes may be easily estimated for on-balance sheet items but it may not be so for off-balance sheet items, due to the general lack of common disclosure requirements applied on an international basis. Suggested remedies for that impact are increased efforts to measure exposures of financial entities (mainly banks) dealing in derivatives and the establishment of conditions for maintaining adequate capital reserves to cover increased exposures.

d. Owing to the wide use of derivatives, the interdependence of risks from a broad financial failure may have been enhanced. As antidotes to these risks, internal control systems and improved risk management systems for end-users and providers of derivatives, improvement of payment and settlement systems through the development of netting arrangements, as well as continuous monitoring of organized exchanges and OTC markets by management and regulatory agencies, have been suggested. The operational aspects of these remedies, however, have not been worked out yet. Given the fact that systemic risk can also be viewed as a composition of different sub-risks (liquidity risk, market risk, credit risk, legal risk, settlement risk, operational risk), supervising entities are more likely to directly address the more identifiable components of this risk. Suggestions in this direction have gone as far as central bank intervention by using currency options (Taylor, 1995). Such proposals seem drastic and their proper evaluation has not been conducted yet. On more practical grounds, however, national authorities started requiring conformity with the Lamfalussy standards for net settlement systems, while most central banks prefer Real-Time Gross-Settlement (RTGS) Systems for large value transfers which settle on the books of the central bank.

C. Trends and Anticipated Developments

A well-established trend in the global derivatives market is the enhancement of competition among organized exchanges located in different countries. An easily identified trend in this area is the involvement of organized exchanges of developed countries in the trading of currencies of less developed and emerging countries. As a result of this trend, national regulators—especially those of emerging markets—have to re-evaluate their approach to regulation and are forced to deal with the international aspects of derivatives markets, such as the different national regimes where derivative contracts are listed and/or traded. Moreover, competition between OTC markets and organized exchanges on the one hand, and the blurring of the OTC and exchange market instruments on the other, will only add to this competitive pressure.

Between 1978 and 1988, the number of exchanges has grown considerably and the number of financial futures and options listed on these exchanges has grown from 16 to 205. Automated trading systems in the area of futures and options that have come on line since 1988 account for more than 80 percent of the total (Domowitz, 1992), a statistic which is indicative of the growth of the industry. Such a rapid expansion of organized exchanges has

lead to increased competition, the benefits of which are finding their way mainly in the form of lower transaction costs to end users. The following list summarizes some of the latest developments:

- In Italy, pursuant to a decree by the Minister of the Treasury, a new financial options market, the Market Telematico delle Opzioni (MTO), was established in 1994 which complemented existing MIF - Italy's futures market.
- Trading of the first two option shares started in Spain in 1993 and an option on the IBEX-35 index had been trading in Madrid since 1992. The incorporation of the companies MOFEX (Madrid Financial Options Exchange) for financial options and MEFFSA (Madrid Financial Futures Exchange) for financial futures took place in 1989, after a Treasury Resolution authorized the creation of organized markets. In the short time they have been in place, derivative markets have become one of the most active financial market segments in Spain (Nuñez, 1991).
- Following a compromise deal between Lisbon and Porto, a derivatives exchange was established in Porto in 1995.
- In April 1995, Korea's stock exchange started trial trading of stock index futures for the Korean Stock Price Index (KOSPI 200). The Index accounts for 70 percent of the total domestic capitalization level. Plans for the introduction of stock index futures in Korea were put forward in the beginning of 1996.
- The Kuala Lumpur Options and Financial Futures Exchange (KLOFFE) was given permission to operate an organized exchange in derivative products in 1992.
- Thailand's Securities and Exchange Commission established in 1994 a formal working group for the drafting of legislation for the creation of a futures exchange , as well as for the regulation of trading and investment in derivative instruments.
- The futures market of Argentina (ROFEX) was established in 1991 and trading oil futures was introduced recently. A small number of shares options is also traded in the last few years.
- In Mexico, equity warrants have been traded on the Mexican exchange since 1993.

- In Austria, the Austrian Futures and Options Exchange (OTOB) was introduced in 1991 and by 1994 it had contributed to the evolution of a domestic securities lending and borrowing system, even though the number of stocks on which options could be traded was just six.
- The Belgian Futures and Options Market (BELFOX) was established in 1992 and posted initially disappointing results. However, the reforms of 1993, which included the abolishment of the fixed commission structure and the breaking of the banking industry's monopoly in the area of derivatives, stimulated activity in BELFOX.
- The Moscow Financial and Futures Exchange (MEFEX) started trading in September 1995 after the establishment of a necessary guarantee fund.
- Finally, after its legal reorganization, the Athens Stock Exchange (ASE) announced in mid-1995 the formation of an affiliate company, which among other responsibilities will proceed with the introduction of derivative instruments in the exchange. By early 1996, the Capital Markets Committee had approved draft legislation for the establishment of an organized futures and options exchange in Athens. Later on, however, the Capital Markets Committee expressed some hesitation in proceeding according to plans.

Smith and others (1991) suggest that the spectacular growth of the derivatives industry represents a confluence of forces that will lead up to "seamless" markets for many securities and derivatives by the end of the 1990s, in much the same way as a "seamless market in foreign exchange exists today." This is an anticipated development that will force a new approach to supervision and regulation of such dynamic markets. Technological advances in this area have raised doubts as to whether traditional definitions and standards are applicable or useful. Even the definition of an exchange across countries is so vague that virtually anything could be considered an exchange.¹¹ Moreover, competition among organized exchanges located in different countries and thus operating under different regulatory regimes have forced regulators to reevaluate their approach to regulation. Competition from the OTC markets and the blurring of the OTC and exchange market structures will only add to this pressure (Napoli, 1992).

As a result of the intensifying competition, organized exchanges have launched new products related to currencies of emerging markets. The Chicago Mercantile Exchange (CME) launched in 1995 a contract on the Mexican new peso and plans to list contracts on the Italian lira and the Spanish peseta soon. In November 1995, CME launched a set of

¹¹ In the United States, an exchange is defined by section 3(1) of the Securities and Exchange Act.

Brazilian currency derivatives. France's MATIF, Finex Europe, and the Brazilian Bolsa de Mercadorias & Futuros also introduced new currency contracts. Finally, as reported in earlier sections of this paper, currency warrants and derivative instruments involving the Greek drachma have been listed in the Frankfurt, Munich, Luxembourg, and London exchanges. Due to the globalized nature of financial markets nowadays, these developments are expected to present a competitive threat to any future exchanges that will be established in the home countries.

In the area of regulation and supervision, the approval of the rule that revises the risk-based capital treatment of derivatives by the Federal Reserve, FDIC, and the Office of the Comptroller of the Currency in August 1995, signals the starting of new rounds of European deliberation on these issues. The rule expands the methodology for calculating potential future exposure to equity, precious metals (except gold), and other commodity categories, in addition to the interest rate, foreign exchange and gold categories considered so far. Moreover, the new rule allows for a reduction of potential future credit exposure for transactions subject to qualifying bilateral netting arrangements. The fact that the rule is based on a revision of the Basle Accord, which was adopted by the Basle Supervisors Committee in April 1995 and is effective at year-end 1995, implies that the European Commission may soon follow the same path.

Prerequisites for the further development of derivative markets are, in addition to systemic stability, the elimination or reduction of obstacles facing investors in emerging market economies and the creation of an institutional framework that will adapt local conditions and practices to international standards.

D. Opportunities for Domestic and International Investors

Despite the fact that most derivative products have no direct link with the production process or with the process of saving and investment, they have the characteristic of providing insurance and investor protection for risk averse investors by rechanneling risk to those who are willing to assume it for higher returns. Such a characteristic can not be easily provided by competent authorities or by any other arrangement in an efficient market.

The limited availability and liquidity of traditional financial instruments in an emerging market, the inadequate or possibly stringent regulatory system, and an often underdeveloped financial infrastructure can only reduce the benefits from the introduction and use of new financial instruments. The lack of liquidity, which in effect reduces market efficiency, can further be enhanced by supervisory initiatives aiming at the provision of an appropriate legal and accounting system that ensures the transparency of financial transactions.

Investors often face bureaucratic restrictions that can limit market access and hinder the settlement of payments. The abolition of restrictions on foreign exchange transactions and other barriers on market entry and exit, the improvement of information on securities transactions, the increasing presence of market makers and brokers, and the decreasing cost of

transactions sharply improves investors' benefits at the local and international level. In this context, financial intermediaries, in particular dealers and brokers, are also encouraged by the existence of derivatives-specific legislation that guarantees compliance with agreements and contracts. Emerging equity markets develop and function well only if participants have confidence in the efficient workings of the financial market system, trust that the rules of honest trading prevail, and accept specialized government institutions as arbiters in disputes. Furthermore, harmonization in accounting rules and settlement standards between emerging and established markets should be sought in order to minimize uncertainty in investment decisions.

To further promote the development of new financial products in an emerging market and with it, investors' benefits and attractiveness, attention should also be paid to other institutional factors that inhibit portfolio investment such as the tax system, the legal framework and financial procedures. Accounting systems that are perceived as fair and accurate help in gaining investors' confidence. Laws ensuring that private contracts are honored and enforced and that appropriate dispute resolution mechanisms exist, as well as measures dealing with fair equity trading, transparency of transactions, and disclosure rules, lead to international acceptance of emerging markets. By allowing the computerization of equity and currency market dealings, simplifying procedures for listing firms in the equity markets, and relaxing antiquated standards for accepting brokers' and brokerage houses' derivative dealings, transaction costs and management fees are significantly reduced and the financial infrastructure is improved. Finally, in order to remain competitive in today's global marketplace, governments of emerging equity markets should adopt a flexible approach in regulating their financial systems and institute measures that enhance market efficiency.

VI. CONCLUSION

The present environment is as conducive as it has ever been for the development of the financial industry in Greece. With the advent of deregulation in the early 1990s, a variety of new financial products and derivative instruments related to the drachma were launched in the local and international markets. Despite these trends, however, the fact remains that Greece is one of the few countries in EU without an organized exchange and relevant legislation for derivative instruments.

Judging from the first wave of innovations and their causes and effects, it is evident that the recent derivatives market developments in Greece resemble those observed in the financially advanced markets during the 1980s. Increased volatility, deregulation, and international competition has forced financial institutions to engage in a financial engineering process that would satisfy the investment needs of their clients. At the same time, the nature of regulation has adjusted to this wave of financial innovation, primarily through the adoption of ready-made EU legislation. This synergy may have also contributed to the containment of the exchange rate volatility observed and to the flexibility in conducting monetary policy sought for.

In this rapidly evolving environment, financial institutions, investors, and supervisory authorities face the continuous challenge of properly balancing the risks from the development of financial innovations and the rewards from their use. As long as technology continues to make geographic distances unimportant, markets continue to become more global in nature and new avenues for profitability are opening and closing. In addition, the demand for new "regulatory tools," organized exchanges that can compete with OTC markets, and modern payment systems will undoubtedly continue to grow and present new challenges to all parties involved in the innovation process.

Also, it should be noted that uncertain and unsustainable macroeconomic policies, both domestic and foreign, add to the volatility of the exchange and interest rates, and complicated taxation rules that encourage tax arbitrage significantly contribute to the development of many of the financial instruments. In principle, additional financial instruments, facilitated by better technologies and lower transaction costs, improve the allocation of scarce resources as more markets allow more information to be disseminated about the preferences of the various agents. In the case of Greece, many of the incentives to create these instruments have also been caused mainly by restrictions and unsound domestic macroeconomic policies, which, among other things, amplify the need for hedging. As the deregulation and financial ingenuity continue, many of the intentions of the current policies will, somehow, tend to be circumvented. Thus, there will be a persistent and stronger request for a change in unsustainable policies. As deregulation forces the decision makers to change unsustainable economic policies, and therefore to adopt this first-best solution, the greater will be the economic gains from the financial intermediation process and the lesser will be the incentives for financial ingenuity that adds little or no real value to the domestic economy. Finally, the evolution of derivatives markets in Greece may serve as a useful paradigm for the development and regulation of capital markets in new emerging and transition economies.

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