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Empirical examination of equity market integration in European Community: An asset pricing model

Akdogan, Haluk, Ph.D.

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EMPIRICAL EXAMINATION OF EQUITY MARKET INTEGRATION IN EUROPEAN COMMUNITY: AN ASSET PRICING MODEL

by

HALUK AKDOGAN

A dissertation submitted to the Graduate Faculty in Economics in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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Abstract

EMPIRICAL EXAMINATION OF EQUITY MARKET INTEGRATION
IN EUROPEAN COMMUNITY:
AN ASSET PRICING MODEL

by

Haluk Akdogan

Adviser: Professor Yaman Asikoglu

We attempt to examine empirically the capital market integration versus segmentation issue in European Community stock markets. The question of equity market integration across the Community markets is analyzed by employing asset pricing models as empirical tools. Evidence supports that the EC stock exchanges have been headed toward a more integrated European market for securities since the early 80s. However, the movement is rather slow. Evidence also suggests that some EC markets are better integrated among themselves than the rest of the Community. Special empirical emphasis is given to the sources of segmentation. In this context we test whether or not capital controls over the equity markets play a deterministic role in the level of market segmentation. There, we fail to accept the hypothesis that market price of risk is the same across the EC markets after two important legislation years when most capital controls were lifted. We do observe, however, that there is a gradual trend toward an integrated EC equity market when we contemplate how well an EC composite model explains the movements in security returns in a sample of eight Community stock markets. The monthly data on stock prices are used.

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CHAPTER I

I. INTRODUCTION

Equity markets in Europe have been traditionally less important in channeling financial funds. Existence of a well-developed commercial banking system has taken the lead in attracting and distributing funds thereby decreasing the market values of European equities which constitute only a small portion of the world equity market. When they are taken separately, the European equity markets are much smaller in aggregate market values than those of the Japanese and U.S., the two giant equity markets in the world.

Despite its small size in market capitalization, the European -particularly European Community equity markets on the average outperformed the U.S. equities. Besides, the appreciation of the European currencies against the U.S. dollar has attracted the non-European -most notably the U.S.investors who want to diversify internationally. However, the recent developments in the EC to deepen both the political and economic integration have discriminated against non-EC investors. Therefore, mostly the U.S. and Japanese equity investors in large numbers have gradually lost a potential area of diversification thereby the benefits associated with optimum portfolios that are made up with both domestic and international securities.

This argument is especially a valid one in a segmented world equity market for, when the securities are priced according to their local systematic risk, part of that risk becomes unsystematic and hence diversifiable in a global context. As the share of diversifiable risk increases, optimum hedging decisions are revised. International diversification which offers a different hedging startegies for equity investors who are willing to trade in foreing securities.

It is a cliche to say tha world equity market is a segmented one. However, whether a European capital market is segmented or integrated is unclear. In the light of recent developments toward a greater financial integration within the EC, one might argue that the EC equity markets are now more integrated than ever and that the European equities are priced in an integrated market not according to their domestic systematic risk contents. Whether the EC capital markets are integrated displays important questions as far as both European equity investors and companies in the Community that make capital budgeting decisions are concerned.

Despite its importance, there are very few studies that have dealt with the issue of equity market integration. It is true that much has been said and written about the European single market economy; however, little research is done in the literature of economics and finance on the topic of financial integration in Europe using capital asset pricing models. A rich body of studies on European financial integration have either taken European integration as given from the outset, (See for instance Razin and

Sadka 1989, 1990, Micossi, 1988) or else they have focused on a wide range of institutional aspects of the capital market integration. Others have dealt with open-economy-macroeconomic aspects of European integration, such as the implications of pro-fixed-exchange-rate-stand, meaning of a common currency or a common monetary policy in Europe. Still some other works arguing that capital market integration is not particularly desirable have focused on the normative dimension of financial integration (see Dornbusch, 1988).

Consequently, the question whether European capital markets are integrated or segmented is largely unresolved from an empirical standpoint. It is still unclear that the European capital markets are headed towards integration. To the best of our knowledge, there has not been any empirical works based on capital asset pricing models to test whether the European capital markets are integrated. Nor has there been any particular study addressing the existing level of integration (segmentation) in European capital markets. The issue of capital market integration in the EC or in Europe as a whole is almost untouched empirically.

We argue that the institutional framework that is expected to prepare the European Community for the common market does not by any means guarantee that the financial markets will act as if there is one EC market. If they do not become one market, that is if the national markets are segmented, then returns on domestic portfolios will be less than those on European portfolios. This means that there exists a European portfolio that is superior to domestic

portfolios. Alternatively, if the supranational market portfolio is the mean-variance efficient one, then any other portfolio set locally will not be efficient.

The primary purpose of this study is, therefore, to examine empirically the issue of capital market integration versus segmentation in European capital markets in particular stock markets by employing several versions of international capital asset pricing models.[1] Our principal concern is be on the sources of segmentation if the tests support that the European markets are not integrated.

II. MEANING AND IMPORTANCE OF INTEGRATION OF CAPITAL MARKETS:

What is meant by integration of capital markets is simply nonexistence of differential risk premia for similar or identical financial instruments traded in different locations. Alternatively, capital markets are said to be integrated if the risk associated with similar or identical assets traded in different exchanges carries the same price. A stricter version of this definition suggests that capital markets are integrated if assets with perfectly correlated rates of return -meaning identical assets have identical risk premiums regardless of the location in which they are traded. That is, if risk carries the same price across the EC capital markets, then the European Community equity markets can be classified as being integrated. A complete integration of capital

[1]European capital markets in this study are confined with the European Community (EC) markets.

markets should imply the absence of arbitrage opportunities. This implies that as markets become integrated arbitrage profits should tend to disappear.

Therefore, risk premia differentials suggest some level of segmentation in capital markets, and sources of risk premia differentials should shed some light into the causes of segmentation. If the EC markets are segmented, that is if risk premia differentials do exist for the assets of the same characteristics, both the individual and the corporate financial strategies differ from those in the presence of integrated capital markets.

First of all, when markets are segmented, international (European) portfolios are likely to exhibit risk-adjusted returns above domestic portfolios for priced domestic systematic risk diversifiable partially.[2] Next, domestic firms will face optimal hedging decisions. They will also face optimal foreign borrowing versus optimal home borrowing decisions. Alexander, Eun, and Janakiramanan argue that segmentation of capital markets produces incentives for firms to adopt countermeasures and that dual listing of stocks on foreign capital markets is the typical way of dealing with segmentation. They also show that, under segmentation in capital markets, international listing of a security accompanies with a reduction in its expected return through affecting the stock

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[2]Jorion and Schwartz define integration as "a situation where investors earn the same risk-adjusted expected return on similar financial instruments in different national markets." (Jorion, and Schwartz, 1986)

price significantly (Alexander, Eun, and Janakiramanan (1987, and 1988) Finally, capital budgeting decisions will be entirely different under segmented national markets.

III. HISTORY:

A. Early Years:

The history of the idea of financial integration within the European Community goes back to the early sixties. The Council of ministers of the Community -then of six member states had adopted two Directives that set out initial obligations for the removals of capital controls in member states in 1960 and 1962 respectively. These directives to deregulate the capital transactions were associated with a number of basic financial freedoms in the Community such as short term and medium term credits, personal capital movements, investments, and trade in quoted securities. A third proposal was also submitted by the Commission in 1964. This was intended to remove the remaining discrimination in the legislations of member states regarding stock exchange listing, the issuing and placing of securities, and the acquisitions of securities through financial institutions. Nevertheless, this proposition was rejected by the Council of Ministers.

Early years of the decade of sixties were relatively successful for the future of the Community. The policy actions taken at the Community level would have been much more effective, had the international economic circumstances of the late sixties

and seventies been more favorable. Two major events caused serious setbacks toward for liberalizations of capital movements, the underlying objective of the two early proposals in the Community. First, the end of Bretton-Woods and the U.S. Treasury's cease the dependence of the dollar to gold brought about uncertainties for the future of the EC. Second, the oil crises of the seventies simply pushed the EC member states to concentrate more on their domestic problems. The impacts of these two external shocks for the EC equity markets were that most member states reintroduced controls on capital movements. Besides, the three new members of the Community, the United Kingdom, Ireland, and Denmark brought with them strict controls on capital which invoked the pessimism about the future of European Economic unity.

Having started off with such an undesirable economic climate, much of the 1970s did not contribute significantly to the financial integration in Europe. An effort to harmonize at least to a minimum degree the different regulations of the member countries on the admission of securities to stock exchange listing and the information provided to investors was made. In 1972, the EC Commission in a proposal for a first Directive in this area, stated that the omissions and differences in the information available to the public concerning securities constitute a "second barrier" for capital movements between the member states which prevents the securities markets fully benefiting from the advantages of achieved by the partial removal of currency restrictions. A second consideration was the operation of a single securities market

within the EC. Since 1979, the EC Council of Ministers has adopted important Directives in this particular area.

The March 1979 Directive coordinating the conditions for the admission of securities to official stock-exchange listing was the first stage.[3] This Directive covered the conditions required for issuers of securities, including the minimum issue price, the company's period of existence, free negotiability, sufficient distribution and the provision of appropriate information for investors. The purpose of this Directive was to encourage member states to provide equivalent protection for investors at Community level. The Directive, however, did not provide a coordination for it left great deal with the member states to apply or not to apply. Under this directive, for instance, they may have decided -if they wanted to- not to apply this Directive to units issued by collective investment undertakings other than the closed-end type, and to securities issued by a Member State or its regional or local authorities.[4]

In addition, there were a small number of Commission recommendations that were adopted, but Directives were limited in number in the 1970s. In one of such recommendations, the Commission was in the opinion that a European code of conduct should be adopted. It recommended to the member states that they should ensure the observation of certain basic principles to further

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[3]Directive 79/279/EEC.

[4]Council Directive of 5 March 1979, Article 1.

facilitate the process of harmonization through Directives by making clear in advance the approach the Commission will be adopting.[5]

B. The Changing Attitude and the Single European Act:

Unlike the seventies the decade of eighties for the European Community was a promising one. After the second oil shock of the decade (1979) Europe gradually entered into a new phase, and a slow but sustained economic growth in most states was observed. Economic pressures of the early and mid seventies were somewhat lifted and European issues once again became dominant over domestic problems. First of all, the Community started the decade with the European Monetary System entered into force in 1979. The system that now includes all twelve member states was further enhanced with the comprehensive realignment of March 1983. The EC countries participating in the exchange rate mechanism (ERM) pursued a number

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[5]In a Memorandum dated 25 July 1977, the European Commission specified the content of the code. Six general principles were set out. The first principle emphasizes the importance of the code as a departure for future Directives. The second principle is that information provided to savers must be complete and accurate, since lack of knowledge is a source of imperfection in any market. The third general principle relates to equality of treatment for shareholders. "The fourth, the fifth, and the sixth general principles are more particularly concerned with ceratin categories of persons the importance of whose role in the realization of the code's objectives is beyond doubt, namely the members of companies' supervisory boards, company directors and company managers (principle 4), financial intermediaries and persons concerned professionally in transactions in securities (principles 5 and 6)". (Official Journal of the European Communities, 77/534/EEC, 25 July 1977, pp. L 212/38-39)

of policies that brought about convergence in cost and commodity prices.[6]

In a significant effort, two member states with their own initiatives removed all restrictions on capital movements in their national markets. The United Kingdom and Germany had eliminated all capital controls in 1979 and 1981 respectively. Although the removals of capital controls in Britain and in Germany had been more of national attempts of independent nature rather than EC originated tasks, they have accelerated the movement toward financial unity in other member states.

One important step toward the liberalization of capital movements was the March-1980 Directive coordinating the requirements for the drawing up, scrutiny and distribution of the listing particulars to be published for the admission of securities to official stock-exchange listing.[7] The Directive specifies items of information that must be published when equities, debt securities as well as those certificates representing shares are admitted to stock-exchange listing. This directive was followed by a Council Resolution on 15 February 1982 on the directive on information to be published on a regular basis by companies whose shares are already admitted to stock-exchange listing.[8]

The year of 1983 was one of the most consequential years in

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[6]See Paolo Cecchini, "The Costs of Non-Europe",(1988) on the issue of convergence.

[7]Directive 80/390/EEC.

[8]Directive 82/121/EEC.

the history of the Community. In this year, European Commission, the executive body of the EC initiated a new "European approach" to the financial integration in a communication. After this particular year of the first initiative, capital controls then-existing over the European markets except for Germany and Britain have been gradually lifted. In the following year, 1984 it was planned that exchange controls as well would be eliminated in most EC countries by the end of 1988.

The most radical attempt toward a European common market economy, however came in the second half of the eighties, a period that is considered to be the best times for the future of the Community. The so-called Cockfield's White Paper dated 1985 and almost fully adopted by the Commission President Jacques Delors scheduled the future of a complete integration. The White Paper made up the main body of what has come to be known as "The Single European Act". The Paper with its two Directives implemented for the first time the "new approach" on completing the internal market in the spirit of the 1983 communication. Specifically the principle of mutual recognition of the legal provisions of the Community States based on a minimum level of coordination of national provisions and control by the country of registration or country of origin was implemented.

The framework for the approximation of legal provisions so as to achieve approximately equal conditions of competition and effective protection for investors in all EC member states was set out in the Coordination Directive. The second Directive, the

Liberalization Directive, required that Member States remove all restrictions on the free marketing of units. The field of application, the admission conditions, the structure of investment funds and their investment policy, the information to be supplied to unit-holders, the general obligations of funds[9], the observance of the laws of the Member State in which the units are marketed, the rights and obligations of the supervisory authorities and the creation of a Contract Committee are covered by the provisions of the Coordination Directive.

The Commission communication of 1983 and the White Paper of 1985 essentially involve four areas of action on the path towards full financial integration: removal of restrictions to capital movements and to the provision of financial services across national borders; a series of regulations to ensure the stable and efficient functioning of capital markets; tax harmonization measures to remove fiscal distortions; and lending-borrowing activity of the Community institutions.

Removal of obstacles to capital movements was aimed in a subsequent Directive adopted by the Council of Ministers in 1986. The 1986 Directive enlarged the categories of capital transactions that are subject to the unconditional liberalization to include equities, bonds, and long-term trade credits. The Directive further requires that the member states refrain from introducing new authorization procedures that are more stringent than the existing

[9]Obligations such as the ban on borrowing.

ones on the date of entry into force of the Directive.

In 1987, a Council Directive relating the indirect taxes on transactions in securities is aimed at abolishing indirect taxes on such transactions. The argument in favor of abolishment was largely motivated by the absence or a minimal presence of taxes on stock exchange transactions on major financial markets, such as the American and the Japanese ones. In the same year with another Directive, investor protection, the removal of distortions, and the combat of fraud were coordinated.

There was another important EC directive on the liberalization of capital movements in June 1988. The Directive was a clear decision on full liberalization of capital movements.[10] This 1988 Directive was the second phase to abolish all the remaining restrictions on capital movements. In particular capital movements that are covered by this Directive are monetary transactions - especially short term transactions, financial credits, operations in current and deposit accounts, account openings abroad, and transactions in money market instruments.[11]

This important Directive stipulated two deadlines for the remaining controls on capital movements. July 1, 1990 was chosen as the deadline of removal for France and Italy. The rest of the Community States were asked to remove all remaining restrictions by the end of 1992. The directive also contained a provision on the

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[10]The Council Directive of June 1988 was meant to implement the Article 67 of the EEC Treaty.

[11]Council Directive 88/361/EEC.

responsibility of national authorities in terms of monetary policy measures adopted in the absence of a common European currency.

France and Italy abolished remaining capital restrictions in January and May 1990, respectively, ahead of the July 1 deadline stipulated in the 1988 Directive on the liberalization of capital movements. Belgium and Luxembourg ended the dual exchange rate market regime for both current and capital transactions in March 1990. Spain and the United Kingdom finally joined the ERM in June 1989, and October 1990 respectively.

C. Remaining Obstacles:

There still remain important disagreements among EC states over such issues as stock exchange listings, share trading across borders, and capital adequacy. In May 1990, an agreement was reached for a European list to be developed by the end of 1991. The idea of a European list was proposed by France. It involves listing Europe's leading companies on all stock exchanges within the Community, allowing investors to trade in the shares issued by foreign companies through their own national stock exchange. France had initially wanted to restrict the list to 300 companies, selected largely by the size of the home country's GNP. Later, she agreed on dropping these restrictions. The list is to be open ended, and GNP will not play any role in the selection of companies to be listed.

Despite of the gathering wave of deregulation since the mid-1980s, national exchanges have only recently begun to seek ways and

means to break down the remaining barriers between them to make up a working environment for investors to trade across borders. The idea of European-wide share trading is yet to be worked out. Britain argues that European share markets are fragmented and that they are still unattractive to large investors -especially those from the US and Japan. Officials in London International Stock Exchange believe that investors want a wholesale market spanning the continent. This belief, of course undermines national securities markets.

On the other hand, France led group including Belgium, Italy, and Spain insist that all securities business should pass through recognized national exchanges to give investors the highest level of protection. Therefore, no business should be conducted off-market. If somehow it is, then investors should give express permission for their dealing to bypass the organized markets. The group also insists that all trades should be disclosed immediately and that trading in a given security ought to be allowed only on exchanges where that security is officially listed.

The issue of off-market appears to be one the important disputes among member states. It clearly favors institutions which already have a big market share. The disagreement between the French-led camp and Britain or Germany who see no need to limit trading in this way is partially explained by the large share of the business that German and British banks and brokers want to secure. Many of these banks still continue to rely on a substantial amount of business in their domestic markets. Small competitors and

many outsiders suffer from being excluded from much of trading. This strengthens the position of existing market leaders and results in an internationalization of stock markets into a small number of banks, similar to the securities trading in Germany dominated by a handful of large banks. The consensus between the giant and loosely regulated Euromarkets of the U.K. and the German trading sector, which at present has no formal exchange seems to overweigh the French-led group.

In spite of all these disputes, there is a widespread optimism in the Community. The deadline 1992 is seen as an historical step on all accounts. The optimism can be taken granted for the time being for the process of eliminating major obstacles is underway. Thus, as barriers and several government controls are gradually lifted over the European capital markets a complete integration of legal sense is scheduled to take place prior to the deadline of the Single European Act. The trend toward integration has actually become more evident since the Act was entered into force in 1987.

There is now a greater convergence in monetary policy as well as inflation rates in the Community. Financial integration of European money markets has been extraordinary both in terms of speed and of size. Many consider monetary integration irreversible. There is less certainty on the part of equity markets. Part of the uncertainty seems to be related to how much monetary integration is required for a complete liberalization of European capital. Whether capital market opening can proceed without further significant monetary integration such as a truly common monetary

policy and/or a common currency with a common Central Bank integration is unclear.

All these questions have important policy implications for and after the deadline 1992 that does not necessarily suggest that the EC will enjoy a full capital market integration of practical sense. Without examining empirically the existing level of capital market integration (segmentation) in the EC, any answers to these questions would fall short for new macroeconomic measures to enhance the financial integration. A similar type of uncertainty exists on the part of equity market investors whose decisions will surely differ in an integrated European capital market. We shall attempt to test for integration based on equity markets in the Community later in this study existing level of integration (segmentation) in the European Community. The following chapter will review the literature.

TABLE I

Percentage differences in prices of standard final products in eight Community Member States compared with the average of the four lowest national prices

	Germ	Belg	Spai	Fran	Ital	Luxe	Neth	U.K.
Banking Services								
1. Consumer credit	136	-41	39	n.a	121	-26	31	121
2. Credit cards	60	79	26	-30	89	-12	43	16
3. Mortgages	57	31	118	78	-4	n.a.	-6	-20
4. Letters of credit	-10	22	59	-7	9	27	17	8
5. Foreign exchange drafts	31	6	196	56	23	33	-46	16
6. Travellers cheques	-7	35	30	39	22	-7	33	-7
7. Commercial loans	6	-5	19	-7	9	6	43	46
Insurance services								
1. Life insurance	5	78	37	33	83	66	-9	-30
2. Home insurance	3	-16	-4	39	81	57	17	90
3. Motor insurance	15	30	100	9	148	77	-7	-17
4. Commercial fire and theft	43	-9	24	153	245	-15	-1	27
5. Public liability cover	47	13	60	117	77	9	-16	-7
Brokerage Services								
1. Private equity transactions	7	36	65	-13	-3	7	114	123
2. Private gilts transactions	90	14	217	21	-63	27	161	36
3. Institutional eqty transactions	69	26	153	-5	47	68	26	-47
4. Institutional gilt transactions	-4	284	60	57	92	-36	21	n.a

Source: Cecchini, Paolo, "The Economics of 1992" in European Economy, March 1988

CHAPTER II

A REVIEW OF THE LITERATURE

I. SOME PROBLEMS OF STUDYING CAPITAL MARKET INTEGRATION:

Being well aware of the importance of the internal market, many scholars seem encouraged to work on various aspects of the European common market economy. Thus, much has been written on European single market. Nevertheless, many appear less interested in the capital market implications of the common market. From an institutional point of departure, One can find substantial amount of work that attempt to evaluate the legal and procedural bases of the internal market. There does not exist sufficient amount of quantitative work on European capital markets under a continental single market economy.

There are, however, two major difficulties in doing research on the issue of segmentation versus integration in capital markets. First of all, the theory of international capital asset pricing is non-standard. There seems to exist an intense controversy in international asset pricing due to varying assumptions on utility functions, market imperfections, and sources of price uncertainty. Some theoretical models for instance assume that all investors

irrespective of where they live consume the same good, with different stochastic domestic inflation rates (Grauer, Litzenberger, and Stehle, 1976). Some others assume that exchange rates reflect relative price variations in the sense of deviations from purchasing power parity with non-stochastic price changes and different tastes across countries (see Solnik 1973). Absence of a consensus in the literature of international capital markets to the question of integration or segmentation is very much related to these fundamental differences on assumptions.

The second major difficulty lies in the complexity and variety of capital controls. National governments' impediments to capital movements are so complex that often generalized tests of capital market integration fail to be informative. Although regional free trade blocks and bilateral trade agreements have to some degree harmonized several national policies among and between the trading partners, there are practically as many different foreign capital regimes as the number of countries. This complication obviously poses a great challenge to the theory of international asset pricing and integration of capital markets. The lack of sound empirical work in the field might be traced to the non-standard theory due to this complexity.

One other reason for the lack -only in the context of European finance can be attributed to a peculiarity of European capital markets. That European Community researchers or others do not empirically deal with the capital market integration issue seems to imply that they find it more practical and interesting to

capture the institutional and procedural insights of the European internal market or that the existence of a well-developed banking sector in Europe might have given a secondary role to European stock markets in the academic literature.

Perhaps, the only exception is the early works of Solnik (1974, and 1977) who in particular attempted to determine the international market structure of asset prices both theoretically and empirically. His main concern was by no means the integration of European capital markets. Rather he looked into American, Japanese and European equity returns to describe an international asset pricing model. Solnik's pioneer work indicated that the domestic β of a security cannot be taken as the true measure of its risk although his data set of eight European and two non-European (the United States and Japan) stock prices covered the time period from 1966 to 1971, a period when the European integration was still premature.

There are few studies that have dealt with the issue in the context of equity markets. Most works have apparently focused on monetary integration. The method that has been adopted to test for monetary integration is based upon the validity of interest rate parity in European markets. Aliber (1973), Marston (1976), and Roll and Solnik (1977) studied the Eurocurrency markets. They overwhelmingly validated the interest rate parity relationship in

short-term Eurocurrency markets.[12] Convergence in interest rates, that is the tendency toward equalization in interest rates does not tell much in terms of capital market integration. Rather, it should be taken as sign of money market integration.

A rich body of the literature on financial integration have adopted modern asset pricing models. In terms of asset pricing models, there appear two lines of research on international pricing of capital assets in general and on the issue of capital markets segmentation in particular. Numerous previous works -with a possible exception of Stehle (1977) focused on the presence or absence of segmentation in capital markets without any reference to the sources of segmentation. Most of them have failed to accept that the world capital markets are integrated. (See for instance, Solnik (1974, 1977), Adler and Dumas (1975, 1983), Ibbotson, Carr, and Robinson (1982))

A number of researches most recently have argued that a widespread rejection of capital markets integration should not suggest that there is no empirical question left unanswered, and they have given special emphasis to the sources of segmentation in capital markets. Basically three different sources have been recognized: a) market imperfections in the form of direct barriers to investment such as government impediments-capital controls (Stulz (1981a, 1981b), Errunza and Losq (1985), Gultekin, Gultekin,

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[12] All these three studies showed that interest rate parity holds almost identically in short-term Eurocurrency markets. See also Dooley and Isard (1980).

and Penati (1989, 1990), b) market imperfections caused by the inability of a group of investors (Jorion and Schwartz (1986)), and c) implications of exchange rate risk on international asset pricing (Solnik (1974,1977)).

II. MODELS OF CAPITAL MARKET INTEGRATION:

A. Non-asset Pricing Models of Capital Markets Integration:

Although most empirical studies carried out recently are based on models of international asset pricing, numerous previous works focused on the discrimination between the segmentation and integration on the basis of simple correlation coefficients. By calculating correlation coefficients among equity returns in various countries, some works linked capital markets integration to these coefficients. For instance, Ibbotson, Carr, and Robinson (1982) found high degrees of correlation within various groups of countries. Germany, Switzerland, and the Netherlands exhibited a great deal of comovement as did the United States, Canada, Australia, Hong Kong, Singapore, and the Netherlands. It was argued that these comovements of returns should be a signal for capital markets integration[13].

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[13]Contrary to this argument are the findings of most recent studies that adopt asset pricing models. Among those, Errunza and Losq (1985) find evidence supporting what they call "mildly segmented" world capital markets. Similarly, Jorion and Schwartz (1986) reject the hypothesis of integration between the Canadian and the U.S. capital markets. For an account of the inappropriateness of the covariance matrix of returns see Adler and

Another approach that is not based on capital asset pricing models is to test the validity of interest rate parity and link such tests to the tests for market integrations. (Aliber (1973), Marston (1976), Roll and Solnik (1977)). Interest rate validity tests were adopted in a number of early works on international capital market integration. It was argued that making the assumption of the existence of perfectly capital markets is sufficient to set forward an interest rate parity relation. Since perfect capital markets imply capital market integration, there seems to be a link between the tests of interest rate parity and the test of capital markets integration. Therefore, if interest rate parity differentials disappear one can speak of integration.

There is one major problem in adopting this method. The problem is its lack of generality. It is questionable to conclude that security markets are integrated when the parity relation holds since the interest rate parity differential is only a measure of money market segmentation. If interest rate parity differentials disappear or tend to disappear, this should imply monetary integration and not necessarily an integration of capital markets.

B. Modern Asset Pricing Models of Capital Markets Integration:

Whether capital markets are integrated requires a working definition of risk in the context of international pricing of

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Dumas (1975, and 1983) who argue that the matrix does not give information an the presence or absence of capital markets integration. See also Solnik (1977).

capital assets. This brings about the question of risk measurement. The mean-variance CAPM -whether single or multi factor- postulates that individuals measure an asset's risk by the covariance of its real return with the real return on his portfolio or the market rate of return. Consumption based asset pricing models measure an asset's risk as the covariance of its real return with the growth in his consumption (See for instance Wheatley (1988).

A test of integration versus segmentation becomes a joint hypothesis whereby international integration of equity markets and a given asset pricing model are tested. Thus, tests of integration are expected to provide evidence for or against a joint hypothesis that capital markets are integrated internationally and that a chosen asset pricing model holds.

1. Single Index Models:

International extension of CAPM was first studied by Solnik (1974) who derived a single index model and further investigated whether a domestic factor -for instance that part of the return on the domestic portfolio that is uncorrelated to the world portfolio- can solely explain the variations in stock returns via world market index. The following is the international version of a single index model that is in essence similar to what Solnik, Stehle (1977) and others have derived:

$$E(r_i) = \alpha_i + \Gamma\beta_{i,v} \qquad (2.1)$$

where $r_i = r_{i,n} - r_f$ = excess return on asset i, $r_{i,n}$ is the nominal return, r_f is the risk free rate, and $r_w = r_{v,n} - r_f$ is the excess return on the world market. Γ stands for the risk premia estimator. A zero intercept in this return generating process corresponds to the Sharpe-Lintner version and that a nonzero intercept implies a version of the Black model.

Then the question raised here is whether a single world index model would give a reasonable description of international asset prices. If the argument is a valid one, then the parameters of two regressions, one that regresses returns on a domestic market index, and the other that regresses returns on an international market index should answer the question of integration or segmentation. That is, capital markets are said to be integrated if the international factor is priced, or markets are segmented if a purely national factor is priced. Adopting this model, many of the empirical works fail to reject the hypothesis that the world markets are integrated.

The mean-variance CAPMs predict that the world market portfolio will be mean variance efficient under the hypothesis that capital asset markets are internationally integrated. Provided that the individual measures an asset's risk by the covariance of its real return with the real return on his portfolio, capital market structure of international stock prices is believed to be approximated by a single index market model just as that of the domestic prices is.

Having employed standard single-factor asset pricing models,

recent literature in international asset pricing and capital market segmentation have concentrated on testing whether or not international capital market integration exists. These works have in general adopted an international single asset pricing model of Sharpe-Lintner tradition based on the standard assumption that the return on any security is a linear function of the return on the domestic market index. In the international context, domestic market index translates into an international market portfolio or a composite world index.

An international market portfolio is simply a basket of securities selected from different capital markets of the world. A composite world index, on the other hand, is a weighted average of the domestic market indices. In either case, the focus is on whether the single index is priced by the data. If the international index is priced, this might be a signal for an integration since it accounts for an international factor as an important determinant for equity return variations. Therefore, one might conclude that the international pricing of capital assets is correct model. If, however, international model is insignificant and the composite index is not priced, this can imply that domestic factors are still important for pricing purposes and that the segmentation is the right model.

Solnik warned about complexities of an international single factor model such as the non-existence of a universal risk free asset and the presence of exchange rate risk. He assumed that all securities are affected by the international factor through their

national index. Although he found out that the international regression for country indices support international pricing of risk, he concluded that this was unrealistic and that two stocks with the same country risk could have different sensitivity to international developments for several other reasons (Solnik, 1974).

In one of the early works comparing the international and domestic versions of the CAPM, Stehle (1977), whose model is based on empirically the Fama-Mcbeth cross-sectional, time series approach, cannot reject the hypothesis of segmentation, nor can he reject the integration hypothesis. Stehle adopts a multi-period capital market equilibrium model based on logarithmic utility functions. He proceeds to test whether risk premiums on U.S. stocks during the period 1956-1975 were determined as if the U.S. market were segmented from the rest of the world or were integrated fully. It turns out that the data do not provide any support for the domestic model. Yet, he cannot accept the validity of the international model, either.

Stehle's model of integration has been adopted by some recent studies. Given the multivariate probability distributions of a domestic market and an international index, Stehle regresses the domestic market index against the world index to isolate the purely domestic one by projection. The regression using the incorrect measure of risk will have a residual that is not independently distributed from the independent variable. As a result of this, ordinary least square estimates will be inconsistent. Therefore,

it is necessary to identify those parts of the total rate of return variations representing a diversifiable risk in a segmented (integrated) but not in an international (segmented) market.

Having examined the issue of market segmentation for the Canadian stock market, Jorion and Schwartz (1986) reject the integration, in a recent study. Their test support a strong degree of segmentation between the Canadian markets and the global North American market. A "mild" market integration that is partial integration of some degree is only supported for the interlisted stocks. They suggest that their rejection of the joint hypothesis of integration of the North American equity market combined with the CAPM is due to their adoption of the maximum likelihood technique, a more powerful technique than the traditional Fama-MacBeth two-pass approach.

In two recent studies, Alexander, Eun, and Janakiramanan (1987, and 1988) provided evidence of high covariances between a sample of Canadian and the U.S. securities. Their results are inconsistent with those of Jorion and Schwartz. They show that international listing of securities accompanies a reduction in the expected return on the stock. They further draw a parallel between the insignificant decline in the alpha-adjusted average returns of the Canadian securities and an integrated market between the U.S. and Canadian markets. Their work seems to suggest that the stock prices -when they are introduced to international listing are set in a relatively more integrated market than pre-interlisting period.

Errunza and Losq (1985), applying a model originally developed by Stulz (1981a, and 1981b) find evidence to support the mild segmentation hypothesis in their work which includes a large number of world capital markets. Their work, unlike many others, is based on the assumption that the only market imperfection is "the assumed inability of a class of investors to trade in a subset of securities." (Errunza and Losq, 1985) They suggest that the securities inaccessible to some investors display super risk premiums that are proportional to the conditional market risk, a new risk concept which means the conditional covariance between the return on a security specific and the return on the market portfolio. (Errunza and Losq, 1985)

Although the single index models are widely used in the literature, this should not suggest that they are trouble free. Critiques argue that when it comes to international pricing the validity of a single factor return generating model is an open question. In fact, single index models of standard Sharpe-Lintner tradition have had some empirical problems. One such problem lies in the difficulty in assuming a universal logarithmic utility function or no correlation between the exchange rates and stock returns and domestic consumption deflators, and/or the assumption of purchasing power parity.

All or some of these assumptions are inherent to the single index capital asset pricing models. Recent models, such as several versions of the arbitrage pricing theory argue that single index models cannot capture the structure of international asset prices.

Single asset prices are also criticized for their weakness about addressing the sources of capital markets segmentation. However, there is a consensus in the literature that when and if a single-index model is appropriate and a mean-variance efficient market portfolio exists, it is most likely the best model.

As far as the results are concerned, most studies adopting international versions of standard capital asset pricing models and comparing a domestic market to an international benchmark market have concluded that world markets are neither integrated nor segmented. Some have called this situation as being "mildly segmented" (Errunza and Losq, 1985 and Alexander, Eun, and Janakiramanan, 1988) This conclusion essentially suggests that domestic factors still play a major role in international asset pricing although regional trading blocks and bilateral free trade agreements as well as customs unions have come to dominate the world trade and financial markets.

2. Multi-Factor Asset Pricing Models of Integration and the Arbitrage Pricing Model of Integration:

It is often questionable whether a single global world index would describe properly the international structure of capital assets. That is, the results of two cross sectional regressions that employ one of the two alternative systematic risk measures as the single independent variable cannot answer whether capital markets are segmented or integrated. Returns are likely to be affected by several other independent and international factors in

addition to the national risk. Thus, return should follow a multi-factor linear generating process wherein domestic market index is one of the factors.

Two major multi-factor return generating processes have been adopted in the literature. One is the standard multi beta CAPM wherein all factors represent some form of portfolio of assets. The essence of this model is not different than the single-index CAPM. The other one is the Roll-Ross arbitrage pricing theory where the factors that determine the variations in asset returns are not necessarily portfolios of the original securities.

Some recent works have employed an international version of a multi-index asset pricing model where equilibrium rates of return are set by arbitrage conditions.(Berges (1981), Cho, Eun, and Serbet (1986), Korajczyk, and Viallet (1986), Gultekin, Gultekin, and Penati (1989, and 1990) Arbitrage pricing theory (APT), unlike the single index pricing models attributes the changes in stock returns to more than one factors that are not necessarily portfolio related.

In an international APT, investors of different countries are assumed to adjust nominal (dollar) returns by a random variable. The model is not based on utility though it still requires the definition of riskless portfolio. One important weakness of CAPM does not arise in APT. Factors in an APT are not constrained to be the portfolios of the original assets.

The return generating stochastic process under the assumption of APT is a linear multi-factor regression wherein several (k)

number of factors make up the systematic risk. It has been argued that one of the advantages of employing the APT in an international capital asset pricing framework is that it eludes the problem of purchasing power parity deviations for the pricing and estimation of risk premia in this model are based on an arbitrage condition of nominal returns. A disadvantage of adopting an APT model is that factor elimination process and testing are both costly and nonstandard. The following is a typical APT multi factor return generating model as adopted widely in the literature:

$$r_{it} = E(r_i) + {}_{k=1}\Sigma^{K} b_{ik}\delta_{kt} + \epsilon_{it}$$

$$E(\delta_{kt}) = E(\epsilon_{it} \mid \delta_{kt}) = 0 \qquad (2.2)$$

where

r_{it} ≡ Return on security i between time t-1 and t for any finite i

$E(r_i)$ ≡ Expected return on security i

δ_{kt} ≡ The k^{th} common factor, i.e. source of systematic risk between time t-1 and t

b_{ik} ≡ The k^{th} common factor sensitivity of the return on security i, also called factor loading

ϵ_{ik} ≡ The idiosyncratic unsystematic risk or the residual risk of the return on the i^{th} security between time t-1 and time t. It is assumed to have zero mean and finite variance and to be sufficiently independent for a law

of large numbers to apply.

$$E(r_i) \approx q_0 + b_{i1}q_1 + b_{i2}q_2 + \ldots + b_{ik}q_k \qquad (2.3)$$

where

$q_0 \equiv$ Expected return on the zero-beta (risk free) asset

$q_k \equiv$ The risk premium on the k^{th} common factor, k=1,2,..., K.

The task of a multi-factor return generating APT here is to estimate the risk premia, that is a vector of q's, and to test whether the q's are priced. Factor analysis is frequently used to extract independent return generators. The algorithm of factor analysis searches time series data of T+1 periods' security or portfolio rates of return over a cross section of N different assets. Next, the analysis statistically extracts those risk factors that systematically affect the returns of the assets in the sample. There is a simultaneous analysis of all the returns from N assets over T+1 periods in a matrix as the one given below:

$$\begin{bmatrix} r_{1,t}, & r_{1,t+1}, & \cdots, & r_{1,t+T} \\ r_{2,t}, & r_{2,t+1}, & \cdots, & r_{2,t+T} \\ & \vdots & & \\ r_{N,t}, & r_{N,t+1}, & \cdots, & r_{N,t+T} \end{bmatrix} \qquad (2.4)$$

From this matrix of returns, factors (explanatory variables) are extracted. The purpose of doing factor analysis is to reduce the NxT+1 matrix of returns to a smaller matrix that explains most of the variation in returns. The k common factors are extracted. The values of these factors are called factor scores ($\delta_{i,t}$) as shown below:

$$\begin{bmatrix} \delta_{1,t}, & \delta_{1,t+1}, & \cdots, & \delta_{1,t+T} \\ \delta_{2,t}, & \delta_{2,t+1}, & \cdots, & \delta_{2,t+T} \\ & \vdots & & \\ \delta_{k,t}, & \delta_{k,t+1}, & \cdots, & \delta_{k,t+T} \end{bmatrix} \qquad (2.5)$$

Once the factors are extracted the return generating regression is run. Factor loadings are estimated and used in the estimation of the factor risk premia.

To test for integration or segmentation in capital markets, vector of risk premia across stock markets are compared to see if the risk premia differentials are existent. The definition of capital markets integration in the context of arbitrage pricing theory is driven from an arbitrage condition of asset prices. Specifically, if arbitrage ensures that risk carries the same price in, say, two different stock markets in two countries, then it

follows that these two markets are integrated. That is, capital markets are said to be integrated if assets with perfectly correlated rates of return have the same price regardless of the location in which they are traded. According to Stulz (1981) it is natural to look at the integration of capital markets based on risk premia differentials.

Arbitrage pricing models in international context have both advantages and disadvantages over CAPM. One disadvantage of an APM is that factor analytic approach through which explanatory factors are extracted is a purely statistical technique that can result in factors that in general do not make any economic sense at all. Indeed, this along with the problem of correct number of factors has been the major critique of the APT.

On the problem of the right number of factors, considerable empirical research is done. Solnik argues that the number of common factors in an international APT must be small compared to the number of assets for the APT to be a viable and useful theory of asset prices. He seems to propose a combination of international factors common to specific types of assets such as stocks plus national factors affecting only domestic assets. (Solnik, 1983) Others prefer a prespecified-factor-approach wherein systematic risk factors are selected by the researchers' common sense about a particular return generating process rather than a purely statistical extraction method (see for discussion of prespecified factors method Gultekin, Gultekin, and Penati, 1990).

In a similar recent effort, Ehrhardt critisizes previous empirical research on APT on the same matter and argues that the typical significance tests employed to extract the factors are inappropriate when the estimated model residuals for all securities have insignificant means but are not distributed independently. In that case the standard significance tests would indicate incorrectly that more factors are needed. Ehrhardt argues that when this is the case the researcher has already extracted enough factors and that the results of the case can then be viewed with greater degree of confidence. If, on the other hand, the means are significant, this would imply that the estimated model is not a true APM, even when the residuals are independently distributed. (Ehrhardt, 1987)

The APT, in spite of these disadvantages, provides a useful empirical framework that can be desirable depending on the case. One advantage of an international APT over a CAPM is on the exchange rates. Some technical problems posed by currency translation and aggregation in the international CAPM do not arise in international arbitrage pricing model (Solnik, 1983). More importantly, the conclusion drawn from the domestic CAPM that a well identified market portfolio is mean-variance efficient does not exist internationally for world market portfolio is not optimal in the sense that investors will hold different portfolios, particularly the "hedge" ones. Accordingly, portfolio identification problem of an international CAPM may be eliminated in an international APM (See Solnik (1983)).

3. Consumption Based Asset Pricing Models of Integration:

Another group of empirical studies done recently adopts a consumption based capital asset pricing model. Some of such models test the equality of the marginal rate of substitution across countries. In an empirical work, Obsteld (1986) fails to reject the hypothesis of integration. Wheatley (1988), using a discrete-time version of the consumption-based asset pricing model, cannot provide enough evidence against the joint hypothesis that equity markets are integrated internationally and that the asset pricing model holds.

Wheatley, who defines risk as the covariance of an asset's real return with the growth in real consumption, provides several tests of international capital market integration. All his tests are based on a simple consumption asset pricing model that attempts to predict that there is an asset pricing line for each country that relates an individual's expected real return on each asset to the covariance of this return with the growth in individual's real consumption. His tests provide very little evidence against the joint hypothesis that the stock markets are internationally integrated and that the particular asset pricing model holds.

III. METHODS ON THE SOURCES OF SEGMENTATION IN CAPITAL MARKETS

A. The Role of Market Imperfections:

It has long been recognized that barriers to international

investment are the real sources of segmentation in equity markets. The belief about the market distortion effects of restrictions on capital movements is almost unanimous. Departing from this motivation a recent group of researches in the literature argues that a widespread rejection of integration should not suggest that there is no empirical question left unanswered and that the future researches ought to aim at the specific causes of segmentation in world capital markets.

Gultekin, Gultekin, Penati (1990) for instance argue that generalized tests of capital market integration are likely to be uninformative. They, therefore suggest case-specific studies wherein experiences of one or two countries are examined rather than the world market as a whole. In their event study, Gultekin, et al. (1990) take the specific case of Japanese capital market versus its American counterpart where they focus on the type of market imperfection created by capital controls.

What type of market imperfection causes segmentation is still an open question. Identifying market imperfections as causes of segmentation in practice is very important to several economic agents. It is important to specify the market imperfection to corporations making capital budgeting decisions, to macroeconomic policy makers thinking that they correctly deal with the efficient distribution of available capital among the various sectors in their economies, and finally to the investors facing different risks when they invest in foreign securities. We shall now mention about the types of imperfections that are likely to cause

segmentation in equity markets.

There are, in general, three major imperfections -including governments' impediments accepted by the literature in international capital asset pricing. One is the presence of government impediments or the legal barriers in general. The legal or direct barriers are anything that discriminates the country of origin. More specifically, we see restrictions on ownership of foreign securities, juridical status differences between foreign and domestic investments, differential taxation, and several other government impediments to capital movements as the most common applications of legal barriers. There is sufficient evidence in the literature of international capital markets that legal barriers are in most cases the only source of capital markets segmentation. The second type of imperfection is the assumed inability of a group of investors to trade in a foreign capital market. This type assumes that there exists some irrationality in the part of international investors. Finally, the presence of exchange rate risk is the third main market imperfection that we consider.

The common sources of segmentation in world capital markets have been studied in the academic literature by several scholars. We shall summarize the mentioned three groups based on the implications of these sources as studied in the literature of international asset pricing:

(i) Implications of exchange rate risk on international asset pricing: Given that no government impediments over the capital markets exist and that investors are engaged with no particular

irrationality whatsoever, some early works of integration adopted capital asset pricing models when there is differential exchange rate risk. The well-known study based on the assumption of exchange rate risk is that of Solnik. (Solnik (1974, and 1977)) Solnik postulates that all investors do not face the same investment opportunity set because of the presence of different exchange rate risks depending upon the investor's country of origin.

(ii) Implications of market imperfections in the form of direct barriers to investment on asset pricing: Direct barriers to international investment is the most studied market imperfection for integration purposes. Numerous capital controls over the markets can be classified under direct or legal barriers. Assuming (or extracting) that exchange rate risk is either negligible or absent direct barriers are examined by Black (1974) and Stulz (1981a, 1981b), Jorion, and Schwartz (1986), Gultekin, Gultekin, Penati (1990).

Mean-variance CAPMs with direct barriers to international investment first appears in Black (1974) and Stulz (1981). They both focus on legal barriers seen in the form of taxes. Black models capital controls as taxes on long positions in foreign (foreign currency denominated) assets -with corresponding subsidies on short positions. Stulz (1981b), however, considers them as taxes on both long and short positions. Gultekin, Gultekin, and Penati (1990), employing an arbitrage pricing model, look into the effects of liberalization in Japan on the integration between the Japanese and the U.S. markets and conclude that the source of segmentation

can be traced to legal barriers based on the nationality of the issuing firms while Jorion, and Schwartz (1986) reach the same conclusion with a CAPM when they examine the integration of the Canadian stock market to a benchmark North American market.

(iii) Implications of those market imperfections in the form of indirect barriers: The inability of a class of investors who trade in international capital markets may relate to barriers such as the difficulty of obtaining information about foreign securities, financial reporting differences across national markets, language barriers, and any other implicit or explicit cost of being a foreigner in a foreign market.

There are basically two methods suggested to examine the issue of capital market integration. One is the method of interlisted stocks that looks into the integration of those stocks that are dually listed and those that are not independently. The second method examines the effect of liberalization of capital markets and distinguishes the pre and post liberalization periods. we shall now outline these two approaches.

B. The Methods:

1. The Method of Interlisted Stocks:

This method is based on how well (or badly) the interlisted stocks in more than one exchanges are integrated. Two possible outcomes are evaluated as follows:

(i) If market imperfections were caused by indirect barriers

(the term is due to Jorion and Schwartz (1985)) and if indirect barriers were the only source of segmentation in capital markets, then we would expect that the interlisted stocks are integrated but the purely domestic stocks (those that are not interlisted) are segmented.

Based on the classification of Jorion and Schwartz (1985) the following indirect barriers are common:

a) Difficulty of obtaining information about foreign stocks,

b) Differences in the dept and quality of financial reporting due to the differences in accounting disclosure requirements,

c) Impediments based on traditional practices such as reluctance to deal with foreigners, or any other indirect cost of doing business abroad.

One can argue that such indirect barriers in the EC have become less important as the Community States open up to trade and finance within the Community.

(ii) If, on the other hand both the interlisted and the domestic stocks were segmented, we could then conclude that the effective barriers are of the legal type such as

a) Differential juridical status between the domestic and international investments.

b) Differential tax considerations,

c) Restrictions on ownership of foreign securities,

d) Any other governmental barrier linked to the origin of the security.

2. Method of Regime Switches:

Since the end of the seventies, world capital markets have been subject to less capital controls almost everywhere. Restrictions on foreign capital have been gradually lifted even over the third world markets. Therefore, one can look at the pre and post liberalization periods in one or two specific markets and compare the risk premia between or among the markets under consideration. Not necessarily should one choose the interlisted stocks to test for equity market integration.

The disadvantage of the method is its lack of generality. That is, if markets are segmented for the reasons other than controls of national governments, then this method does not help much. However, given the fact that quite a few nations have lifted capital controls over their markets, this method can explain a good part of market segmentations. Besides, lack of generality seems to be the common problem in all international capital asset pricing models.

Based on two possible outcomes, we can evaluate the issue of capital markets segmentation in this method as follows:

(i) If the government impediments to foreign investment are the only source of segmentation, the price of risk in two or more selected capital markets should be different before but not after a specific liberalization act.

(ii) If, on the other hand, the risk premia do not differ significantly from their pre liberalization levels, then one can argue that capital restrictions are the real sources of lack of

integration and that there are other reasons for market segmentations.

IV. TESTS AND ECONOMETRIC PROBLEMS:

Three testing procedures have been adopted in the literature to test the equality of vector of risk premia by using cross-sectional regressions of stock returns on the estimated betas. The first test is based on the standard usage of mean rates of stock returns in each periods assuming that periods are distinguished from one another by a major capital market liberalization legislation. Mean rates of both pre and post liberalization periods are taken as the dependent variables in the cross-sections and estimate the vector of risk premia jointly with a seemingly unrelated regression. The equality of the risk premia is tested with a standard F-test of linear constraint.

The second testing procedure the Shanken-Weinstein multivariate approach. The Shanken-Weinstein procedure considers the estimation errors of the betas in the first step of this approach. This approach is recently adopted by Gultekin, Gultekin, and Penati (1990).

The third approach is the well-known Fama-MacBeth (1973) procedure. In Fama-MacBeth procedure, normal or expected returns are predicted according to a cross-sectional relationship whose coefficients are estimated by regressing average portfolio returns on average portfolio betas to ensure that the estimators reflect the nature of equilibrium relationship between risk and return

relationship. That is, given the beta coefficient estimated using the market model (CAPM) for the ith security, the expected (normal) returns are calculated employing a cross-sectional relationship.

The standard capital asset pricing model is equivalent to the mean variance efficiency of the market portfolio -or a market index. One econometric difficulty arises when the market index is unidentifiable. Therefore, investors cannot test whether a preselected portfolio is ex-post efficient. As long as market index is unidentifiable only ex-ante efficiency can be testable. This is, indeed the most important weakness of the mean-variance efficient capital asset pricing models.

Most of the empirical studies of the CAPM use cross-sectional regressions to test the ex-ante linear relation between the factor loadings (security betas) and expected returns implied by the mean variance efficiency of the market portfolio. This approach has been criticized for it has a serious empirical problem, the problem of errors in variables. That is, the true values of factor loadings are unknown since the regressors are estimates. To some extend this can be avoided by using portfolio observations or observed market indices instead of security observations. There is a possibility that the security risk characteristics are non-stationary over time. Stehle (1977) argues that empirical tests using security risk characteristics as independent variables must take this non-stationarity into consideration to avoid possible biases.

The measurement error problem brings about inconsistency. When the independent variables in a regression are measured with some

error, the regressors -the estimates of the coefficients of independent variables will be inconsistent. Either OLS is not applied for the error term is heteroscedastic or else one of the following ways is adopted to avoid inconsistency:

(i) Observations can be grouped. If the groups are formed independently of the measurement errors, then the OLS based on the group means will be able to yield consistent parameter estimates. The use of an incorrectly specified functional relationship in general does not affect the efficiency of the grouping method. (See Stehle (1974, 1977).

(ii) Direct use of instrumental variables. Whether the exact functional form of the relationship between a particular independent variable and its instrument is known determines the efficiency of the instrumental variable method. If an incorrectly specified relationship is used, this misuse reduces the efficiency of this method. If, on the other hand, the exact functional form is known, the instrumental variable technique is always more efficient than an OLS based grouped.

As far as the arbitrage pricing models are concerned, econometric problems do not seem to be significant. This characteristic of APT makes it a useful alternative to the standard CAPMs since mean variance efficiency does not hold in an international context. APMs have been criticized on the basis of their usage of factor-analytic approach. This critique, however, is confined to a possible lack of economic intuitive on the part of the factors extracted. A critique of APMs on an empirical basis

is discussed in Ehrhardt (1987) who argues that the typical tests for factor extraction usually overstate the relevant number of factors and that the standard statistical procedures are insufficient for they fail to determine when the estimated model satisfies equilibrium conditions.

CHAPTER III

EMPIRICAL MODEL AND TESTS

I. ASSUMPTIONS:

A single index capital asset pricing model is employed as the principal tool for several reasons. First of all, there are the general benefits common to all CAPMs. The underlying assumptions of CAPM elude some important empirical problems that would arise otherwise. Once we use CAPM and assume that there exists a universal logarithmic utility function for all investors, the price level and those questions related to purchasing power parity differentials become irrelevant for optimum portfolio choice purposes. In other words, exchange rate risk and purchasing power parity deviations can be assumed away. Therefore, all equity prices can be converted into one (any) currency and the analysis is performed in nominal terms. One other reason for employing a single-index CAPM is that we use macro data on stock market prices from which we calculate the returns. Therefore, we are limitted with the stock markets. This might create problems associated with small sample size in cross-sectional regressions as far as the tests are concerned. APT in particular requires a large individual security data set.

Although we primarily use a single index model, an alternative multi-index pricing model, such as an arbitrage pricing model of capital assets -despite it has certain empirical advantages does not particularly seem necessary. First of all, exchange rate risk within the European Community is negligible since there is an almost-fixed exchange rate system where relative prices of currencies are permitted to fluctuate within small margins only. The margin is plus and minus 2.25 percent in most of the Community states. The exceptions are the United Kingdom, and Portugal that have adopted plus and minus 6 percent margins, and Greece along with Portugal that are yet to join the exchange rate mechanism (ERM).[14]

In a fixed exchange rate world, there is no need for a model such as the APM that can elude exchange rate arbitrage. Besides, it has been observed that there is convergence in most commodity prices across the Community (see Cecchini Report, 1988). This would suggest that there is no particular need for the elusion of purchasing power parity deviations, a significant advantage of the APT. Further, a multi-factor model -either in the framework of the standard multi-beta CAPM or APM would not be desirable for a possible high correlation between and among the European Community market factors.

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[14]Greece and Portugal are not included in the empirical model and the tests.

TABLE: II

Market Values of European Equities at the End of 1980 in Billions of U.S. Dollars

Countries Included	$ Billions	% Europe Index	% EC Index
Belgium	10.0	.022	.025
Denmark	4.0	.009	.010
France	53.0	.116	.135
Germany	71.0	.155	.180
Netherlands	25.0	.055	.064
Italy	25.0	.055	.064
Spain	16.3	.036	.041
United Kingdom	190.0	.415	.481
EC Total	394.3	.863	1.000
Austria	1.9	.004	
Norway	2.6	.006	
Sweden	12.2	.027	
Switzerland	46.0	.100	
EFTA Total	62.7	.137	
EC+EFTA	457.0	1.000	

Source: Financial Analysts Journal, several issues, and Author's own calculations.

The model does not only serve to test for integration, but also it attempts to extract the underlying character of market imperfections. A rich body of studies in the theory of international asset pricing and international capital movements have found out that different risk premiums for similar assets traded in different exchanges are caused by some type of market imperfection and/or government impediments against foreign capital. However, since market imperfections have been seen in varying forms from one market to another -that is, peculiar to the market is the type of imperfection- the theory that links market imperfections to segmentation is not a standard one.

Therefore, we find it both appropriate and necessary to assume in the existence of a particular market imperfection such as a specific national government impediment concerning the free movement of capital from one market to another and to assume away other imperfections for the question of integration is an elusive one.[15]

We suspect that the capital controls over stock markets are the only source of segmentation. That is, risk premia differentials are caused by national governments' impediments over capital markets. The reason for focusing on capital controls and assuming away the other two major market imperfections, namely exchange rate risk and investors' irrationality is not because the recent

[15]Specifying the type of imperfection before undertaking any model of integration or segmentation is recommended also by Solnik (Solnik, 1974, 1977)

literature is biased toward the assumption that capital controls are important sources of segmentation in stock markets. Rather, it is more appropriate to disregard the existence of exchange rate risk and/or irrationality across the EC capital markets because of the peculiar developments that have taken place within the Community.

That we assume away the exchange rate risk can well be justified with the prevailing exchange rate system in Europe. Ten of the 12 EC member states are in the European exchange rate mechanism (ERM) that keeps the participating currencies within defined upper and lower limits in relation to one another. Although there is still no consensus on how wide the margins should be, most members have accepted that their currencies may fluctuate up to 2.25 percent in either direction as mentioned previously.[16]

Further, the assumption of inability of a group of investors to trade in a class of securities can be assumed away for the EC citizens have gradually become accustomed to the idea of being European. A pan-European securities market is in the mind of any EC investor. The problems arisen from language have diminished remarkably. Therefore, most indirect barriers such as difficulties associated with being a foreigner in a foreign market, language barriers, and any other barrier related to the origin of investment

[16]Greece and Portugal still prefer their currencies to float freely and have not yet joined the ERM. Spain and the United Kingdom have opted for margins of 6 percent, considerably higher than 2.25 percent, the margin that most others have adopted.

have become less important. We think that neither the inability of a group of investors to trade in foreign securities for the reasons other than governments' impediments nor the exchange rate risk is to be taken as underlying market imperfection that can cause segmentation in the EC capital markets, although one can never rule out that possibility.

There are, however, a number of problems with the methodology. First of all, empirical tests are done with ex post data, whereas the theory behind is ex ante. Secondly, the assumption that investors have logarithmic utility functions may pose danger when the behavior towards risk is different.[17] Thirdly, the basic model whose specifics and several versions are given below lacks generality.[18] Yet, all these problems are common to most international asset pricing models and it is quite difficult to establish a standard international model for capital asset pricing without making some assumption about the utility functions or reversing the difficulty of ex post data.

We select a couple of important dates as far as the liberalization of capital markets is concerned -in the recent past

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[17]If there is greater risk aversion than the logarithmic investor or if there are deviations from the purchasing power parity then the equilibrium rate of return on any asset also depends on its correlation with the inflation rates in other countries. (See Adler and Dumas (1983)

[18]Gultekin, Gultekin, and Penati (1989) argue that generalized tests of capital market integration are usually uninformative and that individual "event study" should be the approach to capital market segmentation. They attribute the difficulty of generalization to the complexity of governments' impediments to capital movements.

of the EC. The dates we choose should be thought of as times of regime switches. One of these dates is 1983 when the new approach to financial integration is initiated. The other one is the year of 1985 when the White Paper was introduced. A final one is the year of 1987 when the White Paper is implemented under the name of "Single European Act."

Although none of these years may represent clear regime shifts, one can expect that asset pricing will be different before and after each one of these dates. That is, it seems reasonable that pricing of European Community securities will become more international as opposed to domestic as we move from 1983 to 1985, from 1985 to 1987, and finally from 1987 onwards. Thus, a European model can explain equity returns better than a domestic model can. This would translate into that a European Community composite model wherein systematic risk is associated with an EC composite market index is priced after a year when capital controls are lifted or scheduled to be lifted but not before.

II. EMPIRICAL MODEL:

Standard international CAPM is applied to the macro data, that is stock market price indices. Here the international market portfolio is an EC composite index calculated as the weighted average of member state market portfolio returns. Weights are the shares of member state local market capitalizations in EC total market capitalization (see Table II).

Given the multivariate probability distribution of rate of

return to market portfolio and the international portfolio (i.e the EC composite rate of return) the stochastic return generating process is specified as follows:

$$E(r_i) = r_f + [\ cov(r_i, r_{ec})/\ var(r_{ec})\ ]\ E(r_i) \qquad (3.1)$$

where

r_i ≡ the nominal rate of return on security (market portfolio), expressed in the common currency (numeraire currency)

r_f ≡ the nominal risk-free rate of return expressed in the common currency.

r_{ec} ≡ the nominal rate of return to the EC market portfolio.

The empirical counterpart of (3.1) is the following:

$$r_{i,t} = \alpha_i + \beta_i r_{ec,t} + \epsilon_{i,t} \qquad (3.2)$$

where all returns are expressed in a common currency. The common currency is the U.S. dollar.

$$\alpha_i = E(r_{ec}) - \beta_i\ E(r_i) \qquad (3.3)$$

$$\beta_i = cov(r_i, r_{ec})/var(r_{ec}) \qquad (3.4)$$

with

$$E(\epsilon_i) = 0 \qquad i = 1,2,..N$$

$$E(\epsilon_i, \epsilon_j) = 0 \quad \text{when } i=j, \text{ and} \qquad i,j = 1,2,..N \quad (3.5)$$

$$= \sigma_\epsilon^2 \quad \text{when } i=j, \text{ and} \qquad i,j = 1,2,..N$$

$$E(\epsilon_i, r_{ec}) = 0 \qquad i = 1,2,..N$$

where i is the index for the member state's market portfolio, r_i stands for nominal rate of return in the ith market, ec stands for "composite index", r_{ec} is the monthly rate of return to the composite market portfolio, β is the sensitivity coefficient of the ith market to the composite market (that is the systematic risk coefficient), ϵ_i is the national market specific idiosyncratic residual.[19] Note that we have not assigned any rate of interest to serve as a risk free rate in the model. We estimate the regression constants and test whether they are significant to represent the riskless rate in the EC capital market.

As far as empirical tests are concerned, the composite EC market portfolio is taken as a weighted average of national market returns. The weights are the share of the market specific in the total EC market capitalization. The weighted average is calculated

[19]Returns are calculated as $(P_t-P_{t-1})/P_{t-1}$ where P's are IFC share prices (market portfolios). Dividends are excluded; thus, IFC share prices are taken as proxy for actual return.

as follows:

$$r_{ec,t} = \Sigma\ w_i r_{i,t} \qquad (3.6)$$

where

i = U.K., Germany, France, Netherlands, Belgium, Denmark, Italy, Spain.

and

w_i's = the proportions of the member state equity market capitalizations in total EC market (composite) capitalization (The 1980 market capitalizations are employed). The proportions (in percentage terms) of the markets in sample are as follows:

The U.K.	:	48.1
Germany	:	18.0
France	:	13.5
Netherlands	:	6.4
Belgium	:	2.5
Denmark	:	1.0
Italy	:	6.4
Spain	:	4.1

The total risk factor in a given market is identified by

$$E(r_i^2) = \beta^2 E(r_{ec}^2) + E(\epsilon^2)$$

or

$$\sigma_i^2 = \beta^2 \sigma_{ec}^2 + \sigma_\epsilon^2 \qquad (3.7)$$

where

σ_i^2 = measure of market portfolio specific (total) risk,

$\beta^2 \sigma_{ec}^2$ = measure of systematic (composite) risk,

σ_ϵ^2 = measure of unsystematic (idiosyncratic) risk.

The time series regression of the equation (3.1) estimates factor loadings. Estimated factor loadings are reported in Table II. Factor risk premia are estimated by the following cross-sectional regression:

$$\text{Mean}(r_i) = \delta_i + \mu_i \beta_i + u_i \qquad (3.8)$$

where μ_i stands for the risk premium of the ith market. What we attempt to find out here is whether the μ_i are priced by the data. Therefore, the μ_i are estimated and tested to see whether it is statistically significant. If so, then the systematic risk associated with the market portfolio (i.e. the composite supranational market index) is priced. That is, markets are

integrated. If, on the other hand, the composite index is not priced, then the markets are segmented.

III. HYPOTHESIS TESTING:

Whether the composite model is priced examines the existence of integration (segmentation) in capital markets. However, it does not tell about the sources of segmentation. In order to pinpoint the sources of segmentation, we attempt to look into the effects of capital controls on pricing of capital assets. For that reason, the data are partitioned into several sections. The partitioning is based on major institutional developments in the EC toward either limiting or eliminating the restrictions to capital movements.

Our hypothesis is that capital assets (stocks) traded in the EC equity markets are priced according to an international model. That is, we test whether an integrated European Community composite market model -as opposed to a segmented model for each member state equity market is priced. Thus, the hypothesis that the assets are priced in an integrated (European) market against the null hypothesis of no relationship is tested. The hypothesis is outlined below:

$$H_0 : \mu_i = 0$$
$$H_1 : \mu_i \neq 0 \qquad (3.9)$$

where μ_i is (are) the estimated risk premium (premia) associated with the ith subperiod under consideration. The risk premiums and their t-statistics of eight different periods from 1972 until the end of 1990 are reported in Table XIII. An acceptance of the null hypothesis implies that the risk premium is not priced and that the systematic risk of the international (European Community composite) model is not the proper systematic risk specification. It may also suggest that domestic factors are important for asset pricing purposes in the EC markets -at least as far as the stock markets are concerned. Further, a national pricing model wherein the systematic risk is represented by a purely domestic factor such as a market price index is likely to explain the variations in stock returns with some (greater than that of the composite model's) significance.

If the alternative hypothesis is adopted then international model is priced. Capital assets are priced according to an integrated European market model. That is, the integration of capital markets is said to be supported by the sample data of EC equity markets. The results of the time series and the cross section regressions as well as the empirical tests are evaluated in the next section.

We also perform the F-test of risk premia differentials for two subperiods. The null hypothesis that risk premiums of both subperiods are equal to the full period's risk premia is tested both at 1 per cent and 5% confidence intervals. That is, the null hypothesis that

$$H_0 : \mu_i = \mu_0$$

$$H_1 : \mu_i \neq \mu_0$$

where

i = 1 for the subperiod 1981/4 - 1983/12,

i = 2 for the subperiod 1984/1 - 1986/9,

and

μ_0 = risk premia of the full period 1981/4 -1986/9

is tested by way of the F-test of risk premia differentials.

The tests that we employ here are tests of integration of capital markets. An alternative to this test would be a test of segmentation where a segmented national model is specified for asset pricing is required. Our model can be translated in words into an attempt to estimate the risk premia independently before and after a certain European Commission Directive on capital controls to see whether the particular legislation amount to a true regime switch.

We select two significant (institutionally) dates. Although some of these Directives mentioned throughout the text do not bring about clear regime switches, it is still of empirical importance to identify these periods with different asset pricing models. That is, one can still concern about whether it is possible to identify the subperiod with an integrated European composite model better than that with a segmented model where the local systematic risk

is the appropriate source of risk.

What we expect essentially is that, if the year when a liberalization act or a major Directive to limit capital controls over the EC equity markets changes the way we define the market price of risk vis-a-vis specifying the correct systematic risk measure in a given market, capital markets should then become less segmented after the particular cut-off date. Empirically, the data after the cut-off year are expected to price the EC composite systematic risk but not before.

The two important dates for financial integration in the Community were the years of 1983, and 1985. The risk premia in the EC equity markets are estimated both before and after the data-cut-off years of 1983 and 1985.[20] We also estimate the risk premia for the late 1970s and compare the estimates with those of the early and late 1980s. If the years that we select amount to regime swtiches, then there should be notable risk premia differentials between the subperiod before and the subperiod following the critical cut-off years.

One sample problem emerges due to the fact that in the decade

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[20]The selection of a cut-off year is not arbitrary. It is a date after which capital controls over equity markets are either lifted entirely or a tendency in that direction has begun. In selecting these years as cut-off, we are motivated by their importance for the institutional framework of the Community. The year 1983 was the year of the first EC Commission initiative on liberalizing capital markets. The year 1985 is the year when the breakthrough White paper was introduced. We have assumed that there should be significant differences in the price of systematic risk across EC capital markets before and after the years of 1983, and 1985. Thus, the data are divided into three, and each period is expected to display different risk premiums.

of 1980s there were a series of Directives to limit or abolish capital controls. In order to keep large the sample size in each partition of the data set, we let the partitions overlap. Yet, any partitioned period is is compared only with the period that it precedes or comes before.

TABLE: III

Proportion of systematic risk of portfolio returns explained by single market factor*

Country**	Per 1	Per 2	Per 3	Per 4	Per 5	Per 6	Per 7	Per 8
U.K.	.848	.897	.677	.655	.659	.784	.605	.809
Germany	.277	.255	.276	.201	.233	.328	.117	.647
France	.189	.193	.337	.378	.383	.505	.334	.690
Nether's	.357	.326	.580	.224	.376	.597	.029	.667
Belgium	.264	.145	.232	.440	.318	.281	.420	.468
Denmark	.051	.000	.076	.086	.042	.044	.124	.568
Italy	.128	.002	.233	.359	.316	.243	.388	.652
Spain	.066	.017	.051	.237	.165	.026	.430	.417

* Single market factor is the EC composite market return. Proportions reported are the share of systematic risk in total portfolio risk (i.e. $\beta^2\sigma_c^2/\sigma_i^2$). Proportions are rounded.

** Period 1: 1972/1-1986/9
Period 2: 1978/7-1981/3
Period 3: 1981/4-1983/12
Period 4: 1984/1-1986/9
Period 5: 1981/4-1986/9
Period 6: 1983/4-1984/12
Period 7: 1985/1-1986/9
Period 8: 1989/10-1990/12

If, as we expect the composite index is priced after the cut-off year but not before, this will suggest that capital market segmentation is created by national governments' impediments to foreign investment. If the index is priced both before and after the cut-off year, then markets are integrated irrespective of capital controls. If the index is never priced, this suggests that purely national factors are important for asset pricing purposes and that capital controls are not the real reason for market segmentation.

Using macro data and adopting the very same model described above sources of capital markets segmentation can be evaluated by an alternative way. This is simply to look into the sources of market segmentation in this model by comparing the risk premia differentials across the EC markets both before and after the cut-off year. Similarly, if the capital controls are the only reason for segmentation, then the two risk premia should tend to become closer after capital controls are lifted given that the risk premia in the two markets were different before the cut-off year.

If capital controls are unimportant for asset pricing purposes, then the risk premia before and after the cut-off year should not be different form one another significantly. This can be tested through a standard F-test of linear constraint or through the Fama-Macbeth methodology. We perform the F-test of risk premia differentials. The F-test compares a given subperiod to a full period. That is, any given subperiod is compared with the full period from which the subperiod is selected on the basis of

estimated risk premia. The standard t-statistics test whether or not a particular asset pricing model is the correct model for pricing purposes.[21]

[21]F-test of linear constraint is also employed to test for integration. The results of this test is reported in Table XIV. Fama-MacBeth procedure is an alternative that requires that the risk premia for EC are estimated in each month (monthly data are used) of the two subperiods. Thus, one can obtain two time series of risk premia differentials that ought to have zero mean if capital markets are perfectly integrated and employ the Hotelling T^2 statistics to test the mean differentials.

TABLE: IV

Average Monthly Returns:
Returns are calculated using IFS adjusted share price indices

Country	78/7-81/3	81/4-83/12	84/1-86/9	81/4-86/9
U.K.	.11543	.14565	.18098	.16332
Germany	-.31689	.13760	.19273	.16517
France	.14681	.91973	.26020	.17609
Netherlands	-.13662	.16665	.21021	.18843
Belgium	.14713	14059	.22674	18366
Denmark	.71184	.38297	-.39517	.17173
Italy	.34223	-.10028	.48451	.23274
Spain	-.19940	.28873	.44264	.23576

	72/1-86/9	83/4-84/12	85/1-86/9
U.K.	.10826	.17441	.16383
Germany	.62826	.12521	.27981
France	.11190	.23398	.33343
Netherlands	.73627	.20497	.23412
Belgium	.66851	.21563	.25548
Denmark	.12980	.10678	.65523
Italy	.13006	.51909	.68755
Spain	.65965	.21437	.50909

TABLE: V

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

UNITED KINGDOM

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	-.4009242	.2066939	-.2444835
St. Error	.4154918	.3912069	.4516421
t-value	-.9649389	.5283493	-.5413214
Portf. Beta	1.7243370	.9935408	.9140238
St. Error	.1047049	.1231848	.1190098
t-value	16.4685400	8.0654470	7.6802380
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	-.7426724	-.2814495	-.5776732
St. Error	.2942565	.4476616	.6242966
t-value	-.2523894	-.6287104	-.9253185
Portf. Beta	.9360156	1.1935780	.8487626
St. Error	.8409470	.1434069	.1572703
t-value	11.1305000	8.3230180	5.3968390
	1989/10-1990/12	1972/1-1986/9	
Intercept	.2634756	-.3672665	
St. Error	.4713052	.2183398	
t-value	.5590339	-.6820870	
Portf. Beta	.8821814	1.4916730	
St. Error	.1237045	.4770830	
t-value	7.1313590	31.2665400	

TABLE: VI

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

GERMANY

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	-.5880780	.6375008	.5455773
St. Error	.3662375	.5423070	.8340432
t-value	-1.6057290	1.1755350	.6541356
Portf. Beta	.3006875	.5870890	.6147647
St. Error	.9229267	.1707639	.2197743
t-value	3.2579780	3.4380170	2.7972540
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	.5993182	.9305237	.1407992
St. Error	.4736566	.6997622	.1330763
t-value	1.2600340	.1329771	1.0580340
Portf. Beta	.6003950	.6829956	.5324518
St. Error	.1359308	.2241665	.3352404
t-value	4.4169180	3.0468230	1.5882680
	1989/10-1990/12	1972/1-1986/9	
Intercept	.6473074	.2346596	
St. Error	.9925177	.2268501	
t-value	.6521872	1.0344260	
Portf. Beta	1.2240720	.4049412	
St. Error	.2605083	.4956785	
t-value	4.6987830	8.1694340	

TABLE: VII

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

FRANCE

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept St. Error t-value	.9103222 .8997158 1.0117890	-.1316722 .1420078 -.9272181	-.1430508 .1568216 -.9121885
Portf. Beta St. Error t-value	.6184443 .2267304 2.7276640	1.7778520 .4471602 3.9758730	1.7941910 .4132322 4.3418460
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept St. Error t-value	-.1366209 .1032462 -1.3232540	.2476871 .8723501 .2839309	-.1906887 .2580409 -.7389866
Portf. Beta St. Error t-value	1.7841020 .2950641 6.0464880	1.2327700 .2794544 4.4113470	2.0074870 .6500463 3.0882220
	1989/10-1990/12	1972/1-1986/9	
Intercept St. Error t-value	-.3568180 .8680490 -.4110575	.3349992 .5796161 .5779673	
Portf. Beta St. Error t-value	1.1783350 .2278387 5.1717920	.8066024 .1266489 6.3688070	

TABLE: VIII

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

NETHERLANDS

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	-.5140414	.4734072	.8189706
St. Error	.4285786	.4594578	.7240978
t-value	-1.1994100	1.0303600	1.1310220
Portf. Beta	.4184784	.9484045	.5709149
St. Error	.1080028	.1446760	.1908032
t-value	3.8747010	6.5553700	2.9921660
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	.5830349	.4286381	.1888285
St. Error	.4179706	.6954468	.9073204
t-value	1.3948950	.6163492	2.0811670
Portf. Beta	.7424139	1.1825630	.1734591
St. Error	.1194506	.2227840	.2285685
t-value	6.2152410	5.3081140	.7588930
	1989/10-1990/12	1972/1-1986/9	
Intercept	-.5701217	.2347349	
St. Error	.4884353	.2398540	
t-value	-1.1672410	.9786574	
Portf. Beta	.6291375	.5159886	
St. Error	.1282007	.5240926	
t-value	4.9074420	9.8453700	

TABLE: IX

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

BELGIUM

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	-.4791878	.1847870	-.5761634
St. Error	.6357684	.1006925	.7946960
t-value	-.7537144	.1835162	-.7250111
Portf. Beta	.3681812	.9706863	1.0344740
St. Error	.1602151	.3170646	.2094060
t-value	2.2980440	3.0614780	4.9400270
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	.8295849	.6624953	-.2761122
St. Error	.6396995	.1006163	.1159955
t-value	.1296835	.6584377	-.2380370
Portf. Beta	1.0005300	.8802533	1.0842880
St. Error	.1828178	.3223208	.2922112
t-value	5.4728240	2.7309850	3.7106290
	1989/10-1990/12	1972/1-1986/9	
Intercept	-.1062812	.1074893	
St. Error	.7732933	.3339039	
t-value	-1.3743970	.3219170	
Portf. Beta	.6604527	.5771838	
St. Error	.2035618	.7295960	
t-value	3.2539740	7.9110060	

TABLE: X

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

DENMARK

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	.7316912	.3204602	-.1649363
St. Error	.8081036	.9829183	.1236955
t-value	.9054423	3.2602940	-1.3334060
Portf. Beta	-.2200766	.4969225	.5580221
St. Error	.2036439	.3095054	.3259434
t-value	-.1080693	1.6055370	1.712022
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	.1014695	.6876041	-.9421071
St. Error	.8361408	.1946853	.1477983
t-value	1.2135460	.3531874	-.6374276
Portf. Beta	.4008379	.5887002	.6118087
St. Error	.2389582	.6236679	.3723275
t-value	1.6774400	.9439322	1.6234000
	1989/10-1990/12	1972/1-1986/9	
Intercept	.9453095	.1028969	
St. Error	.7755554	.4118849	
t-value	1.2188810	2.4981960	
Portf. Beta	.8094964	.2767334	
St. Error	.2035618	.8999883	
t-value	3.9766630	3.0748560	

TABLE: XI

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

ITALY

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	.3343144	-.1502715	.1515785
St. Error	.1224530	.1153278	.1347445
t-value	2.7301440	-1.3029950	1.1249330
Portf. Beta	.8778798	1.1148560	1.4812830
St. Error	.3085843	.3631489	.3550581
t-value	.2844862	3.0699680	4.1719450
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	-.9072659	-.6824736	.2317981
St. Error	.9042106	.8929859	.1992873
t-value	-.1003379	-.7642603	1.1631350
Portf. Beta	1.4052810	.7080263	1.7456040
St. Error	.2584116	.2860650	.5020367
t-value	5.4381500	2.4750540	3.4770440
	1989/10-1990/12	1972/1-1986/9	
Intercept	-.1712307	.7481255	
St. Error	.9871288	.5125931	
t-value	-1.7346330	1.4594920	
Portf. Beta	1.2287870	.5683483	
St. Error	.2590939	.1120041	
t-value	4.7426330	5.0743540	

TABLE: XII

Estimated Factor Loadings:
Single Index
Time Series Regression Estimates

SPAIN

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	-.1450432	-.1756576	.1976120
St. Error	.1108411	.9014430	.1332036
t-value	-.1308569	-.1948738	1.4835330
Portf. Beta	-.2050036	.3691667	1.0902060
St. Error	.2793222	.2838501	.3509978
t-value	-.7339325	1.3005690	3.1060200
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	.8879304	.2655490	.7067049
St. Error	.8226306	.1311308	.1760418
t-value	1.0793790	2.0250690	.4014416
Portf. Beta	.8384763	-.3015933	1.6792140
St. Error	.2350971	.4200731	.4434774
t-value	3.5665100	-.7179544	3.7864690
	1989/10-1990/12	1972/1-1986/9	
Intercept	-.7776593	.3246724	
St. Error	.1670131	.4481497	
t-value	-.4656279	.7244731	
Portf. Beta	1.2865640	.3446308	
St. Error	.4383629	.9792286	
t-value	2.9349290	3.5194110	

IV. REGRESSION RESULTS:

A. Single Index Model:

Estimated factor loadings (the results of the time series regression (3.3)) are reported for all countries in the sample in Tables V through XII. The cross-sectional risk premia estimates are reported in Table XII. Independently are summarized the results of sensitivity coefficients to demonstrate the strength of a particular EC market portfolio to the EC composite market index in Table III. In this table estimated factor loadings are rounded for clarity.

1. The Differential Risk Premia Test Results:

The results of the model suggest that systematic risk vis-a-vis the European Community composite model is not priced for the period of 1978-1981. This implies that European Community capital markets were segmented in the late 1970s. Domestic markets appear to be the major factors explaining the variations in stock returns. Thus, the local market index is the principal source of systematic risk in the period of late 1970s. Alternatively, the European Community composite index is unimportant for asset pricing purposes for this period.

Several reasons can be given for dominance of a local market return over a composite European index in terms of asset pricing. The most important characteristic of the decade of 1970s was the

instability. As a result of the two major oil shocks, businesses as well as capital markets were regulated in this decade. Domestic policies outweighed the policies to overcome the difficulties in order to complete the single (common) market in Western Europe. Most notably, This was the period when government impediments over equity markets within the EC were existent, including the U.K. and Germany. Macroeconomic policies conducted by individual States were far less interdependent in the seventies. This was still a period when the productivity shocks shaped monetary policies throughout Europe. Further, because the European Monetary System came into being in 1979, there was also an exchange rate risk in this period that could not be easily disregarded for.

The systematic risk based on the same model for the periods of 1981/4-1983/12 and 1984/1-1986/9 are priced. Both the standard t-test and the F-test of risk premia differentials support the view that the EC equity markets became more integrated in the first half of the 1980s than they had in the 1970s. The t-test of significance shows that the integrated asset pricing model is priced between 1981/4 and 1986/9. Further, the null hypothesis that the risk premia in the EC composite market model for each subperiod -i.e. both 1981/4-1983/12 and 1984/1-1986/9 are equal to the risk premia of the full period (1981/4-1986/9) is accepted with 1% confidence based on the F-test of linear constraint (see Tables XIII and XIV).

These results would apparently translate into the belief that the decade of 1980s displayed a tendency toward greater integration across the Community markets. However, the null hypothesis that the

EC composite market model is priced after our first cut-off year of 1983 is priced but not before is not accepted by the data. That is capital controls over stock markets do not seem to affect asset pricing at least in the early 1980s, although there is evidence to believe that the EC equity markets were more integrated between 1981 and 1986 than they had been prior to 1981.

Thus, we cannot conclude that the restrictions on capital imposed by national governments are not the only sources of segmentation. Other reasons appear to be important as well. These reasons are those that we have classified under the category of "indirect barriers" such as language difficulties, difficulties concerning information about markets or financial assets. It is important to restate that there seems to exist a clear difference between the two decades, although we have been unable to attribute this result to the presence of capital restrictions specifically.

As far as our second cut-off year is concerned, there is little evidence that the year of the White Paper did indeed contribute to the integration of capital markets within the EC. The results concerning 1985 is more supportive (a greater t-value) to the hypothesis that the government impediments are the only sources of segmentation in equity markets than those concerning the first cut-off year 1983. Yet, the composite model for the period 1985/1-1986/9 still is not priced. Therefore, the data do not provide evidence for the role of restrictions on capital as the primary sources of segmentation. This partially conclusive result is reached because before and the following the first cut-off year

1983, risk premia across the EC capital markets did not differ significantly (See Table XIII).

2. An Alternative Way of Evaluating Equity Market Integration:

There is an alternative way of evaluating capital market integration based on the times series regression results. Table III reports the proportion of systematic risk of portfolio returns explained by single market factor. The difference in percentage between the proportion of a given market's systematic risk and the market's share in total EC capitalization is also a relevant measure of equity market integration. Any systematic risk proportion that is higher than market capitalization of a given country should imply integration.

In Table III, it is clear that for the last and the most recent period all market portfolios in the sample exhibit high proportions of systematic risk as explained by the single EC composite factor model. It is also clear that each member state's proportion of systematic risk in total risk is larger than the share of each market in total EC market capitalization. Thus, all markets seem to be integrated.

What seems to be true as well is that each market's proportion of systematic risk as explained by the integrated model in proportion to its market capitalization share has increased through time in the entire decade of 1980s. A close examination of the last period relative to the previous periods for which we have estimated the measures of systematic risk appears to suggest that integrated

model explains the variations in equity returns in each market in the sample better now than it did in the 1970s and even in the early 1980s.

This result provides partial evidence for the acceptance of an integrated model against a segmented model. That is, there is at least partial evidence that the systematic risk in the EC equity markets is priced in an integrated EC model. The interpretation of Table III seems to give different but more consistent results about the capital market integration in EC. They are more supportive for the existence of an integrated model than the results based on the standard tests that are provided.

However, this approach does not particularly address the sources of segmentation in equity markets. All we can say based on the results of this model is that an integrated European Community model explaines increasingly greater proportion of variations in share prices. Yet, we fail to attribute this to a specific legislation eliminating or limitting the capital restrictions. That is, we cannot in this approach select a year that represents a regime switch.

B. Multi-factor Model:

In addition to the single index model, we also use a multi-factor return generating model to estimate the risk premia to test for integration. A prespecified bi-factor model approach is adopted. In a prespecified multi-factor model the appropriate question is the following: What economic variables, other than the

EC composite market index cause systematic variations in stock returns in the Community stock markets?

In a standard single index CAPM, identifying the sources of risk is unnecessary since the only source of systematic risk is a market index or a market portfolio. As long as we can set or select a domestic (or international) market portfolio, a model of integration in this context consists of two cross sectional regressions in the first stage, one with a single local and the other one with a single international index. Within a multi-factor asset pricing framework, factors should be prespecified if a statistical method is not employed to extract the relevant factors. In order to capture the movements in the term structure of interest rates relevant for systematic risk we use a long term interest rate. We have selected German Government bond yields as a proxy for the long term interest rates.[22]

The following multi-factor return generating process is adopted:

$$\text{Mean}(r_i) = a_i + {}_k\Sigma^K q_{kt}\beta_{ik} + v_{it} \qquad (3.10)$$

where

$K = 2$,

$\text{Mean}(r_i)$ is time-series mean value of the ith market portfolio's return,

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[22]German Government bond yields are end-of-month-semi-annual yields. The data are from Morgan Guaranty Trust.

β_{ik} is the k-factor sensitivity coefficient of the ith market portfolio as estimated by the regression (4.10),

q_{kt} is cross-sectionally estimated k-factor risk premium,

v_{it} is the residual of the regression.

The time series estimates of systematic risk coefficients for country by country are reported in the Tables XV through XXII. The risk premia estimates of the cross-sectional regression are reported in Table XXIII. The EC composite market return is priced for the first subperiod 1983/1-1986/1. This is consistent with the result of the single index model. The other source of systematic risk, i.e. long term bond yields is also a priced factor for the same subperiod. However, the second subperiod 1986/2-1989/1 does not contain any source of systematic risk priced. Neither the EC composite return index nor the German long term bond yield is priced sources of systematic risk based on the prespecified bi-factor return generating model.

That both single index and multi-factor models price the EC composite return for the subperiod of early 1980s can partially be explained through the large market shares of the U.K. and German equity markets within the EC market. These two eliminated the capital controls just the before this subperiod wherein we have the priced sources of systematic risk. Therefore, the impact of this was a greater equity market integration within the EC in the first half of the decade of 1980s for the British and German markets together account for almost 70 per cent of the total EC market

capitalization. That the assets are not priced in an integrated European Community composite model in the second half of the 1980s until the first month of 1989, on the other hand, can be attributed to the 1987 stock market crush. When a more recent data set is employed, this result is likely to be reversed. However, given that there will be an inertia in the Community even after the 1992 deadline, the speed of integration cannot be as fast.

V. DATA:

The data source is the International Financial Statistics (IFS) published by the International Monetary Fund (IMF). IMF provides adjusted monthly share price indices of stock exchanges. The data are limited to outstanding shares traded in a given exchange. The Common currency is the U.S. dollar. We take the monthly rate of depreciation and appreciation in stock price indices as a proxy for actual returns. These proxies are assumed to represent market portfolios in a given EC member state.

We have had to exclude some EC stock markets for the lack of data. IFS do not publish share price data of Ireland, Portugal, and Greece simply becauese these are the countries that are in the process of developing official stock markets as well as liberalization of their financial sectors. Moreover, the data on Luxembourg official stock exchange do not exist for the period before 1980. Therefore, equity markets of these four EC member states are excluded from the sample.

The government bond yields used in the multi-factor model are

obtained from Morgan Guaranty Trust Company of New York. The Morgan Bank regularly issues the U.S. dollar yields for international debt securities. The German Government bond yields are taken as proxy for long term interest rates. The yields are end-of-month yields and calculated semi-annually.

TABLE: XIII

Estimated Risk Premia:
Single Index
The Risk Premia are estimated Cross-sectionally running the mean values of market portfolio returns against the sensitivity coefficients (betas)

	1978/7-1981/3	1981/4-1983/12	1984/1-1986/9
Intercept	.6146511	-.3784168	-.1366721
St. Error	.1684089	.2421567	.2194486
t-value	.3649753	-.1566503	-.6227978
Premium	.6322328	.3284932	.3346064
St. Error	.2216570	.2421684	.2011396
t-value	.2852300	1.3564663	1.6635530
	1981/4-1986/9	1983/4-1984/12	1985/1-1986/9
Intercept	.1743709	.2257366	.3155492
St. Error	.2694151	.9345241	.1408185
t-value	6.4722020	2.4155240	2.2408230
Premium	.1581887	-.1857003	.7809283
St. Error	.2567258	.1034935	.1257862
t-value	.6161775	-.1794319	.6208376
	1989/10-1990/12		
Intercept	.6527848		
St. Error	.3381792		
t-value	.1930293		
Premium	-.2940588		
St. Error	.3316612		
t-value	-.8866240		

TABLE XIV

The F-Test of Risk Premia Differentials
($\mu_1=\mu_0$ vs. $\mu_1\neq\mu_0$, and $\mu_2=\mu_0$ vs. $\mu_2\neq\mu_0$)*

Period	
1981/4-1983/12 vs 1981/4-1986/9	Null Hypothesis Accepted at both 5% and 1% confidence levels
1984/1-1986/9 vs 1981/4-1986/9	Null Hypothesis Accepted at both 5% and 1% confidence levels

* μ_1 = The risk premium of the subperiod 1981/4-1983/12
μ_2 = The risk premium of the subperiod 1984/1-1986/9,
μ_0 = The risk premium of the full period 1981/4-1986/9.

VI. ALTERNATIVE MODELS:

A. Single-factor Models:

We will discuss several other alternatives to our model. There are still a number of single factor alternatives. For instance, the very same model can be repeated with the micro data and securities are pooled from EC markets. The composite index is made by individual securities. Individual returns are run against this composite market index both before and after the cut-off year. If capital controls are the only reason for the segmentation, then we expect that the composite index is priced after but not before the cut-off date. If the composite index is always priced, then the role of capital controls is neutral. If it is never priced, this suggests that other market imperfections are the causes of market segmentation.

Alternatively, if the risk premia of identical or similar securities differ in the two markets before but not after the cut-off year, this also implies that capital controls are the causes of market segmentation. If the risk premia do not differ significantly neither before nor after the cut-off, then the likelihood that a purely domestic factor (or factors) is (are) priced is high. The same tests are employed.

Another alternative is that domestic versions of standard single index CAPM are adopted. The composite index could then be compared to domestic indices. The following is a simple model of this type:

$$r_i = \alpha_i + \beta_i r_m + v_i$$

$$E(r_i) = \delta_i + q_i\beta_i \qquad (3.11)$$

where r_m is the domestic market index, and q_i is the estimated risk premium. If it is significantly different from zero then the domestic factor is priced. In general, if domestic factor is priced, the markets are segmented. If not, then the composite index model may be more appropriate.

How one can proceed here is as follows: Domestic versions are run both before and after the cut-off year. The necessary condition for the proposition that capital controls are the only sources of segmentation to be justified is that domestic index should have an explanatory power -i.e. it is priced- before the cut-off year but not afterwards. The sufficient condition for the argument to be true is that the composite market index is priced after but not before the cut-off year. Therefore, regressions of (4.4) are run with micro data having individual stock returns as in the second model.

Still another way could be that all of the above specified models can be repeated both with the macro data (stock market indices) and with the micro data (returns to individual securities pooled) by introducing several composite indices. Three other alternatives are an EC-5 composite index, an EC-9 composite index,

and a Switzerland domestic market index.[23] The EC-5 consists of the core EC nation states, namely Germany, France, Netherlands, Belgium, and Luxembourg. The EC-5 is known for its homogeneity. It might be expected that an EC-5 composite index is priced relative to any domestic index that can be defined within these five countries. The second option is the EC stock markets excluding Spain, Portugal, and Greece. The third option is suggested as a peculiar case study.

Finally, a model based on interlisted stocks similar to those adopted by Jorion, and Schwartz (1986) can be adopted. Those stocks that are listed in EC markets are selected. This selection then is used as an index. First, the interlisted stock index is run against an EC composite index such as the ones mentioned above. Next, "purely" domestic stocks, stocks that are registered in one market only are run against the same EC composite index.

Two conditions must hold for the argument of capital controls over markets to be justified. The necessary condition is that the domestic factor is not priced. The sufficient condition is that EC composite index is priced. If these two are satisfied then the government impediments such as capital controls are the sources of market segmentation. If neither factor is priced, then other market imperfections such as inability of a class of investors to trade, cost of obtaining information in order to invest in foreign markets

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[23] Both EEC composite indices are the weighted averages of the national stock market indices, weights being the percentage of total market capitalization.

may be the sources of segmentation.

B. Multi-factor Models:

The above specified and tested models are single-factor capital asset pricing models wherein the returns are assumed to be generated by a composite market index. In actuality, however, the linear stochastic process by which equity market returns are generated is multi-factor process. In a multi factor return generating process, factors can as well be variables that are not portfolio related. Several macroeconomic variables ranging from interest rates to oil prices can be taken under consideration in specifying the asset pricing model. If, on the other hand, a multi-beta CAPM based on mean-variance efficiency is adopted then factors will be confined to market portfolios (or market indices which serve the same purpose). In any event, the return generating process is a multi-factor one as in the following:

$$r_{it} = \alpha_i + {}_k\Sigma^K \beta_{ik}\delta_{kt} + \epsilon_{it} \qquad (3.12)$$

where

r_{it} = rate of return to the security or portfolio at time t,

β_{ik} = kth factor specific sensitivity coefficient of the ith security or portfolio -i.e ith asset sensitivity to the kth factor, k = 1,2,..K,

δ_{kt} = the kth common factor as a source of systematic risk at time t,

ϵ_{it} = security or portfolio specific (diversifiable) stochastic residual risk at time t.

In two beta CAPMs, that is K=2, one domestic index and one international index are taken as factors. Estimated β coefficients in that case give one national and one international risk premium. Depending on whichever is priced, segmentation or integration can be found out. In an APT multi-factor return generating model K is normally greater than two.

Empirical works that have adopted arbitrage pricing theory, in general, extracts the factors by way of statistical factor analysis. This method displays a major problem in asset pricing. The problem is that there is no guarantee that the factors selected by a factor analysis will have economic justifications as determinant sources of the variations in security returns. A second problem is on how many factors should be considered for pricing purposes. The number of factors that are priced has been the subject of quite a few empirical studies (see for instance Chen (1983), Ehrhardt (1987), Trzcinka (1986)).

Market portfolios are better than individual securities for the latter are a major cause of bias in the estimators. When the time series of individual returns from a sample is used, it is implicitly assumed that the risk characteristics of the securities remain unchanged, say, between a period of regulation and deregulation. One problem with this approach is that the consistency of the risk premia estimates is jeopardized because

both the factor loadings and the risk premia are estimated. The second problem is the stationarity of the factor loadings.

TABLE: XV

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

UNITED KINGDOM

	1983/1-1986/1	1986/2-1989/1
Constant	.7151261	.9366581
St. Error	.7569570	.1102141
t-value	.9447380	.8498531
β (EC Comp)	-.9504365	1.0818920
St. Error	.9362513	.1034103
t-value	-10.1515100	10.4621300
β (Gov-bond)	-.6988369	-.1460369
St. Error	.9840485	.1717220
t-value	-.7101650	-.8504260

TABLE: XVI

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

GERMANY

	1983/1-1986/1	1986/2-1989/1
Constant	.2794749	-.1267196
St. Error	.7806759	.1634268
t-value	3.5799090	-.7753909
β (EC Comp)	-.1843874	.8308380
St. Error	.9655883	.1533381
t-value	-19.0958600	5.4183410
β (Gov-bond)	-.3236724	.1795708
St. Error	.1014883	.2546315
t-value	-3.1893580	.7052186

TABLE: XVII

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

FRANCE

	1983/1-1986/1	1986/2-1989/1
Constant	.6289458	-.1589140
St. Error	.1888659	.2774250
t-value	.3330118	-.5728179
β (EC Comp)	-.2105332	1.1260260
St. Error	.2336011	.2602990
t-value	-9.0125100	4.3258950
β (Gov-bond)	-.4139999	.2605715
St. Error	.2455268	.4322495
t-value	-.1686170	.6028267

TABLE: XVIII

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

NETHERLANDS

	1983/1-1986/1	1986/2-1989/1
Constant	.1065366	-.6498519
St. Error	.9072522	.1497007
t-value	1.1742780	-.4341008
β (EC Comp)	-.1648521	.8059499
St. Error	.1122146	.1404593
t-value	-14.6907900	5.7379590
β (Gov-bond)	-.1003009	.9539495
St. Error	.1179433	.2332451
t-value	-.8504162	.4089901

TABLE: XIX

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

BELGIUM

	1983/1-1986/1	1986/2-1989/1
Constant	.5044466	.1748097
St. Error	.1042554	.2316439
t-value	.4838566	.7546485
β (EC Comp)	-.2130826	.3079265
St. Error	.1289495	.2173440
t-value	-16.5244900	1.4167700
β (Gov-bond)	-.3410427	-.2553846
St. Error	.1355326	.3609190
t-value	-.2516314	-.7075954

TABLE: XX

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

DENMARK

	1983/1-1986/1	1986/2-1989/1
Constant	-.5308877	-.1054416
St. Error	.1481852	.1614159
t-value	-.3582595	-.6532295
β (EC Comp)	-.1603324	.3087845
St. Error	.1832847	.1514513
t-value	-8.7477270	2.0388370
β (Gov-bond)	.3457977	.1629744
St. Error	.1926417	.2514983
t-value	.1795030	.6480141

TABLE: XXI

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

ITALY

	1983/1-1986/1	1986/2-1989/1
Constant	.3391990	-.1386265
St. Error	.1157415	.2623824
t-value	2.9306600	-.5283375
β (EC Comp)	-.2233027	1.1101290
St. Error	.1431569	.2461850
t-value	-15.5985200	4.5093290
β (Gov-bond)	-.3917582	.2202296
St. Error	.1504646	.4088120
t-value	-2.6036560	.5387064

TABLE: XXII

Estimated Factor Loadings:
Multi-Factor
Time Series Regression Estimates

SPAIN

	1983/1-1986/1	1986/2-1989/1
Constant	-2.9982650	.2176828
St. Error	1.5316440	.2756962
t-value	-1.9575480	.7895751
β (EC Comp)	27.7829300	1.0885450
St. Error	.1894432	.2586768
t-value	146.6557000	4.2081290
β (Gov-bond)	.3157626	-.3097868
St. Error	.1991146	.4295580
t-value	1.5858330	-.7211796

TABLE: XXIII

Estimated Risk Premia:
Multi-Factor
Cross-Sectional Regression Estimates

	1983/1-1986/1	1986/2-1989/1
Constant	.4763949	.3711497
St. Error	.1286386	.4806332
t-value	3.7033580	.7722098
Premium (EC)	.3448660	.2831606
St. Error	.1224161	.5365525
t-value	2.8171620	.5277407
Premium-bnd	.8771327	-.4710336
St. Error	.8778906	.4638140
t-value	.9991367	-1.015566

CHAPTER IV

MONETARY INTEGRATION

We have not attempted to investigate empirically the status of monetary integration within the Community. Monetary integration is a much broader topic than abolishment of capital controls or integration of equity markets. Equity market integration per se does not require the existence of a common currency or a common Central Bank. Nor does it have to do with a common monetary policy. Yet, a full monetary integration implies not only the fixity of the exchange rates and a common currency but also a common monetary policy.

I. LEGAL ASPECTS OF MONETARY INTEGRATION:[24]

A. First Steps toward unity:

In chapter I, we have given a historical background of financial integration within the EC as far as the liberalization of capital movements are concerned without making specific references for a monetary or currency integration. We shall highlight the important steps taken towards the creation of an

[24]This section is partly due The European Financial Common Market, an official Community publication.

economic and monetary union in the Community.

The first major step towards the creation of a monetary union was the 1969 Hague Summit. The decisions made in this Summit later became the basis of the 1971 Warner Plan, named after the former Luxembourg Prime minister. From this Plan, only an exchange-rate system where rates fluctuate up or down by up to 2.25% has remained.

B. The European Monetary System and European Currency Unit:

Until 1979, practically no major development has taken place. In 1979, the EMS was shaped. The 2.25% margin was adopted in principle with the exception of Italy to whom a 6% margin was granted. The U.K. did not participate. One of the most important aspects of the EMS was the creation of the European Currency Unit, the ecu. The ecu is a basket of weighted amounts of the Member State's currencies, including the U.K. pound. It serves as a point of reference for many aspects of the EMS.

The EMS exchange rate system was quite successful until now. Exchange rates in the Community have remained much more stable than the rest of the world. This has brought some level of convergence in the economic policies of Member States. Further, inflation rates have also converged.

In 1985, the finance ministers and central bank governors adopted a series of measures to reform further the EMS. The interest payable on the ecu held by the Member State central banks was made attractive and tied to market rates in place of average

discount rates. A different holder status for non-EC central banks and international entities to acquire ecu was also mentioned in the 1985 meeting of ministers.

A private ecu market next to the official market -with active interbank trade in deposits and loans in ecu- has grown up gradually. Such transactions became much easier when several banks in the ecu bank association created a settlement system at the Bank for International Settlements (BIS) with the support of the EC Commission in 1986. The ecu is now the fifth most important currency following the U.S. dollar, the German mark, the Swiss frank, and the Japanese Yen. It is particularly important in the bond market.

C. The three stage Delors Plan:

The EC Heads of State and Government agreed at their summit in June 1988 to have the idea of greater monetary integration vis-a-vis greater monetary cooperation examined by a Committee chaired by Commission President Jacques Delors. In April 1989, the Delors Committee that consisted of the governors of the twelve central banks and four other experts completed a major work where a report on monetary union in the Community was finalized. The report highlights the political, economic, and institutional conditions necessary for an economic and monetary integration.

More importantly, however, the Committee put forward a concrete three-stage plan where the formation of a federally structured independent European System of Central Banks (ESCB). The

Delors three-stage plan also included a schedule to reform the existing procedures for coordinating economic policy.

1. The first stage:

The first phase of the Delors Plan that had been scheduled to start on 1 July 1990 at the latest was imposed. The entire plan specifically calls for completion of the monetary union by 1 January 1995 although it sets no predetermined date for the implementation of individual stages.[25]

The principal steps of the first stage can be summarized as follows:

(i) removal of physical, technical as well as fiscal barriers in conjunction with the Single European Act;

(ii) implementation of the structural funds reform and the doubling of their resources;

(iii) strengthening of the rules applicable to date regarding economic and fiscal policy coordination;

(iv) full implementation of the European financial common market;

(v) inclusion of all Community currencies in the EMS exchange-rate mechanism, with the same rules applying to each;

(vi) abolishment of all existing impediments to the private use of the ecu;

(vii) redefinition of the mandate of the Committee of Central

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[25]This specific date is added in a different plan by the European parliament.

Bank Governors with the strengthening of the coordination function.

2. The second stage:

The second stage of the Delors Plan includes the following proposals:

(i) review and consolidation of the results of the Single European Act;

(ii) enlargement of the resources for structural policies, research as well as infrastructure investments;

(iii) extension of the new procedure for the coordination of economic policy introduced in stage one, with the adoption of policy guidelines by majority decision;

(iv) establishing the European System of Central Banks (ESCB);

(v) recourse to exchange rate realignments only in exceptional circumstances;

(vi) transition from the coordination stage of independent monetary policies to a common monetary policy formulated and implemented by the ESCB, with a gradual transfer of decision-making power to a Community institution;

(vii) pooling of some part of the exchange reserves for intervention on the currency markets;

(viii) narrowing the fluctuation margins within the exchange rate mechanism depending on the circumstances.

3. The stage three:

The final stage before the monetary union includes the

following proposals:

(i) irrevocable locking of all exchange rates;

(ii) further strengthening of structural regional economic policies when and if necessary;

(iii) all rules and procedures of the Community to be made binding, in particular those regarding national budgets and transfers of resources for structural policies, and to be applied by the Council of Ministers, in cooperation with the European Parliament;

(iv) new form of representation vis-a-vis the assumption that the role of the Community in the process of international policy cooperation will be full;

(v) decisions regarding exchange market intervention in third currencies to be made on the sole responsibility of the ESCB Council;

(vi) maintenance of official currency reserves at the ESCB;

(vii) transition and change over to a single currency.

D. The European System of Central Banks (ESCB):

The most radical of all institutional changes determined by the Delors Plan is, of course, the establishment of the ESCB. The Bank will be fully autonomous. It will be based on a federative structure since this would correspond best to the political diversity of the EC. The ESCB Council would be composed of the governors of the Member State central banks and the members of the board, the latter to be appointed by the European Council.

At the final stage, the ESCB will be responsible for formulating and implementing monetary policy as well as managing the Community's exchange rate policy in regarding third currencies. It is also in this final stage that the national Central Banks are expected to execute operations in accordance with the decisions made by the ESCB Council.

The Delors Committee proposed that the system will be committed to the objective of price stability and that it should support the general economic policy set at Community level. Further, the ESCB would also be responsible for the formulation and implementation of monetary policy, exchange-rate and reserve management, and the maintenance of a functioning payment system. It would also participate in the coordination of banking supervision policies of the supervisory authorities. In executing, the ESCB Council will have policy instruments available. The system could buy and sell government securities on the market as a means of conducting monetary policy. However, it would comply with the provision not to lend to public sector authorities.

II. THE FIXITY OF EXCHANGE RATES AND SOME IMPORTANT TRADE-OFFS:

The fixity of exchange rates and currency union seem to be taken as given from the outset as prerequisites for monetary integration. As far as a monetary integration is concerned, the problem is not solely a currency integration or the fixity of exchange rates. After all, a monetary integration to some degree has already been achieved, and there is every evidence to believe

that price and interest rate differentials are in the process of disappearing. Convergence is even more evident for the core EC countries especially among Germany, France, and the Benelux[26].

As long as there is convergence in inflation rates -whether to the German rate or to some other rate, and fixed exchange rate system is continued to be adopted, one can speak of a currency integration. If the exchange rate is fixed, it has no consequential importance to actually have a common currency issued by a common Central Bank.

However, there is an important element in monetary integration that has recently emerged as a critical decision matter for the Community States. This matter is the question of monetary policy. Should there be a common monetary policy in the EC? Can a Member State actually conduct independent monetary policy? Here, of course, the question on the agenda has consequential macroeconomic implications as far as where the EC and European integration stand is concerned.

Europe has now come to a stage where any movement to deepen the integration further would jeopardize sovereignty and be dangerous politically. From now on, further attempts to deepen the economic integration will likely to have fundamental and irreversible consequences that are not necessarily practical and helpful for monetary integration.

At this stage, it seems that the monetary decision makers of

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[26]On the issue of convergence and price differentials in Europe, refer to Wieser (1989), and Cecchini (1988).

EC states face some important trade-offs as far as macroeconomic policies are concerned. First of all, in a fixed exchange world where capital is free to move, monetary policy cannot easily be independent. The obligations regarding the fixity of the exchange rates are likely to reduce the independence of monetary policy in a given EC country. Similarly, given an independent monetary policy and a fixed exchange rate system, capital controls are likely to exist. Finally, if all capital controls are lifted and national governments favor independent monetary policies as opposed to a Community-wide policy, then exchange rates will be flexible to some degree. Thus, if monetary policy should be independent, then there is a trade-off between the existence and continuity of a fixed exchange rate system within the Community and eliminating all capital controls.

Presently, a perfect fixed exchange rate system does not exist although the plus-and-minus-2.25% system adopted by the majority of the Community can be considered as a "somewhat fixed" system. Even the plus and minus 6% margin of the U.K. and Spain does not jeopardize the fixity much. This seems to provide to the national governments some space to move and conduct monetary policies independently. On the other hand, most states have already eliminated capital controls. Remaining EC states that still have some restrictions on capital have been scheduled to remove all controls over their exchanges by 1992. It appears, therefore, irreversible to reintroduce capital restrictions individually. If you take the non-existence of capital controls given, then the

trade-off exists between the fixity of exchange rates and independence of monetary policy.

Yet, monetary policy has also converged. Further, the differences in inflation rates among the member states are modest. Besides, risk premia differentials among the EC capital markets are also modest based on the results of our international asset pricing model. Briefly speaking, there is convergence in the financial sector of the Community as a whole with a possible exception of insurance and brokarage. Neither the exchange rates nor the market prices of risk have converged fully, however. All these seem to suggest that there will be less than full convergence in interest rates, exchange rates, and risk premia.

V. CONCLUSION

Integration versus segmentation issue is examined in a sample of European Community equity markets. No clear-cut conclusion can be drawn based on the asset pricing models adopted because we have been unable to identify a benchmark model for European capital markets. Neither a segmented nor an integrated model has empirical superiority over the other. However, a European Community composite return (integrated model) appears to explain the variation in stock market returns better in the decade of 1980s than in the 1970s. The systematic risk vis-a-vis the EC composite model consisted of eight representative member state markets is priced in the first half of the 80s. That is, the hypothesis that assets are priced in an international (European) integrated model -as opposed to a segmented market model for each EC member state equity market is accepted. The systematic risk of the same integrated market for the period of 1978-1980 is not priced.

This result suggests that there is a movement toward a greater integration in the EC capital markets. However, we fail to attribute this result to the presence of capital controls specifically. Evidence does not support that the year of 1983 when an important EC Commission decision was made is a significant year

after which risk premia differentials across the EC markets tend to disappear. No significant difference between the pre and post 1983 periods was noted. Rather, the movement toward a greater financial integration seems to be related to a more general attitude on the part of investors who trade in European equity markets.

The results of the prespecified multi-factor model are more consistent with our argument that the capital controls are the only sources of segmentation in world equity markets. When we take a representative European Government (German) long term bond yields as a second source of systematic risk in addition to the composite index, the composite return a priced factor in both data groups. On the other hand, representative bond yields are priced in the period of 1983-1986. However, the bond yield factor is not a priced source of systematic risk between 1986 and 1989.

The trend of the proportion of portfolio return systematic risk as explained by the single factor model relative to market capitalization share consistently support an integrated capital market within the European Community. Table III where the proportion of systematic risk of portfolio returns explained by single market factor shows that the percentage of systematic risk proportion in total risk factor exceeds the percentage of market capitalization in the composite EC market in each and every member state. Further, the proportion of portfolio systematic risk in total risk relative to the proportion of market capitalization in total EC market capitalization has consistently increased in every

state in the sample. Even those Members with marginal market capitalization shares have substantially high systematic risk components as explained by the integrated single index model.

As a general view we have come to the conclusion that the pricing of European capital assets cannot be appropriate in a segmented model where each EC member state has its own identification of systematic risk. Therefore, the assumption of a perfectly segmented market wherein a domestic market index is taken as the only source of systematic risk does not seem to be a valid one any longer as far as the European Community capital markets are concerned. When the deadline 1992 program that has been underway since 1987 is completed as scheduled, one might expect an even greater integration across the EC markets.

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