

A PORTFOLIO ANALYSIS OF THE EUROPEAN UNION

by

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B.B.A., Simon Fraser University, 1994

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

in the Faculty

of

Business Administration

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Simon Fraser University

May 1996

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## ABSTRACT

This thesis introduces the possibility of using modern portfolio theory from financial economics to evaluate, in a novel manner, alternative compositions of international trade blocks.

The European Union (EU) is envisioned as a politically-created portfolio of nations that can benefit from having an economically diverse set of members. The Markowitz Portfolio Model is used to compare the economic efficiency (in terms of growth and risk characteristics) of the EU Portfolio at different stages of its evolution. The rate and volatility of real economic growth for the EU 6, EU 9, EU 12 and EU 15 are compared to one another. The growth and risk characteristics of some alternative EU compositions are also studied (e.g. the EU 15 less nations not expected to qualify for the third stage of Economic and Monetary Union).

The results show that the geographical expansions made by the EU since 1973 have helped stabilize the EU Portfolio's growth rate. Also, findings made in this paper lend themselves to the existing notion that Germany is an integral and indispensable EU member. Germany improves both the growth and risk characteristics of the EU Portfolio by contributing to the EU Portfolio's economic diversity.

## ACKNOWLEDGEMENTS

First and foremost, I would like to thank my parents for the innumerable self sacrifices they made so that I may succeed.

I would also like to thank my supervisory committee for their guidance and patience.

Finally, I would like to thank my best friend for keeping me company and making me laugh on what would have otherwise been a very quiet journey.

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## CHAPTER 1 INTRODUCTION

Following World War II, Britain's Churchill, France's Monet, and West Germany's Adenauer all envisaged rebuilding Europe's economic and political structures in a way that would overcome divisive national interests (Cooper, 1991). Specifically, French Foreign Minister, Robert Schuman, proposed establishing a European coal and steel common market. Schuman contented that such a common market would inhibit any potential commandeering of these key military industry inputs by any one country. He believed that, "War between France and Germany would become not merely unthinkable but materially impossible." (Cooper, 1991).

Schuman's plan came to fruition when the European Coal and Steel Community (ECSC) was established by the Paris Treaty of 1951. The original signatories were: Belgium, Italy, Luxembourg, the Netherlands, France, and West Germany (Swann, 1992). Since then, the Community's mandate has evolved to include: **i)** regional free-trade of goods, services, capital, and people; **ii)** economic and monetary union; and **iii)** a federal type of political union (Bora, 1994). Some of the benefits attributable to such alliances accrue with increased membership. Therefore, since the early 1970s, the Community has sought to expand. European Community (EC) membership was extended to the UK, Ireland and

Denmark in 1973; to Greece in 1981; to Spain and Portugal in 1986; and to Austria, Sweden and Finland in 1995.

However, the European Union's (EU) enlargement has not been without cost. The accession of new member states has made it more difficult to implement uniform policies. Specifically, increased diversity of national interests within the Union has undermined the Single European Market's integrity and hampered the process towards Monetary Union (Nugent, 1992). For example, both the UK and Denmark were afforded the option of not having to participate in a single currency Economic and Monetary Union (EMU) in order to avoid a break-up of the European Union (Economist, 1993a).

In light of these apparent costs of expansion, this paper will investigate whether portfolio theory can help policy makers arrive at more informed decisions on the expansion of economic unions. In particular, I will study the EU's expansion. I expect portfolio theory to shed some light on the following questions: Was the EU's recent enlargement on January 1st 1995 warranted? If not, should the EU continue expanding?

The following chapters will: **i)** describe the Markowitz Portfolio Model I use to assess the EU's expansion; **ii)** investigate the possibility of using a portfolio model as a criterion for EU expansion; and **iii)** determine whether,

according to portfolio theory, the EU should have admitted Austria, Sweden, and Finland on January 1st 1995. This study concludes by discussing the implications of its findings, as well as suggestions for future research.

## CHAPTER 2

### USING THE MARKOWITZ PORTFOLIO MODEL ON POLITICALLY-CREATED PORTFOLIOS

#### 2.1. A PORTFOLIO ANALYSIS OF CANADA

Markowitz (1952) and Sharpe (1963) described economic efficiency as the minimization of risk for a given level of return, or the maximization of return for a given level of risk. Goldberg and Levi (1994) conceptualize Canada as a politically-created portfolio of provinces. In so doing, these authors characterize return as average annual real GDP growth rate and risk as the standard deviation of the growth rate. That is, they define national economic efficiency as the level and stability of economic growth as measured by real GDP. By so doing, Goldberg and Levi are able to use the Markowitz Portfolio Model to examine the "economic efficiency" of Canada with respect to alternative political arrangements (e.g. a Canada without Quebec). In discussing their findings, Goldberg and Levi use the concept of diversification employed in the management of financial assets to show that a confederation of regions (the portfolio) can benefit from the differences in economic growth rate between regions (elements of the portfolio).

The European Union can also be envisioned as a portfolio made up of regions. Brewin (1987) asserts that the EU is best defined as a union of states rather than a simple

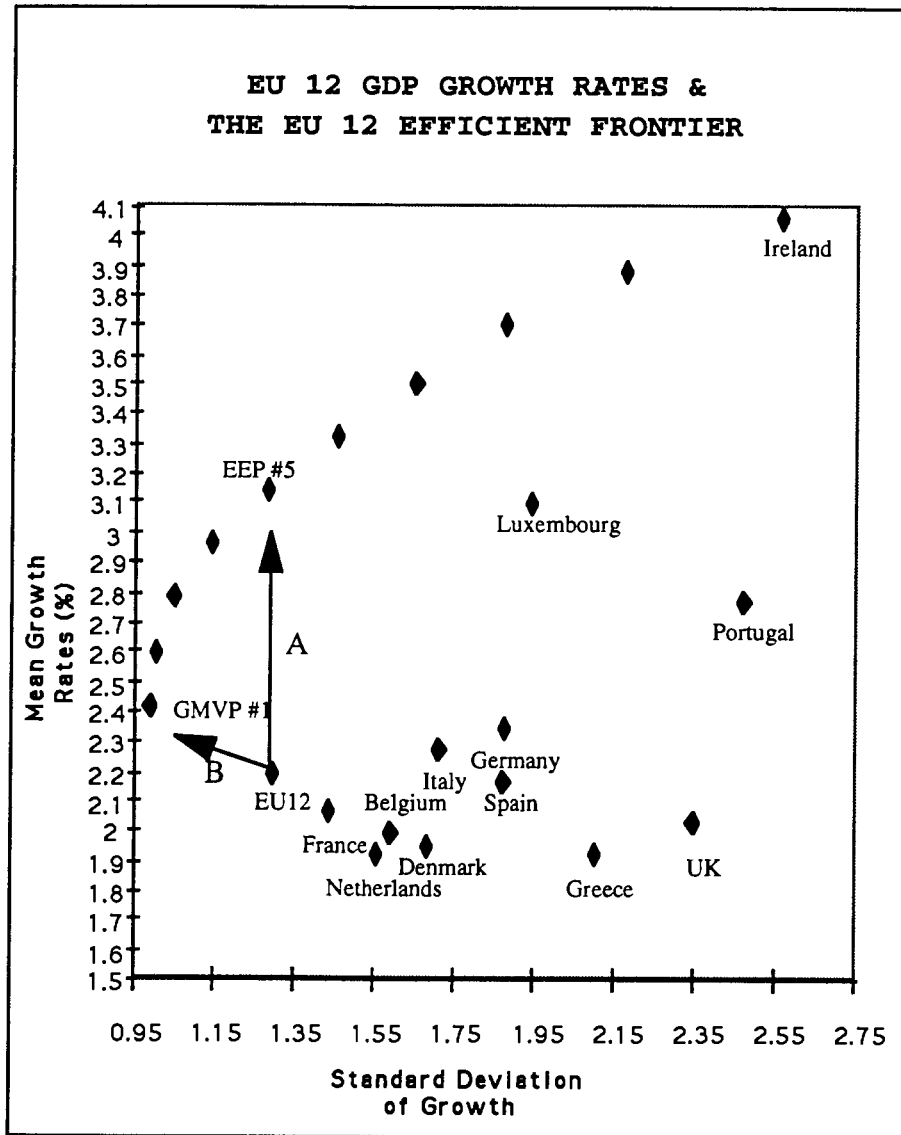
organization. Brewin's argument is supported by the German Constitutional Court's (the Karlsruhe) ratification of Maastricht. The Karlsruhe concluded that Maastricht does not create a European state but rather a "Staatenverbund" (a league of states) (Economist, 1993b). Therefore, it is appropriate to follow Goldberg and Levi's use of the Markowitz Portfolio Model to assess alternative compositions of the EU.

## **2.2. A PORTFOLIO ANALYSIS OF THE EU 12**

Until January 1995, the EU consisted of 12 countries. Figure 1 and table 1 present the average annual real GDP growth rate and the associated standard deviation of the growth rate (i.e. risk) for the period 1978 to 1994. For example, both show the rapid growth and relative volatility of Ireland, the slower but more stable growth of Luxembourg, and the slow yet volatile growth of the UK.

Each country is attributed a weight so as to create an EU 12 Portfolio (see table 2) according to the relative size Nations are assigned weights according to the relative size of their real 1990 GDP as compared with the entire EU 12's real GDP. These GDP comparisons are made using Purchasing Power Parity ratios. The methods I use to assign weights and compare GDPs are those used by the UN, Eurostat and the OECD when they collaborated to produce the 1990 "European Comparison Program" (Szilagyi, 1994).

FIGURE 1







National levels of economic growth (i.e. average annual real GDP growth), and risk (i.e. the standard deviation of the real GDP growth), as well as the correlation of economic growth between countries (see table 3) are used to estimate the EU 12's efficient frontier. The resulting frontier is made up of ten "Economic Efficient Portfolios" (EEPs). Each EU 12 EEP assigns a weight to each EU 12 country so as to maximize the EU 12 Portfolio's rate of return for a given level of risk. For example, the actual EU 12 Portfolio's real annual GDP growth averages 2.19% and has a standard deviation of 1.3 (see table 2). However, EEP #5 reveals that it is possible for the EU 12 Portfolio to attain an average annual real GDP growth rate of 3.14% without increasing the level of risk (i.e. maintaining the standard deviation of real EU GDP annual growth at 1.3). EEP #5 suggests that this could be done by changing the relative weights of the EU 12 countries. In particular, EEP #5 recommends a theoretical EU make up of 21.49% Luxembourg, 23.86% Denmark, 39.53% Ireland and 15.11% Portugal.

### **2.3. HYPOTHESIS**

The diversification benefits associated with portfolio management theory are relevant to confederation of regions (Goldberg and Levi, 1994). Therefore, the Union's expansion should be favored when using the Markowitz Portfolio Model to study alternative EU compositions. An increase in the number of member-states should result in greater regional diversity

**TABLE 3**  
**PAIRWISE CORRELATION TABLE FOR NATIONAL GROWTH RATES**

	Bel.	Den.	Fra.	GFR.	Gre.	Ire.	Ita.	Lux.	Neth.	Por.	Spain	UK
Bel.	1											
Den.	-.09	1										
Fra.	.73	.06	1									
GFR.	.61	.14	.49	1								
Gre.	.48	.17	.55	.42	1							
Ire.	.36	-.27	.32	.37	.14	1						
Ita.	.68	.12	.71	.53	.60	.12	1					
Lux.	.49	.32	.50	.54	.53	.20	.39	1				
Neth.	.53	.25	.47	.83	.44	.41	.50	.79	1			
Por.	.60	-.27	.74	.39	.26	.14	.69	.20	.33	1		
Spain	.60	-.06	.62	.43	.12	.22	.37	.61	.51	.60	1	
UK	.02	.52	.38	.02	.22	-.07	.29	.52	.27	.17	.45	1

the EU. However, marginal diversification benefits of portfolio theory diminish significantly once approximately ten stocks are held in a portfolio (Evans and Archer, 1968). As such, I expect to find that the EU's latest expansion (that of January 1995) will not have had a significant impact on the Union's economic efficiency in terms of growth and risk characteristics.

<i>Ho: EU 12 economic efficiency = EU 15 economic efficiency</i>
--

Confirmation of this null hypothesis would constitute an argument against further EU expansion, especially when the costs associated with expansion are taken into consideration (e.g. increased difficulties in implementing uniform policies across the Union undermine the Single European Market's integrity and hamper the process towards European Monetary Union). However, before testing the aforementioned

hypothesis, it is imperative that I discuss the underlying assumptions as well as the limitations of using the Markowitz Portfolio Model to assess the EU's expansion,

## **2.4. ASSUMPTIONS AND LIMITATIONS**

### **2.4.1. Holding Constant The Effects Of A Shifting Industrial Structure**

Thurrow (1993) asserts that the formation of "quasi" trade blocks (e.g. the EU and NAFTA) leads to changes in the industrial composition of member states. Ricardo's principle of comparative advantage supports Thurrow's assertion. Ricardo argues that a closed economy which opens up to trade will redirect its production efforts towards goods for which it has a comparative advantage (Krugman and Obstfeld, 1991). My analysis depends on the assumption that changes in the location of industries due to changes in the EU's composition have very limited systematic effect on national growth rate variances and covariances. This assumption is also made by Goldberg and Levi (1994) in their portfolio analysis of Canada.

### **2.4.2. A Static Model**

Reaching the efficient frontier is an exercise in theory when applying portfolio theory to a confederation of regions (Goldberg and Levi, 1994), For example, EU policy makers cannot buy more "Ireland" in attempting to reach EEP #5 in

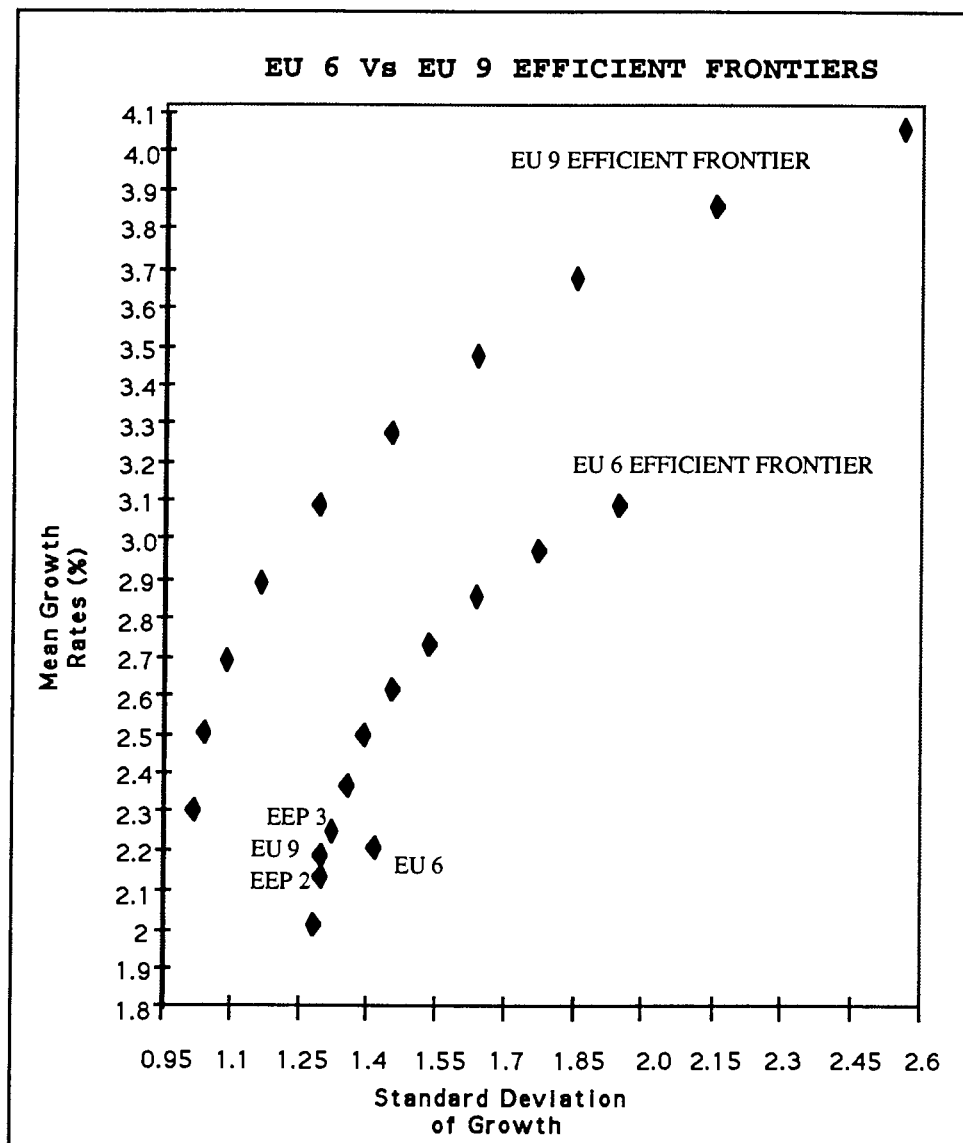
figure 1. At best, they can only admit countries whose growth rates correlate highly with that of Ireland.

Reaching the EU's efficient frontier may best be defined as an optimal but elusive goal. A new efficient frontier is created every time a state joins or breaks away from the EU. European policy makers may move the EU Portfolio onto an existing efficient frontier by admitting a new country into the Union. However, a new efficient frontier, from which the new EU would be displaced, would be created in the process. For example, the EU expanded from six members (Belgium, Italy, Luxembourg, Germany, France and the Netherlands) to nine members (the EU 6 + Denmark, Ireland and the UK) in 1973. The EU 9 Portfolio grows at an average annual rate of 2.18% with a standard deviation of 1.30. It can therefore be found resting on the EU 6 efficient frontier between EEP #2 and EEP #3 (see figure 2 as well as tables 4 and 5). However, the accession of Denmark, Ireland and the UK created a new efficient frontier--the EU 9 efficient frontier--from which the EU 9 Portfolio is displaced.

#### **2.4.3. The Need To Contextualize Results**

Results obtained when using portfolio theory to assess alternative EU compositions cannot be used as the sole basis for making policy decisions concerning the EU's expansion. Policy makers which use only the Markowitz Portfolio Model to select between two alternative EU compositions will always chose the EU which has the least variation in return. Other

FIGURE 2





important political-economic factors would be overlooked. As a result, such policy makers risk making poor decisions. For example, we may find that an EU without Germany has superior growth and risk characteristics than an EU which includes Germany. To exclude Germany based solely on such a finding would be erroneous. Germany is the economic locomotive of the EU (Thurow, 1993). Moreover, Franco-German relations are key in overcoming conflicts which continually arise between North and South EU nations (Scharrer, 1995). Finally, a European Union without Germany would have one less voice on the G-7 Council. Therefore, conclusions drawn from using the Markowitz Portfolio Model to assess alternative EU compositions should be studied in a context which includes a discussion of all EU political-economic objectives.

#### **2.4.4. Expected Returns Are Not Guaranteed**

Making probabilistic estimates of the future performances of stocks is the first step in selecting an equity portfolio (Markowitz, 1952; Sharpe, 1963). This paper uses expected returns based on historical country data to make such probabilistic estimates. It is therefore important to note that historical data may not apply to the future. "Such is the nature of economic change and uncertainty, especially in these times" (Goldberg and Levi, 1994). Nonetheless, a portfolio based analysis of alternative EU compositions could still provide some interesting insight for policy makers.



### CHAPTER 3

## USING THE MARKOWITZ PORTFOLIO MODEL AS AN EU ACCESSION CRITERION

### 3.1. EU OBJECTIVES AS JUSTIFICATION FOR USING A PORTFOLIO CRITERION

EU objectives include: **i)** ensuring that living standard disparities across its member nations are minimized; **ii)** increasing its policy making clout in international economic organizations; **iii)** ensuring that its prosperity is not undermined by regional political instability; and **iv)** promoting its economic stability. It can be argued that justification exists for using the Markowitz Portfolio Model as a flexibly applied EU accession criterion if it can be shown that the EU could better achieve all four of these goals by reaching its economic efficient frontier.

#### 3.1.1. Living Standard Equity Across Nations

Article 130 of the Single European Act explicitly outlines the reduction of living standard disparities between EU member states as a principal objective of the European Union (Council of the European Communities, 1986). To help meet this objective, the 1992 proposal dubbed "Delors II" suggested increasing the European Union's budget from the then ECU 66.5 billion to ECU 87.5 billion in 1997. In effect, Delors II was proposing raising the Union's annual

budget from 1.2% of EU GNP in 1992 to 1.37% of EU GNP in 1997 (Nugent, 1992).

The national income identity asserts that national income is made up of consumption, investment, government expenditure, and net exports (exports-imports) (see equation 1) (Dornbusch et al., 1987). Therefore, an increase in the portion of EU GDP or GNP allocated to government expenditure could result in a detrimental decrease in the level of consumption or investment within the EU as well as an EU trade deficit. EU policy makers could avoid these consequences by improving the EU's real GDP annual growth rate without compromising economic stability (i.e. moving the EU Portfolio along path A toward EEP #5 in figure 1). This follows the idea that an economically efficient confederation of regions enjoys a higher and/or more stable revenue base on which its central government can draw upon to help fund centrally-based transfer of income schemes which maintain living standard parity across regions (Goldberg and Levi, 1994).

#### Equation 1

$$Y = C + I + G + (X - M)$$

*Y = GDP; C = Consumption; I = Investment; G = Government Expenditure; X = Exports; and M = Imports. Therefore, for a given level of income, increasing government expenditure would mean having to reduce private consumption and/or investment and/or net exports.*

### 3.1.2. Increasing The EU's Power To Negotiate Globally

The new world economic order can best be described as tri-polar in nature. Japan, the EU and the US constitute three rival economic regions vying for domination in what the Nomura Research Institute of America (1990) has described as the seven key industries necessary for countries wishing to secure a high living standard for their citizens: microelectronics, biotechnology, material-sciences, telecommunications, civilian aviation, robotics plus machine tools, and computers plus software (Thurow, 1993).

As a result, world trade is becoming characterized by managed trade between "quasi"<sup>1</sup> trading blocks representing each of the aforementioned regions (i.e. NAFTA, the EU, and Japan). Thurow (1993) explains that such a world economic order puts into question the General Agreement on Tariffs and Trade (GATT); an agreement on which current world trade paradigms have been built. For example, the NAFTA is in violation of the GATT. The treaty's "Most Favored Nation" principle stipulates that the lowest trade restrictions imposed on any one country must be afforded to every country. An exception is made for countries forming a "common market" whose ultimate aim is real political union. However, the US, Canada and Mexico do not appear to harbor an intent to integrate politically.

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<sup>1</sup> Thurow makes a distinction between the trading blocks of the 1930s and today's "quasi" trading blocks such as NAFTA and the EU. The former attempted to reduce or eliminate trade while the latter endeavor to manage trade.

If the GATT is losing its ability to effectively govern world trade, a new structural framework for global trade needs to be designed. Thurow (1993) asserts that those who control access to the world's largest market will exert the greatest influence in the making of new trade rules. The desire to enter this market will lead other players to succumb to the rules of those who control it. For example, the EU has been using its market size as leverage to influence the way in which world trade is conducted. The European Union now accounts for 40.57% of the OECD aggregate GDP and it imported 29% of all goods exported from LDCs in 1987 (World Bank, 1989; OECD Economic Outlook, 1995). EU policy makers know the EU is an attractive market for exporters. Therefore, they are requesting that "market opening measures extend internationally on a firm basis of clear reciprocity" (Cecchini, 1988). That is, EU policy makers expect countries wishing to trade with the EU to change their commercial regulations so as to resemble those of the EU. For example, American banking laws prohibit domestic and foreign banks from owning industrial firms. Brittan, the EU Commissioner for Finance, used the argument of "reciprocity" to create an unfair competitive advantage for European banks by prohibiting US banks from owning shares in European industrial firms (Kellaway, 1990). By doing so, Sir Brittan has made it hard for US corporate banks to compete in the EU against European banks which have interlocking boards with many industrial firm (e.g. According

to Dornberg (1990) the Deutsche Bank owns at least 10% of 70 companies and has placed its executives on over 400 corporate boards}.

The EU's aspiration to subtly manipulate the formulation of new global trading rules so as to benefit its industries constitutes an argument for increasing the EU's economic efficiency in terms of growth and risk characteristics. For example, the EU 12 Portfolio's average annual real GDP growth rate would increase by close to 1% if the Portfolio were to move along path "A" to EEP #5 in figure 1 (also see table 2). Such a consistent marginal increase in growth rate, when compounded annually over 20 years<sup>2</sup>, would result in an EU real GDP 22% larger than would otherwise be the case. This would contribute to the EU's quest for domination in world trade negotiations.

This argument is made clearer if we envisage, as did Levi (1990), the G-7 as an organization whose power structure is evenly split between "North America (the US and Canada), Europe (Germany, Britain, France, and Italy) and Japan". The US and Europe each possess approximately 40% of the G-7's power base while Japan holds the remaining 20%, when bargaining power is defined as economic output. Therefore,

---

<sup>2</sup> The most likely significant candidates for accession into the EU are Turkey and Eastern and Central European nations. The Centre for Economic Policy Research in London (1995) estimates that it will take 20 years for these countries to be ready to enter the Union.

the G-7's power structure would change in the EU's favor were the Union's GDP to be inflated by 22%, ceteris paribus.

### **3.1.3. Ensuring Regional Stability**

If the European Union is to continue prospering, it must ensure regional political stability by providing Eastern and Central European Countries (ECECs) the prospect of accession. ECEC democracies may not withstand the "painful" process of economic reform if they are not afforded the expectation of sharing in the economic and political prosperity of the European Union (Baldwin, 1995). Countries undergoing a transition from Communism to Capitalism witness a drop in real GDP as they dismantle their respective traditional production infrastructures (Thurow, 1993). For example, East Germany's industrial production witnessed a drop of 80% two years after reunification (Protzman, 1990).

The newly democratized governments of Eastern and Central Europe have been looking to the European Union for assistance since the Council for Mutual Economic Assistance (COMECON) fell in 1989. They have solicited aid to establish market based economies which can become competitive on the world market (Nugent, 1992). They have also sought support for their newly developed democracies (Cooper, 1991). Christophersen, Vice President of the EU Commission, believes that "They [the countries of Eastern and Central Europe] wish to join the Community because they are confident that we can

protect their newly-won freedom and their newly-won democratic identity..."

The EU would need to increase its annual budget by ECU 58 billion (i.e. 60% of its projected budget for the year 2000) to finance the accessions of the Czech Republic, Hungary, Poland, and Slovakia in the year 2000 (Baldwin, 1995). Current member nations would therefore be required to increase their contribution to the EU budget so as to finance the accession of ECEC countries. This, as we have already determined, could cause a detrimental decrease in the level of investment and/or consumption within the EU and/or an EU trade deficit. However, a 1% sustainable increase in the EU's annual GDP growth rate would help ease the economic burden associated with including ECECs in the Union. Such a stable increase in growth rate could be achieved by moving the EU towards its economic efficient frontier (e.g. along path "A" to reach EEP #5 in figure 1).

#### **3.1.4. Economic Stability And Stable Consumption Patterns**

Politically-created confederations can benefit from diversification, just like stock portfolios (Goldberg and Levi, 1994). In the case of significant inter-regional trade within a confederation, diversification of the regional economies contributes to the stability of demand for each region's products and services. For example, downward pressure on the demand for French cheese caused by an

economic recession in Belgium could be counterbalanced by upward pressure on demand attributable to an economic "boom" in Denmark.

Stable demand for a nation's exports contributes to the stability of that nation's income, according to the national income identity (see equation 1). Also, the aggregate level of national consumption is linearly related to national income through a nation's marginal propensity to consume, according to the consumption function (see equation 2) (Dornbusch et al., 1987). Therefore, stable demand for a country's exports contributes to the stability of that country's annual consumption level.

#### Equation 2

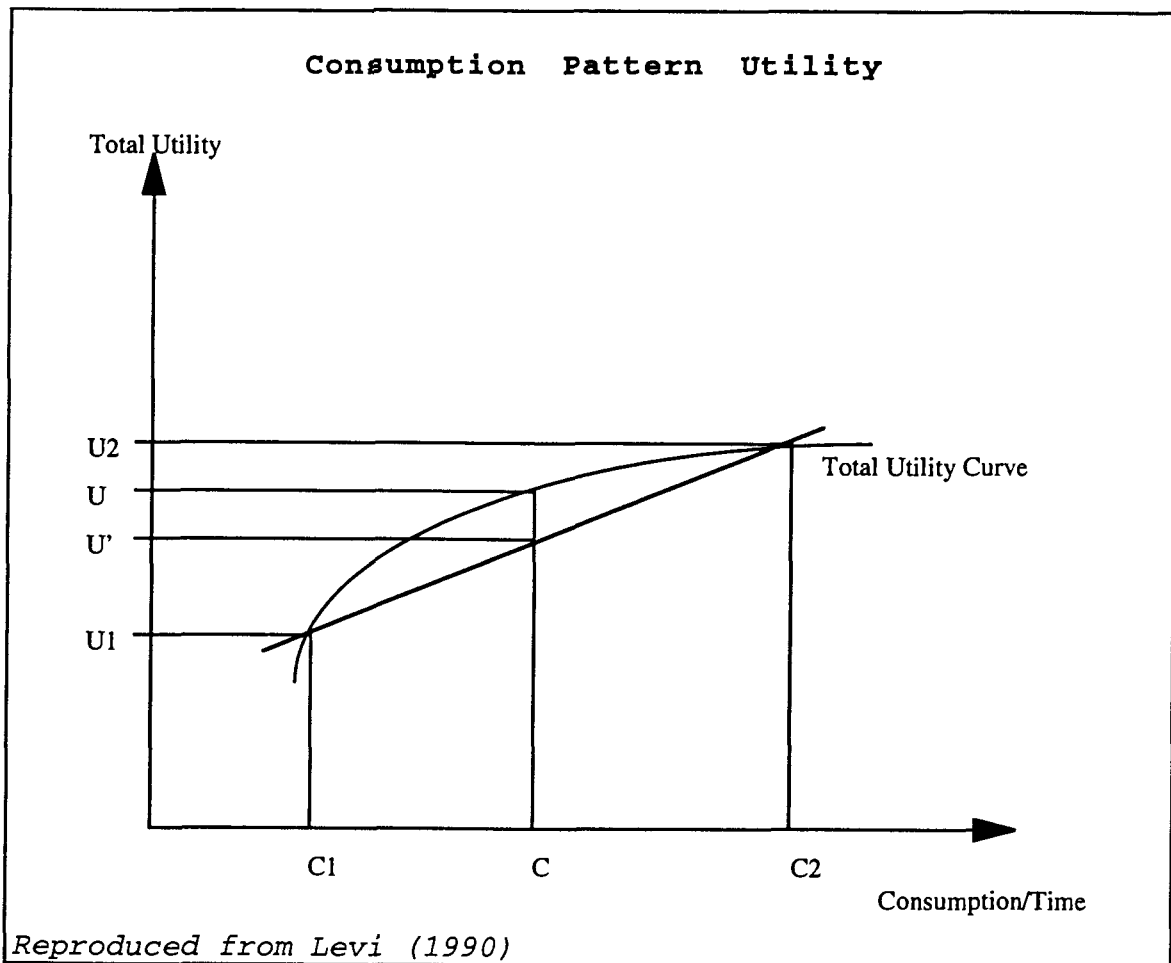
$$C = C_{(constant)} + cY$$

Overall utility for a stable pattern of consumption is greater than that for a variable pattern of consumption, for the same average level of consumption over any given time period (Levi, 1990). Figure 3 reveals that a country whose annual level of consumption varies equally between  $C_1$  and  $C_2$  has an average level of consumption  $C$ . That country's consumption utility varies equally between  $U_1$  and  $U_2$ , resulting in an average total consumption utility level of  $U'$ . The same country could achieve a higher average total



consumption utility level ( $U$ ) by consistently consuming  $C$ . The difference between  $U$  and  $U'$  is due to the diminishing marginal utility of consumption and is the extra utility enjoyed from stabilizing consumption.

FIGURE 3



The EU's Single Market Objective promotes symbiotic growth in trade amongst member states whose economies are relatively diverse. Therefore, it can be argued that the EU implicitly promotes the stability of consumption and income

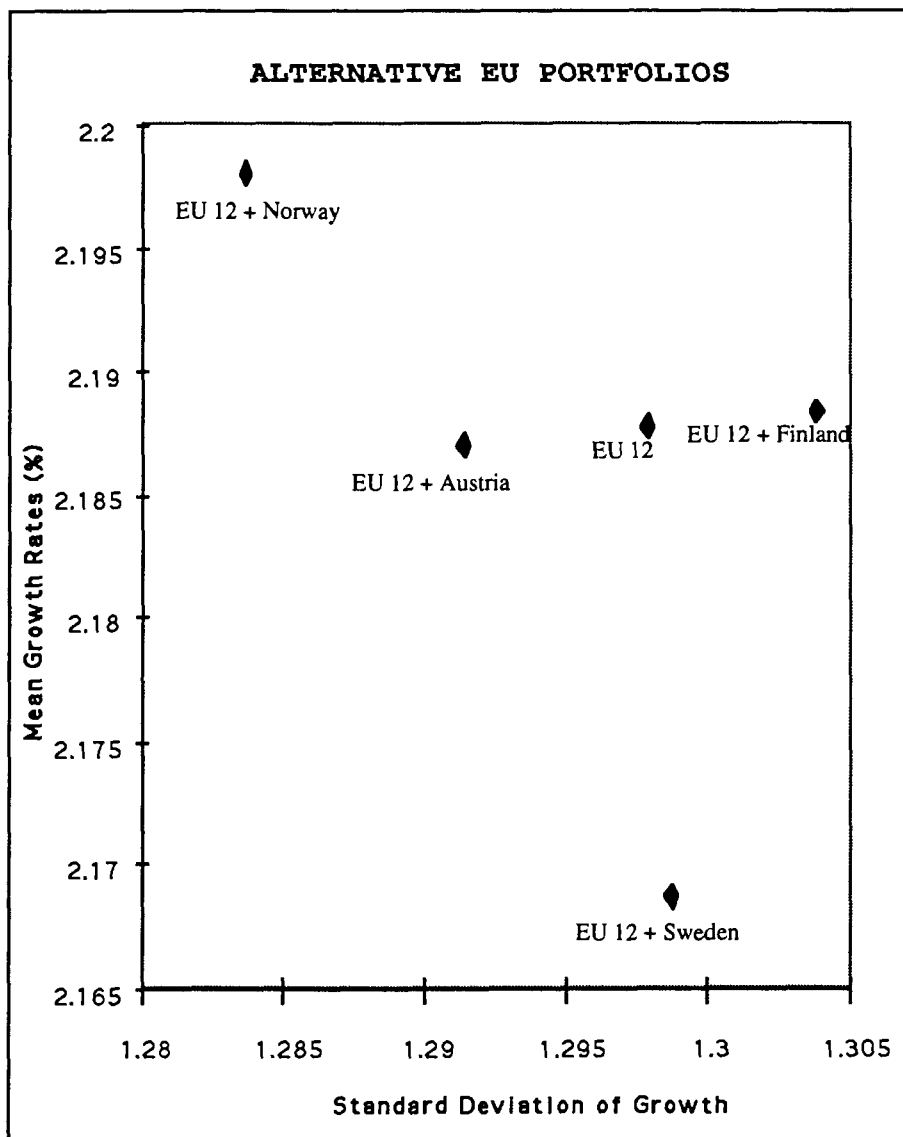
within the Union, when one considers the relationship between equations 1 and 2. As such, it is in the EU's interest to reduce the variance of its current growth rate (i.e. moving along path "B" towards Global Minimum Variance Portfolio 1 in figure 1).

As I have shown, the EU can better meet some of its objectives by improving its economic efficiency in terms of growth and risk characteristics. Therefore, the following section will use the Markowitz Portfolio Model to assess the EU's latest expansion.

### **3.2. A PORTFOLIO BASED ASSESSMENT OF THE EU'S LATEST EXPANSION**

Figure 4 and table 6 show the effect Austria, Finland, and Sweden had on the EU Portfolio when they joined in January 1995. The effect Norway would have had on the EU Portfolio, had its citizens not declined accession in a November 1994 referendum, is also presented. As can be seen, the inclusion of Norway would have unequivocally benefited the EU in terms of growth and risk characteristics. The EU 12 plus Norway would have grown faster and with less volatility than the EU 12 (i.e. The EU 12 plus Norway would have been first-order stochastically dominant over the EU 12.). In contrast, the addition of Sweden to the EU 12 resulted in a lower EU growth rate and a higher EU growth

Figure 4



**TABLE 6**  
**EU 12+ COUNTRY GROWTH RATES & VOLATILITIES**  
**(1978 - 1994)**

	Average Growth Rate	Standard Deviation of Growth
EU 12	2.1876	1.2979
EU 12 + Norway	2.1980	1.2836
EU 12 + Austria	2.1869	1.2914
EU 12 + Finland	2.1883	1.3038
EU 12 + Sweden	2.1687	1.2987

rate volatility. Finally, it is not possible to rank the EU 12 against the EU 12 plus Austria or the EU 12 plus Finland. The inclusion of Austria lowers the EU's economic growth rate and growth rate variability. The inclusion of Finland increases the EU's economic growth rate and growth rate variability. That is, the EU Portfolio witnesses either a lower but more stable growth rate or a higher but more volatile growth rate with the inclusion of Austria or Finland.

The EU should have rejected Sweden's candidacy and made concessions to accommodate the concerns of Norwegian voters, in terms of the Markowitz Portfolio Model. This was not the case. Austria, Sweden and Finland were all inaugurated into the Union in January 1995, while Norway's accession was indefinitely postponed. The following section will explain why this happened and determine how a portfolio-based accession criterion can fit in with the EU's existing accession criteria.

### 3.3. A FRAMEWORK OF EU ACCESSION CRITERIA

The Maastricht Treaty, which came into effect in November 1993, stipulates that a potential entrant's accession to the Union is conditional upon its acceptance of all EU regulations (Economist, 1992a). A study of the European Union's three core governing texts (the 1957 Treaty of Rome, the 1986 Single European Act, and the 1992 Maastricht Treaty<sup>3</sup>), reveals that the principal existing economic criteria for judging a country's candidacy can be summarized as follows (Baldwin, 1995; Nugent, 1992):

- 1) The Budget Criterion: A new member state should contribute positively to the EU's budget.
- 2) The Single European Market Criterion: A new member state should not distort the Union's free trade in goods and services.
- 3) The Economic and Monetary Union (EMU) Criterion: A new member state's inflation rate, interest rate, budget deficit, national debt, and exchange rate should all conform to EMU standards.
- 4) The Immigration Criterion: A new member state should not create or contribute to a net influx of migration into incumbent Union states.

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<sup>3</sup> The 1992 Treaty on European Union is commonly referred to as Maastricht.

### 3.3.1. The Budget Criterion

#### Understanding The Budget Criterion

Title 14 of the 1992 Treaty on European Union and Title 5 of the 1986 Single European Act both contain resolutions aimed at reducing disparities in living standards across the EU (Council of the European Communities, 1986 and 1992). For example, "Objective 1", stipulates that regions whose GDP per capita is less than 75% of the EU average are entitled to receive "aid" from the European Regional Fund, Cohesion Fund and/or Structural Fund (Bora, 1994). Traditionally, "Objective 1" aid has been designated for regions within Spain, Portugal, Ireland, and Greece. However, in 1993, other member-states began arguing that they too have regions which should qualify for "Objective 1" status. The crux of their contention was that the Union granted Northern Ireland and Corsica "Objective 1" status in 1988. That is, the qualifying mark to receive "Objective 1" aid unofficially rose from 75% to 79% of the average EU GDP per capita. As a result, the UK, Belgium, France, Italy, and Holland had all gained "Objective 1" status for some of their regions by June 1993 (see table 7) (Economist, 1993c).

The number of regions applying for aid more than doubled in 1993. It is therefore reasonable to suggest that the EU would like new members to make a net positive contribution

the Union's budget so as to ease the burden of transfer payments placed on incumbent EU nations.

**TABLE 7**  
**"OBJECTIVE 1" REGIONS FOR THE EU 12**

	National GDP Per Capita (EU 12 = 100)	Regions For Which "Objective 1" Status Has Been Granted
Lux.	131	
W.GFR.	116 <sup>c</sup>	Brandenburg, East Berlin, Saxony, Mecklenburg-West Pomerania, Thuringia, Saxony- Anhalt,
Fra.	113	French Overseas Departments, Corsica, Douai, Valenciennes, Avesnes
Den.	108	
Bel.	107	Hainut
Neth.	104	Flevoland
Ita.	104	Basilicata, Calabria, Campania, Molise, Apulia, Sardinia, Sicily, Abruzzi
UK	95	Highlands and Islands, Merseyside, Northern Ireland
Spain	77	Andalusia, Asturias, Cantabria, Murcia, Castile- Leon, Castile-La Mancha, Ceuta and Melilla, Extremadura, Valencia, Galicia, Canary Islands,
Ire.	72	Entire Country
Por.	58	Entire Country
Gre.	47	Entire Country

Source: Economist, 1993c

Method: PPP based comparisons; the EU 12 1993 average = 100

#### **Was The Budget Criterion Met?**

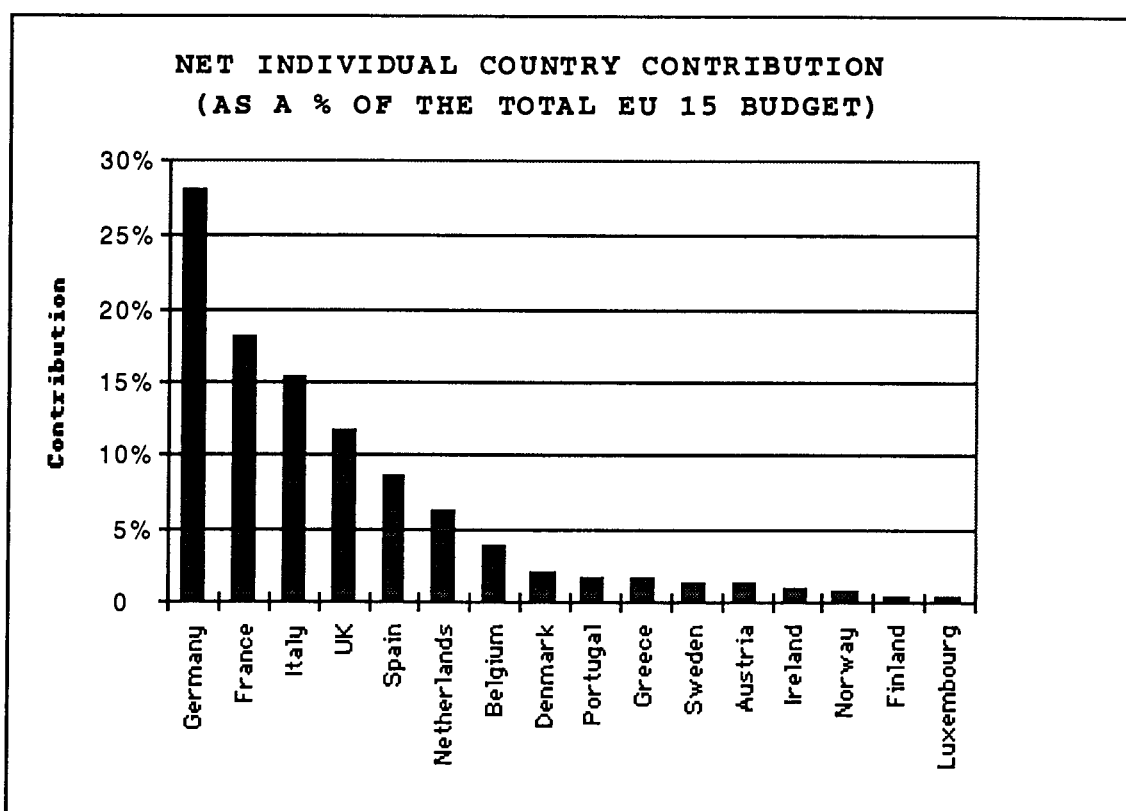
Table 8 and figure 5 reveal that Austria, Sweden, and Finland all made a net positive contribution to the EU budget. Their annual net cumulative contribution is expected to make up 2.42% of the total EU 15 budget in the long run. That is, their cumulative contribution will increase the EU 12 budget by 3% (Flam, 1995).

**TABLE 8**  
**CONTRIBUTIONS MADE TO THE EU BUDGET**  
**(BILLIONS OF ECU)**

	Gross Contribution	Return Transfers	Net Contribution	Net Contribution as a % of the Total EU 15 Budget
Austria	2.1	1.3	.9	1.04%
Finland	1.1	.9	.2	.23%
Sweden	2.1	1.1	1.0	1.15%
Norway	1.1	.6	.5	.57%
Total (excluding Norway)	5.3	3.3	2.1	2.42

Source: Flam, 1995

**FIGURE 5**  
**NET INDIVIDUAL COUNTRY CONTRIBUTION**  
**(AS A % OF THE TOTAL EU 15 BUDGET)**



Sources: Economist, 1994a and Flam, 1995



### 3.3.2. The Single European Market Criterion

#### Understanding The Single European Market Criterion

Within five years of the ECSC's inception, trade in coal and steel amongst the six original signatories more than doubled. Inspired by this success the 1957 Treaty of Rome created the European Economic Community (EEC)<sup>4,5</sup> so as to extend the process of European economic integration to all sectors of the economy. The EEC envisaged the creation of a comprehensive common market which would completely eliminate tariffs and quotas (including tariff and quota equivalent charges and measures) on goods, services and factors of production (Cooper, 1991).

So as to promote undistorted trade in goods and services within the Union, the 1957 Treaty of Rome provided the Union's institutions with powers to (Swann, 1992):

- 1) Ban cartels' and dominant firms' (excluding national institutions) practices which impede interstate trade and/or competition.
- 2) Limit state aid and public purchasing practices which provide domestic industries with an artificial competitive advantage.

---

<sup>4</sup>The Treaty of Rome resulted in three distinct European Communities: i) the European Coal and Steel Community (ECSC); ii) the European Economic Community; and iii) the European Atomic Energy Community known as Euratom.

<sup>5</sup> The terms EEC and EU have been and will continue to be used interchangeably in this paper.

3) Harmonize tax structures and product standards so as to limit their ability to distort the inter-state competitive environment.

The removal of these and other trade restrictions is, in large part, responsible for the fact that internal trade between EU 6 members grew from \$6.8 billion to \$60 billion between 1958 and 1972 (the period preceding the Union's first geographical expansion). In light of this free trade benefit witnessed by the EU, new member-states are expected not to distort EU free trade practices. Cecchini's (1988) estimate of the economic benefits associated with fully completing EU market integration further supports this contention.

Europe experienced stagflation in the late 1970s partly because of rising world energy prices. As a result, European Union members, concerned with domestic unemployment, began erecting non-tariff barriers to protect their respective domestic industries (Cooper, 1991). The EU therefore commissioned a white paper to outline the necessary measures needed to reinstate momentum towards comprehensive economic cooperation. This white paper was entitled "Completing the Internal Market" and was written by Cockfield (1985). It recognized three types of protectionist barriers to trade within the EU:

- 1) "Physical barriers" in the form of customs and immigration controls.

2) "Technical barriers" in the form of national specifications and safety standards designed to hamper the cost structures of foreign competitors. For example, in exporting to EU member states, Philips N.V. had to produce seven different types of television sets incorporating different plugs, semiconductors and tuners (Hufbauer, 1990). "Technical barriers" also included licensing procedures and public procurement practices which favored domestic companies.

3) "Fiscal barriers" in the form of heterogeneous national tax rates and collection methods which created needless bureaucratic setbacks and costs for exporters.

Cockfield's solutions to these "barriers" were explicitly incorporated as EU directives<sup>6</sup> through the Single European Act<sup>7</sup>, signed by all 12 members in 1986 (Wright, 1991). The Act committed the Union to remove all direct and indirect trade barriers by December 31st 1992 so as to fully complete market integration. Cecchini (1988) estimates that the macro- and micro- economic gains associated with completing the EU's market integration amount to a one time 7% surge in total EU GDP. From a microeconomic standpoint, he studied the benefits accrued by each economic sector from:

**i)** The removal of trade barriers; **ii)** The minimization of

---

<sup>6</sup> Although Cockfield made 300 recommendations, only 282 of them were established as directives by the European Commission (Wright, 1991).

<sup>7</sup> The Single European Act, which did not come into effect until June 1987, modifies the 1957 Treaty of Rome which created the EEC (Swann, 1992).

barriers to production, such as those created by public procurement bias and nationalistic technical standards; and **iii)** The achievement of greater economies of scale by such companies as Philips N.V. which no longer need to have different production runs for each export market within the EU. From a macroeconomic standpoint, he assessed the relevant reductions of constraints on macroeconomic management.

#### **Was The Single European Market Criterion Met?**

Cecchini's finding provides support for the assertion that a new member-state is expected not to undermine the Single European Market's integrity. I therefore expect to find that the EU applied the Single European Market Criterion in full and with no exceptions when it assessed the candidacies of Austria, Finland, Sweden and Norway.

As anticipated, the inauguration of Austria, Finland, and Sweden has had no great effect on the trading of goods within the EU (Scharrer, 1995). However, this was not an easy task to accomplish, despite a long-standing (since 1973) free-trading relationship between EFTA countries and the EU. Traditionally, EFTA farmers have been provided with greater subsidies than their EU counterparts. Prior to 1995, EU farm subsidies averaged 49% of output value while those of the EFTA averaged 68% of output value (Economist, 1992b). There are national economic benefits associated with lowering farm

subsidies. These benefits include the alleviation of government budgetary costs, the relocation of factors of production into more profitable economic activities, and the enjoyment of greater aggregate consumer surplus as retail agricultural prices diminish (Baldwin et al., 1995; Flam, 1995). Nonetheless, pressured by their politically influential farmers, Austria, Finland and Sweden protested replacing their farm subsidy programs with that of the EU's Common Agricultural Policy (CAP). The arguments put forth by these countries were unsuccessful. All three nations acceded to the CAP by January 1995 (Flam, 1995). The EU seems adamant in ensuring that new member-states do not corrupt the Single European Market's integrity.

A study of Norway's failure to enter the EU provides further evidence in support of this latter point. In November 1994, a Norwegian referendum was held to determine whether or not to join the Union. The majority of voters (52.3%) rejected the deal put before them by their government and the EU. The issue of control over Norway's fishing resources significantly affected the referendum result (Sogner and Archer, 1995). Norwegian voters were concerned about having to turn over control of their fishing resources to the EU by 1988. The EU's refusal to accommodate this Norwegian concern demonstrates the application of the Single European Market Accession Criterion.

This assertion is made more evident by comparing Norway's case to that of Denmark. The majority of Danish voters (50.7%) rejected Maastricht in a referendum held in May 1992. This outcome was largely due to Danish apprehension towards the Maastricht objective of creating an EMU which has a common European currency and central bank. Only 13% of Danes who voted "No" in the referendum supported the notion of having a common European currency. Conversely, 75% of Danes who voted "Yes" supported this EMU ideal. Similarly, 15% of those who rejected Maastricht in the referendum and 79% of those who votes "Yes" supported the notion of having a common European central bank. It seems that "No" votes were, in large part, votes against a common European currency and central bank (Worre, 1995). Therefore, to save Maastricht and/or to avoid having Denmark leave the Union, the EU presented the Danes with an option to "opt-out" of the EMU. As a result, Danes did not fail to ratify Maastricht when they were presented with a second referendum on the agreement in 1993. The EU's accommodation of Danish concerns over Maastricht and not of Norwegian concerns over the Single European Market can be used to argue that the EU has demonstrated a willingness to make concessions on the EMU Criteria that it is not willing to make on the Single European Market Criterion.

### 3.3.3. The EMU Criteria

#### Understanding The EMU Criteria

A common EU currency, or some quasi-form of it, such as the European Exchange Rate Mechanism (ERM), prohibits an EU member-state from unilaterally devaluating its currency so as to try and balance its current account deficit in the short run. A truly Common European Market, as envisaged by the Treaty of Rome, requires a common EU currency. That is why a 1979 intergovernmental EU agreement introduced the European Monetary System (EMS) which was later included in the Maastricht Treaty as an amendment to the Treaty of Rome. Achieving a common European currency has now become a key objective for EU policy makers. In fact, Swann (1992) asserts that as the EU moves closer towards full market integration, its primary focus will shift away from the removal of trade barriers and towards the attainment of intra-Union economic convergence so as to successfully realize monetary union.

Swann's argument is becoming more convincing as we approach the turn of the century. Maastricht (Articles 109j(1) and 104c(2) and the 5th and 6th Protocols) stipulates that monetary union is to be completed by 1997 if the European Council determines, by a qualified majority, that a preponderance of Union members have (Arrowsmith 1995; Economist, 1992a; European Commission, 1994):

- 1) An inflation rate of no more than 1.5% of the "three best performing states in terms of price stability [where price stability is to be measured using consumer price indices]."
- 2) An interest rate no more than 2% of the "three best performing states in terms of price stability."
- 3) A budget deficit to nominal GDP ratio of no more than 3%. An exception can be made for countries whose ratio has "declined substantially and continually comes close to [3%]."
- 4) A national debt to nominal GDP ratio of less than 60%. An exception can be made for countries whose ratio is "sufficiently diminishing and approaching...[60%]...at a satisfactory pace"
- 5) No unilateral devaluation vis-a-vis the ECU during the two years preceding accession to stage three of the EMU. Also, the normal margins of fluctuation allowed under the EMS (currently  $\pm 15\%$ ) must be respected during this time period.

The EMU's commencement is to be rescheduled for 1999 with as many qualifying nations as possible if their are not enough EU member-states which qualify by 1997.

#### **Was The EMU Criteria Met?**

Swann's prediction and the looming EMU deadlines lead me to expect that the EU applied the EMU criterion in full and with no exceptions when it assessed the potential membership



of Austria, Sweden, Finland and Norway. However, this does not seem to have been the case. Tables 9-13 and figures 6-10 reveal that based on OECD Economic Outlook (1995) projections for the year 1996:

- 1) In 1995 (i.e. the year in which EU membership was extended to Austria, Finland and Sweden), the inflation rates of all four EFTA countries in question were expected to be at or below the EMU Criterion by 1997 (i.e. the first EU deadline for completing European monetary union).
- 2) Austrian, Finnish and Norwegian interest rates were expected to be at or below the EMU Interest Rate Criterion by 1997. The same could not have been said of Swedish interest rates. In fact, they have been moving away from the criterion in question since 1993.
- 3) Only Norway's budget deficit to nominal GDP ratio was expected to exceed EMU standards by 1997. Conversely, Sweden's budget deficit to nominal GDP ratio was expected to be well above the EMU criterion despite a tighter Swedish fiscal policy first announced in 1992 by Sweden's Finance Minister, Goran Persson. Sweden's chances of meeting this particular EMU criterion are even slimmer when one considers the fact that making further cuts to Sweden's budget may not be politically feasible. Government spending accounts for approximately 70% of GDP in Sweden. Therefore, budget cuts tend to have a recessionary effect on the Swedish

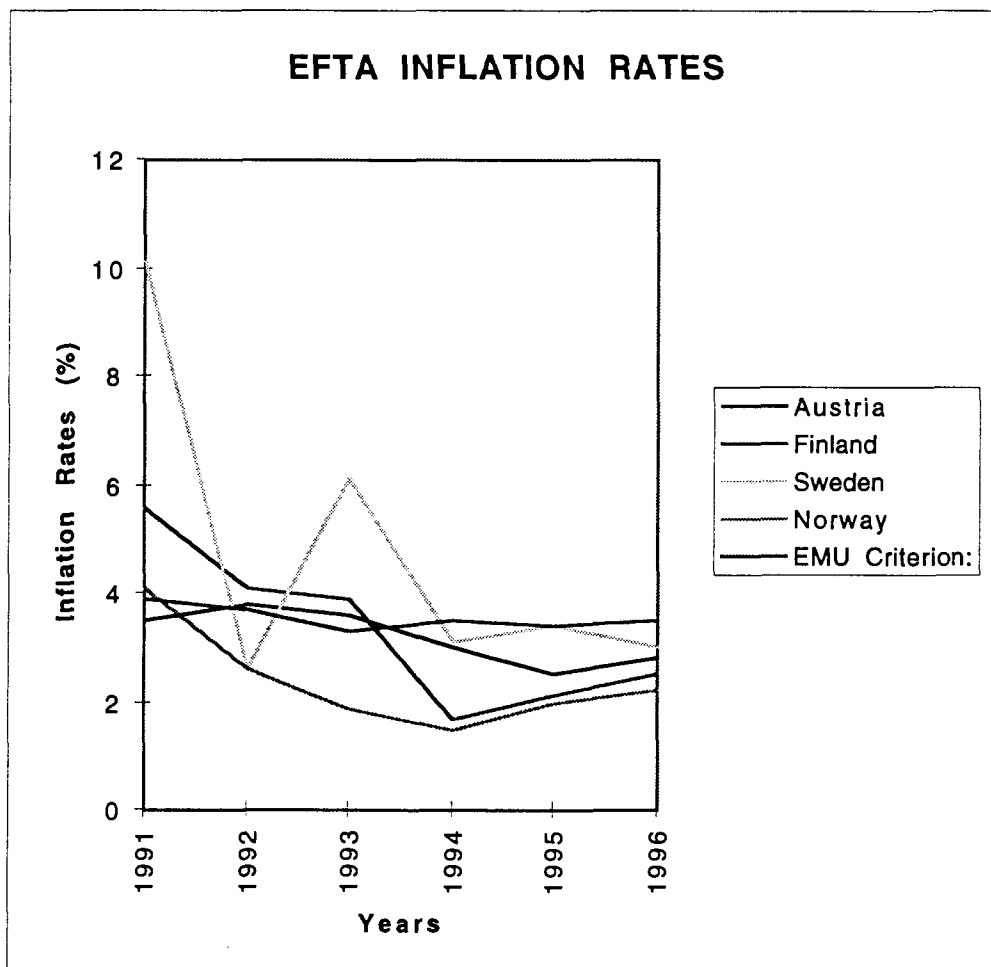
**TABLE 9**  
**EFTA INFLATION**  
**(PRIVATE CONSUMPTION DEFLATORS)**

	1991	1992	1993	1994	1995	1996	Was the Country Expected to be Ready by 1997? (According to OECD Projections)
Austria	3.5	3.8	3.6	3.0	2.5	2.8	Yes
Finland	5.6	4.1	3.9	1.7	2.1	2.5	Yes
Sweden	10.1	2.6	6.1	3.1	3.4	3.0	Yes
Norway	4.1	2.6	1.9	1.5	2.0	2.2	Yes
EMU Criterion: 3 Best EU 12 Avg. + 1.5%	3.9	3.7	3.3	3.5	3.4	3.5	

Source: OECD Economic Outlook, 1995.

Note: Figures for 1995 and 1996 are projections.

**FIGURE 6**



**TABLE 10**  
**EFTA INTEREST RATES**  
**(LONG TERM GOVERNMENT BOND RATES)**

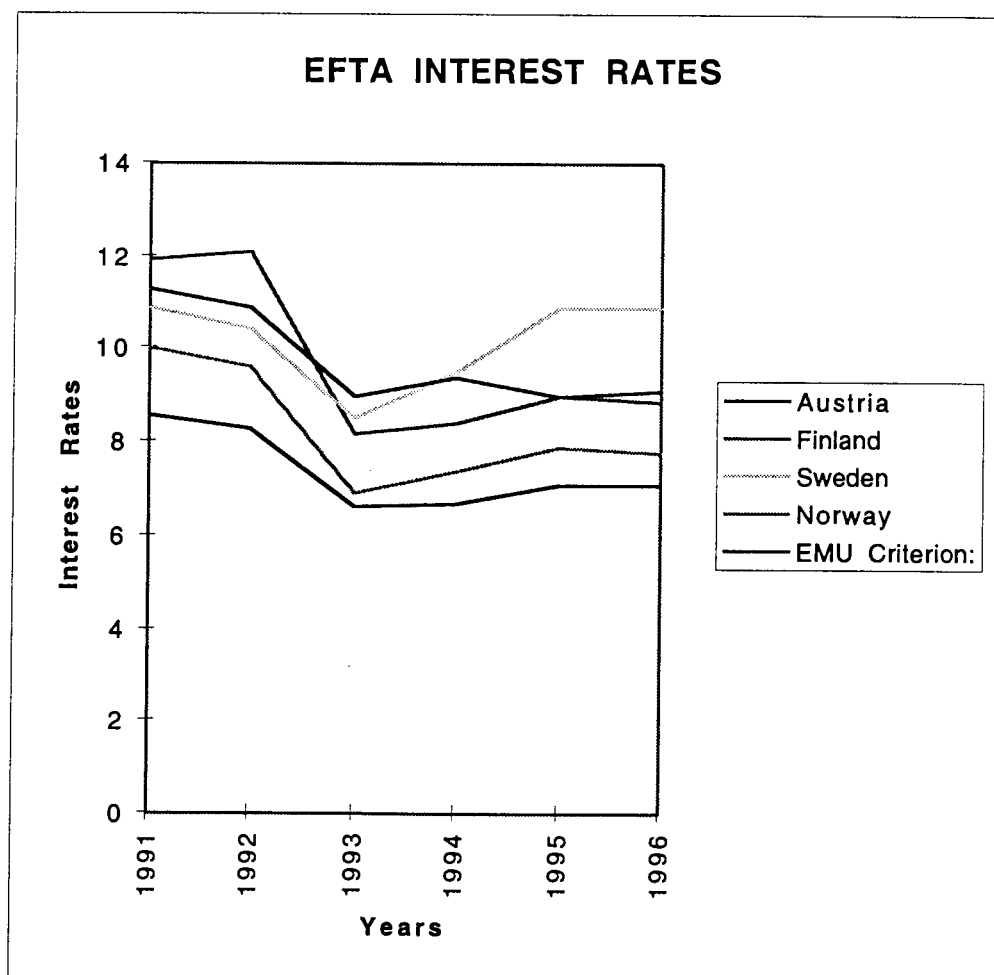
	1991	1992	1993	1994	1995	1996	Was the Country Expected to be Ready by 1997? (According to OECD Projections)
Austria	8.6	8.3	6.6	6.7	7.1	7.1	Yes
Finland	11.9	12.1	8.2	8.4	9.0	8.9	Yes
Sweden	10.9	10.4	8.5	9.5	10.9	10.9	No
Norway	10.0	9.6	6.9	7.4	7.9	7.8	Yes
EMU Criterion: 3 Best EU 12 Avg. + 2%	11.3	10.9	9.0	9.4	9.0	9.1	

Source: Arrowsmith, 1995; IFS, 1995; OECD Economic Outlook, 1995.

Note: Figures for 1995 and 1996 are projections.

Note: The three countries with the lowest expected 1995 private consumption deflators are: France, the Netherlands and Luxembourg. Because the 1995 Luxembourg long term government bond rate was not available, I used the 1994 Luxembourg long term bond rate to calculate the 1995 EMU criterion figure.

**FIGURE 7**



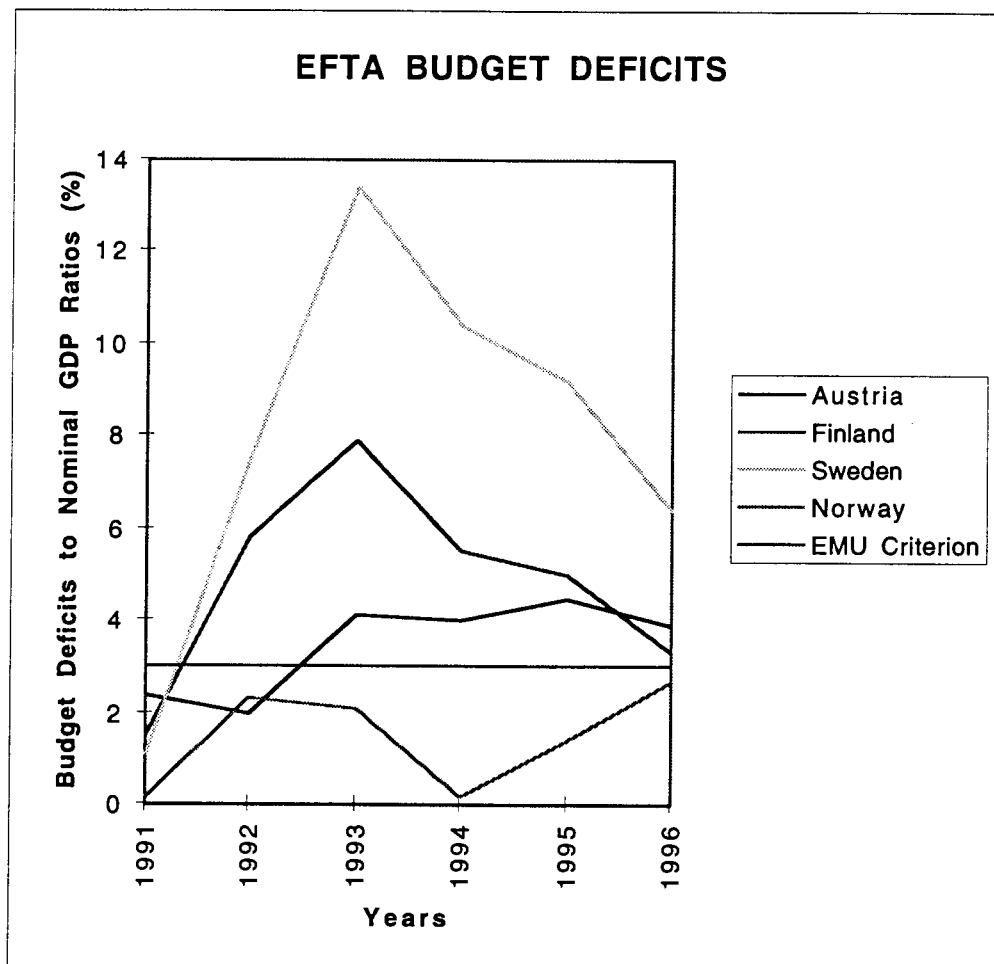
**TABLE 11**  
**EFTA BUDGET DEFICITS**  
**(AS A PERCENTAGE OF NOMINAL GDPs)**

	1991	1992	1993	1994	1995	1996	Was the Country Expected to be Ready by 1997? (According to OECD Projections)
Austria	2.4	2.0	4.1	4.0	4.5	3.9	No
Finland	1.5	5.8	7.9	5.5	5.0	3.3	Marginal
Sweden	1.1	7.5	13.4	10.4	9.2	6.4	No
Norway	0.2	2.3	2.1	0.2	1.4	2.7	Yes
EMU Criterion	3.0	3.0	3.0	3.0	3.0	3.0	

Source: OECD Economic Outlook, 1995.

Note: Figures for 1995 and 1996 are projections.

**FIGURE 8**



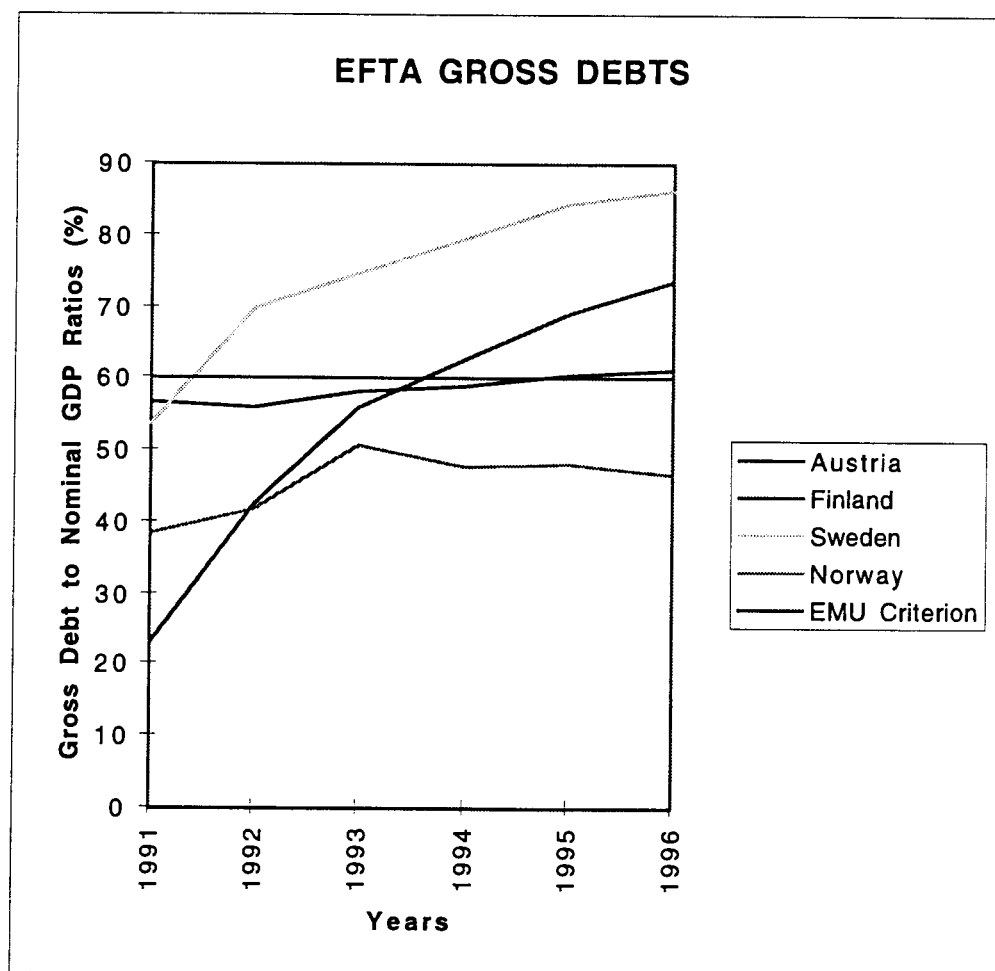
**TABLE 12**  
**EFTA GROSS DEBT**  
**(GENERAL GOVERNMENT GROSS FINANCIAL LIABILITIES)**  
**(AS A PERCENTAGE OF NOMINAL GDPs)**

	1991	1992	1993	1994	1995	1996	Was the Country Expected to be Ready by 1997? (According to OECD Projections)
Austria	56.6	56.1	58.3	59.0	60.4	61.4	Marginal
Finland	23.2	42.4	56.2	62.7	69.1	73.4	No
Sweden	53.7	69.8	74.6	79.4	84.5	86.3	No
Norway	38.5	41.8	50.7	47.7	48.3	46.5	Yes
EMU Criterion	60	60	60	60	60	60	

Source: OECD Economic Outlook, 1995.

Note: Figures for 1995 and 1996 are projections.

**FIGURE 9**



**TABLE 13**  
**NOMINAL EXCHANGE RATES**  
**(VIS-A-VIS THE ECU)**

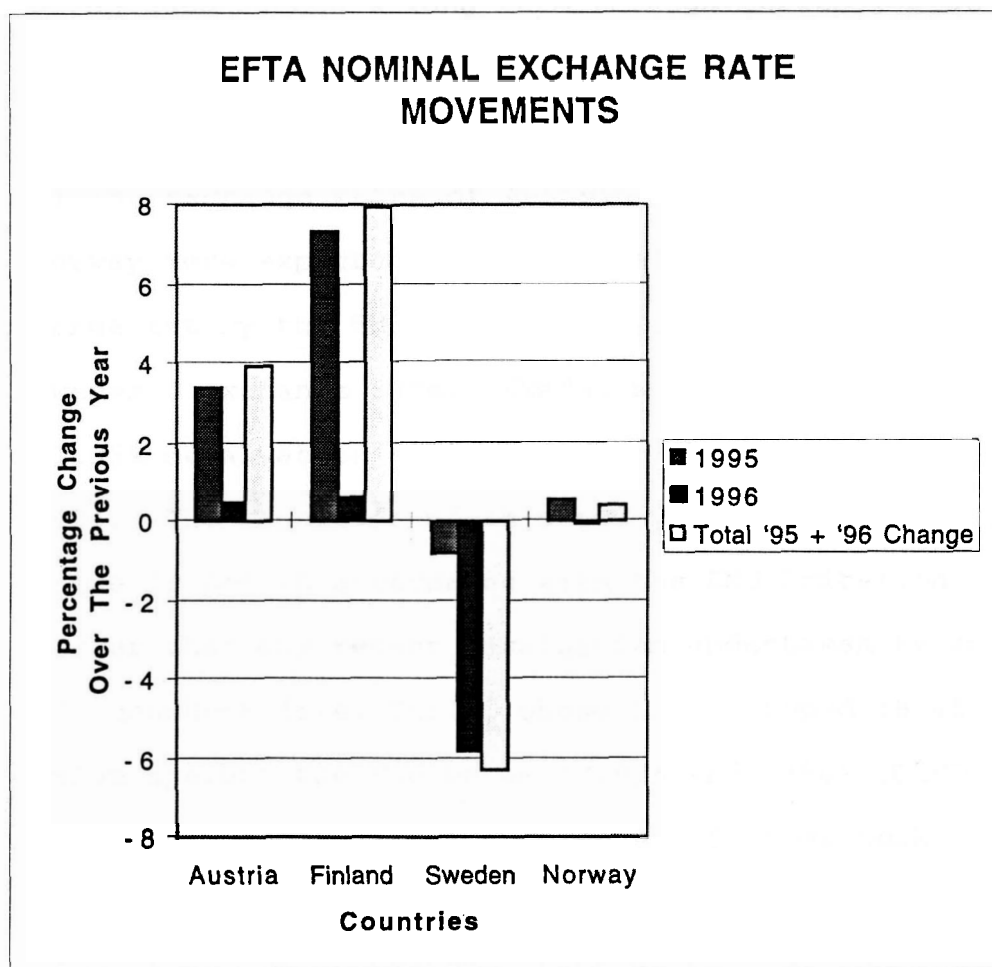
	1993	1994	1995	1996	Total '95 + '96 Change	Was the Country Expected to be Ready by 1997? (According to OECD Projections)
Austria	+4.24	+5.55	+3.40	+0.50	+3.9	Yes
Finland	-15.41	+7.53	+7.31	+0.62	+7.93	Yes
Sweden	-20.97	-3.8	-0.80	-5.84	-6.28	?Yes?
Norway	-3.38	-7.8	+0.54	-0.10	+4.44	Yes

Source: OECD Economic Outlook, 1995.

Note: Figures for 1995 and 1996 are projections.

Note: Devaluation or Depreciation (-); Revaluation or appreciation (+)

**FIGURE 10**



economy. Sweden's real GDP growth rate fell from -1.1% to -2.6% and its unemployment rate rose from 5.3% to 8.2% following the 1992 budget cuts (Economist, 1995a; OECD Economic Outlook, 1995).

4) Norway was the only country whose gross national debt to nominal GDP ratio was expected to exceed EMU standards by 1997. Conversely, Sweden's gross national debt to nominal GDP ratio was expected to be well above the EMU Criterion in question. In fact, Moody has downgraded Sweden's long term foreign currency debt rating from AA2 to AA3 due to Sweden's "heavy burden of public debt..." (Economist, 1995a).

5) The exchange rates of Austria, Finland, Sweden and Norway were expected to remain well within the allowable range set by the EMS. Nonetheless, a caveat concerning Sweden's exchange rate. Sweden's Krona experienced a 21.35% devaluation against the ECU between 1993 and 1994. The magnitude of this two year cumulative drop in value is not in accordance with the EMU Criterion and is larger than any recent devaluation undertaken by an EU 12 incumbent (i.e. Italy, whose Lira dropped 19.4% in value against the ECU between 1993 and 1994) (OECD Economic Outlook, 1995). Moreover, further weakening of the Krona may be caused by the size of Sweden's budget deficit and gross national debt as well as by Sweden's increased cost of financing due to Moody's down-grade of the country's foreign currency debt rating. In the long

run, we can expect the Swedish Krona to stabilize against the ECU only if Sweden continues to tighten its fiscal policy and only if Sweden's inflation rate and nominal interest rate continue to be held at par with the EU's best performing nations.

### **Summary**

Norway's inflation rate and gross public debt to nominal GDP ratio were expected to be lower than those of Austria, Finland and Sweden by 1997. Moreover, it was the only country whose budget deficit to nominal GDP ratio was projected to be below the 3% EMU mark in 1997. Conversely, Sweden's interest rate, budget deficit and gross national debt were all expected to fail the EMU criteria in 1997. Yet, it was Sweden and not Norway which entered the European Union in January 1995. This evidence supports the notion that the EU is willing to make concessions on the EMU Criteria that it is not willing to make on the Single European Market Criterion.

### **3.3.4. The Immigration Criterion**

#### **Understanding The Immigration Criterion**

The 1992 Treaty on European Union and the 1986 Single European Act and Final Act both promote European Citizenship. Ideally, all European citizens (professionals as well as non-professionals) are able to seek employment and residence



within any EU member-state. Also, they have the right to vote in the local and European elections of, and seek diplomatic assistance from, their chosen country of residence (Economist, 1992a). France, Germany, and Italy therefore worry that mass migration may occur from "poor" new members to "rich" incumbent states if the unemployment rate and/or living standard (as may be measured by GDP per capita) in new member-states is significantly below that of the EU average (Thurow, 1993). Van Agt, head of the EU Commission's delegation to the US, has been quoted as saying the following when referring to the possible accession of Eastern and Central European nations into the EU (Cooper, 1991):

*The community in its present structure isn't capable of absorbing a great number of new members, ... There is a growing concern about immigration in Western Europe, ... How can we face mass immigration from Eastern Europe...?*

It is therefore reasonable to suggest that the EU expects new member-nations to have a GDP per capita and an unemployment rate similar to, or better than that of the EU average.

#### **Was The Immigration Criterion Met?**

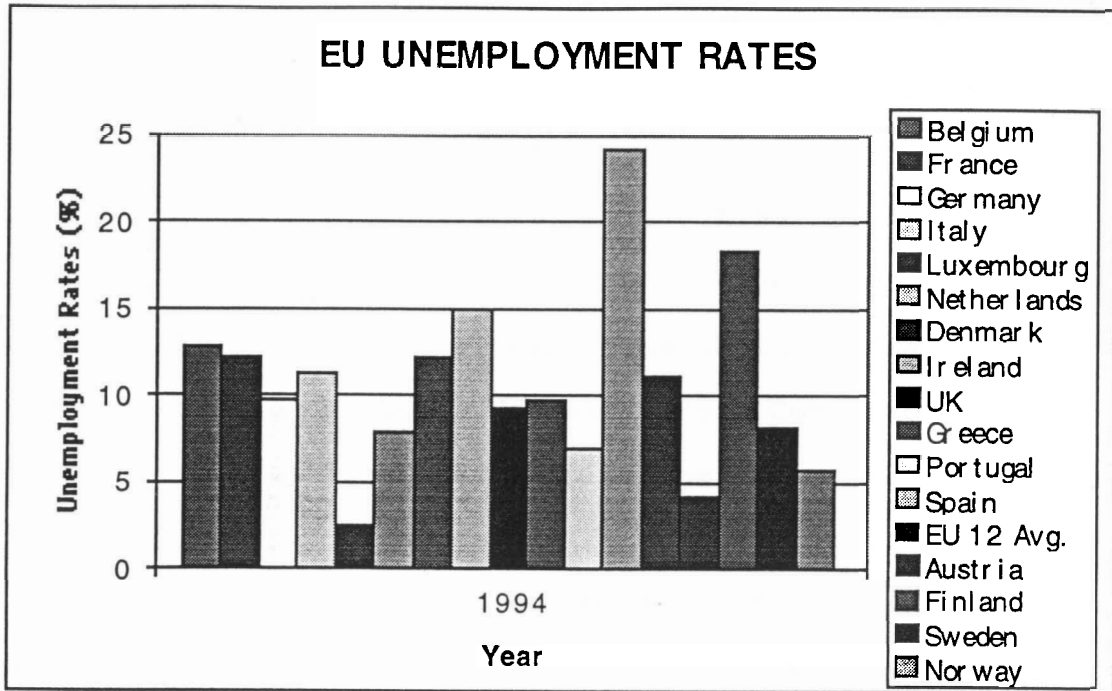
Prior to German reunification, West Germany's government agencies may have been opposed to economic growth. West Germany's economy was facing near full employment while its labor force was shrinking. Therefore, economic expansion unaccompanied by an inflow of immigrant workers or a significant increase in productivity would have caused inflationary wage pressures. Germany opted to stunt its

economic growth, in part, through the use of higher interest rates so as to avoid having to contend with either inflation or an influx of immigrants (Thurow, 1993).

Germany, France, Italy and the European Commission have all demonstrated an aversion to the migration of citizens from "poor" nations into "rich" EU 12 member-states. As such, I expected to find that the EU applied the Immigration Criterion in full and with no exceptions when it assessed the potential membership of Austria, Finland, Sweden and Norway. This was not the case.

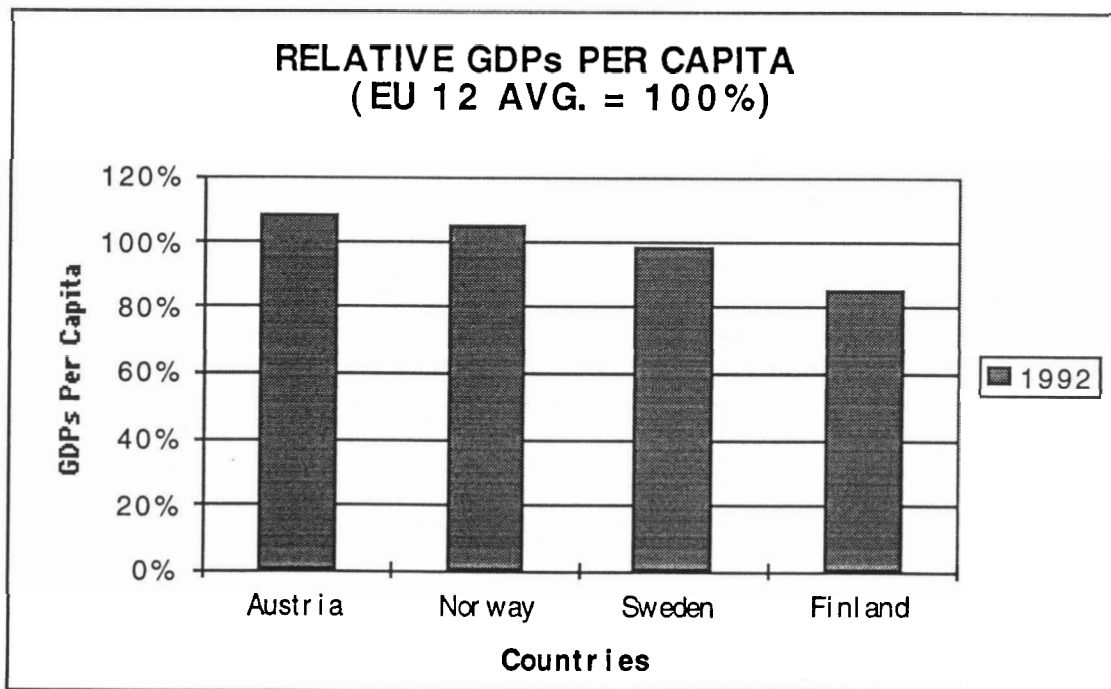
Figures 11 and 12 reveal that , in 1994, the EU 12 average annual unemployment rate was close to 11% while that of Finland was 18.4%. Also, Finland's GDP per capita was only 86% that of the EU 12 average in 1992. Therefore, according to the Immigration Criterion, Finland should not have been admitted to the EU. Nonetheless, Finland was accepted into the Union in January 1995.

FIGURE 11



Source: OECD Economic Outlook, 1995

FIGURE 12



Source: Economist, 1994b

Note: GDP Comparisons were done using PPP ratios.

### 3.3.5. Summary

Table 14 summarizes which of the EU's existing economic accession criteria were met by Austria, Finland, Sweden and Norway. In 1995, Sweden was not expected to meet the majority of the EMU Criteria by 1997. Also, Finland failed to meet the Immigration Criterion on the year of its accession to the EU. Yet, both these nations were inaugurated into the EU in January 1995. Conversely, Norway did not become an EU member despite the fact that it was able to satisfy all but one existing EU economic accession criteria. Norway failed to become a Union member, in large part, because neither Norway nor the EU were willing to make concessions on the question of who will control Norway's fishing resources (Sogner and Archer, 1995).

**TABLE 14**  
**WAS THE EU ECONOMIC ACCESSION CRITERIA MET?**

	Austria	Finland	Sweden	Norway
Budget Criterion	Yes	Yes	Yes	Yes
Single Market Criterion	Yes	Yes	Yes	No
EMU Criteria				
(inflation rates)	(yes)	(yes)	(yes)	(yes)
(interest rates)	(yes)	(marginal)	(no)	(yes)
(budget deficits)	(no)	(marginal)	(no)	(yes)
(national debts)	(marginal)	(no)	(no)	(yes)
(exchange rates)	(yes)	(yes)	(?yes?)	(yes)
Immigration Criteria				
(unemployment rates)	(yes)	(no)	(yes)	(yes)
(GDP/capita)	(yes)	(no)	(yes)	(yes)

The EU has therefore demonstrated a willingness to make concessions on the EMU Criteria that it does not seem to be

willing to make on the Single European Market Criterion. Therefore, the EU's existing economic accession criteria can be categorized into two groups: **i)** Primary criteria such as the Single European Market Criterion; and **ii)** Secondary flexible criteria such as the EMU Criteria and the Immigration Criterion. A Portfolio Criterion could be used as a secondary flexible EU accession criterion. It would be desirable but not necessary for an applicant-nation to meet it.

It is therefore possible, despite the aforementioned lack of criterion validity, to use portfolio theory to assess the candidacy of a potential EU member-state. A portfolio-based criterion can be categorized as secondary in importance, so that it would be desirable but not necessary for an applicant to meet it.

At this juncture, it is worth noting that, in using the Markowitz Portfolio Model to study the EU's expansion, the major conclusion can be drawn by looking at the magnitude, rather than the direction of impact a new or potential member-state has on the EU's economic growth and risk characteristics. The following chapter's discussion will, therefore, focus on the degree of impact past EU geographical expansions have had on the EU Portfolio's economic efficiency.

## CHAPTER 4

### MARGINAL DIVERSIFICATION GAINS

#### 4.1. INTRODUCTION

##### 4.1.1. Marginal Diversification Gains in Equity Portfolios

Total variation (risk) of a financial portfolio is made up of systematic variation and unsystematic variation. The covariation of the market's return with the returns of a portfolio's individual stocks is the systematic variation. The portion of the variation of stocks not attributable to the variation of the market but rather to the peculiarities of the individual stocks is the unsystematic variation. That is, "The total contribution of a security to the return of a portfolio can be broken into two components: (1) an investment in the 'basic characteristics' of the security in question and (2) an 'investment' in the [market] index" (Sharpe, 1963).

Evans and Archer (1968) assume that stocks covary solely on the basis of their shared common correlation with the market return. They, therefore, conclude that to reduce the variation of a portfolio's return by increasing its level of diversification is to reduce the unsystematic portion of the portfolio's total variation. That is, the variation of

a portfolio's return should approach that of the market's return (systematic risk) when the number of stocks included in the portfolio approach the number of stocks in the market.

In their study, Evans and Archer found that the majority of unsystematic risk was eliminated in portfolios made up of at least eight stocks. That is, the addition of a ninth stock provides no statistically significant diversification benefits to a portfolio. The authors conclude by suggesting that portfolio costs are not only a function of the number of shares acquired but also a function of the number of different securities held. Therefore, investors need to perform a marginal cost-benefit analysis with respect to incremental increases in the number of stocks included in a portfolio already comprised of "10 or so stocks." Evans and Archer go so far as to "raise doubts concerning the economic justification of increasing portfolio sizes beyond 10 or so securities."

#### **4.1.2. Marginal Diversification Gains In Politically-Created Portfolios**

Euromoney publishes a semi-annual country risk ranking aimed at foreign investors. The list comprised of 181 countries in the September 1995 issue (Piggott, 1995). These 181 countries can be viewed as the "market of nations" and the total variation of a politically-created portfolio's economic growth rate can be considered to be made up of

systematic and unsystematic variations. For example, the growth rates of all EU member-states are affected by international economic factors such as the energy crisis of the 1970s. All 15 EU nations covary because they share a common correlation with the "market's" return. However, the growth rate of any EU member-state is also affected by events particular to its borders. For example, French labor disputes should have no systematic adverse effect on the economies of other EU member-states.

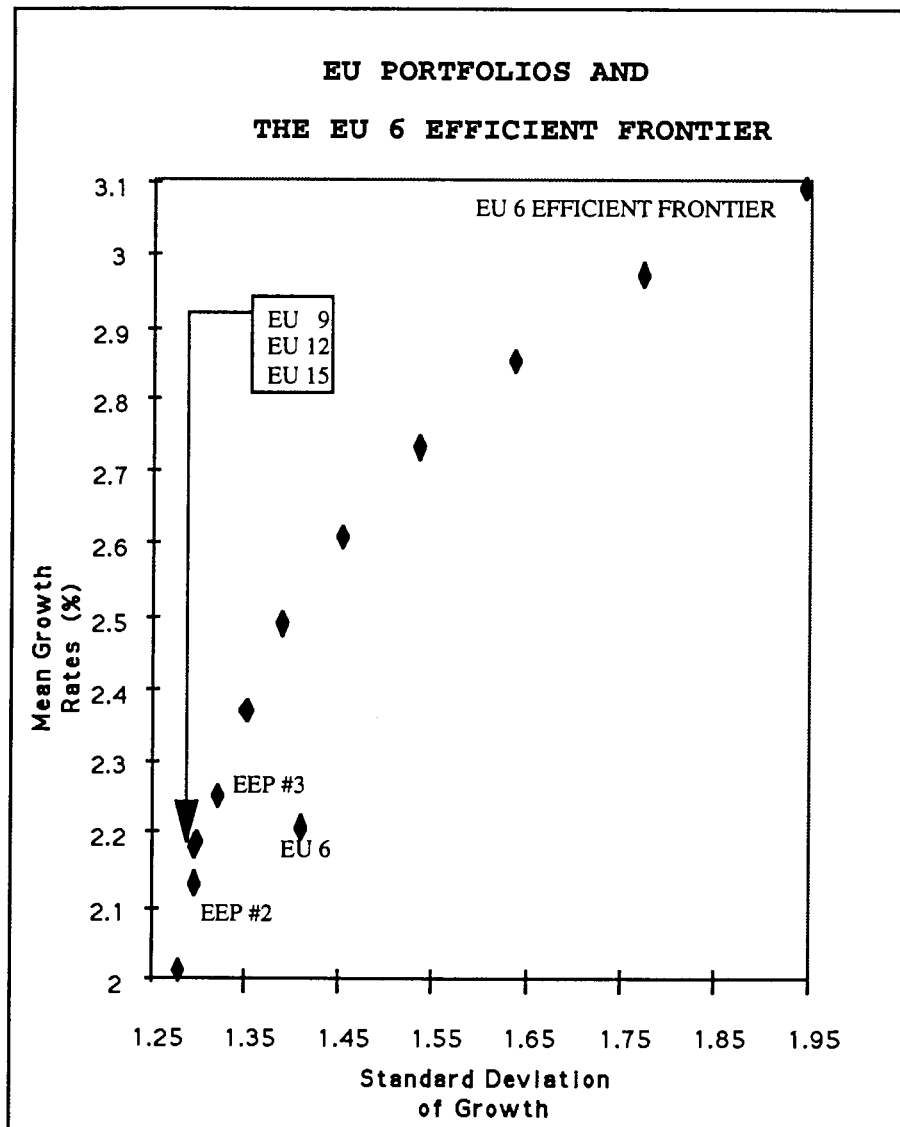
Are Evans and Archer's (1968) findings applicable to politically-created portfolios such as the EU? That is, did the EU diversify away most of its unsystematic risk in 1973 when it became a Union of 9 nations? These questions are worth exploring in future research.

#### **4.2. MARGINAL DIVERSIFICATION GAINS AND THE EU**

The EU 6 admitted Denmark, Ireland and the UK to become the EU 9 in 1973. The EU's growth and risk characteristics benefited from this expansion. Recall that the EU 9 Portfolio rested on the EU 6 Portfolio's efficient frontier between EEP #2 and EEP #3 in figure 2. However, subsequent expansions have failed to improve the EU's economic efficiency in terms of real GDP growth and risk characteristics. Figure 13 reveals that the EU 9, EU 12 and EU 15 portfolios all rest on the same spot between EEP #2 and EEP #3 on the EU 6 Portfolio's efficient frontier. All three



FIGURE 13



portfolios have a common<sup>1</sup> average annual real GDP growth rate of 2.2% and a common standard deviation of growth of 1.3. It appears that Evans and Archer's (1968) finding that financial portfolios witness diminishing marginal diversification benefits applies to politically-created portfolios of nations. There exists evidence to suggest that unsystematic variation in the EU's growth rate was minimized in 1973 when Denmark, Ireland and the UK were inaugurated into the Union.

#### **4.2.1. The Rationale Behind These Results**

The lack of diversification benefits afforded to the EU through its recent expansions can, in part, be understood by examining the EU's January 1995 expansion in the following manner:

1) In portfolio theory, risk is minimized through diversification. Therefore, ideally, a new member's growth rate pattern should not correlate highly with that of the EU. However, table 15 reveals that there is sufficient statistical evidence at the .05 significance level to reject the null hypothesis that no correlation exists between the growth rate of individual nations and that of the EU 12 portfolio. That is, there seems to exist a linear association between movements in EU 12, Austrian, Finish and Swedish average annual real GDP growth rates. Therefore, Austria, Finland and Sweden

---

<sup>1</sup> The Mean Growth Rates for the EU 9, EU 12 and EU 15 are 2.18%, 2.19% and 2.17% respectively. The standard deviations of growth for the three portfolios are 1.30, 1.30 and 1.28 respectively.

may have failed to make a significant contribution to the level of diversification within the EU portfolio.

**TABLE 15**  
**CORRELATION TABLE FOR THE EU 12 1995 EXPANSION**

	EU 12	Austria	Finland	Sweden
EU 12	1			
Austria	.67 P= .003	1		
Finland	.4669 P= .059	.2858 P= .266	1	
Sweden	.7330 P= .001	.4094 P= .103	.7961 P= .000	1

Note: The first number is the correlation coefficient, the second number is its two tailed significance level<sup>2</sup>.

2) Austria, Finland and Sweden do not constitute a significant portion of the EU's total real GDP (see table 16). Therefore, their respective average annual real GDP growth rates have very little impact on that of the EU portfolio.

#### 4.3. IMPLICATIONS

The results presented in this chapter have four significant implications on which future studies may be conducted.

##### 4.3.1. An International "Market Of Nations"

The variation of a portfolio's return should approximate

<sup>2</sup> Please refer to Appendix 2 for a discussion on statistical methodology.

**TABLE 16**  
**RELATIVE REAL GDP WEIGHTS OF EU 15 MEMBER-NATIONS**

	Real GDPs (As a % of the EU 15 Real GDP)
Belgium	2.91
France	17.63
Germany	23.08
Italy	16.56
Luxembourg	0.13
Netherlands	4.20
Denmark	1.53
Ireland	0.72
UK	15.35
Greece	1.66
Portugal	1.74
Spain	8.42
Austria	2.30
Finland	1.31
Sweden	2.46

Source: OECD Economic Outlook, 1995

Note: Real GDPs were compared using a PPP ratio.

that of the market's return (systematic risk) when the portfolio consists of approximately 10 stocks and has diversified away all unsystematic risk (Evans and Archer, 1968). Therefore, it can be argued that the EU's growth rate variance approximates that of the international "market of nations". To do so, however, it must be shown that the EU's growth rate is free of unsystematic variation. Also, the "market of nations" in which EU countries are "traded" needs to be clearly defined. For example, does this "market" include non-democratic nations?

#### **4.3.2. Studying Smaller Economic Unions**

Portfolio models may best be suited to study the composition of economic unions whose membership do not exceed

ten nations (e.g. the Arab Maghreb Union). This includes the study of unions in the making. For example, 30 Middle Eastern and African nations attended the 1995 Trade and Investment Summit held in Amman (Martin, 1995). However, we have seen that the EU has experienced increased difficulties in implementing uniform policies as the diversity of national interests within the Union has increased with the accession of new member-states. That is, the process of completing a truly common market is made more difficult as the number of nations involved increases. Therefore, the Markowitz Portfolio Model could help determine an optimal founding composition of no more than nine to ten nations for a future Middle Eastern and African economic union. Additional member-states could join the union once the founding group of nations establish a common market strong enough to withstand an increase in diversity of national interests brought on by the accession of new member-states.

#### **4.3.3. Discouraging The EU From Expanding**

There has existed an ongoing debate over whether the EU should focus its attention and resources on "deepening" the degree of integration between existing member-states, on "widening" its geographic boundaries, or on both deepening and widening as these two positions may be reconcilable. Since the early 1990s, the first of these three positions has been losing support to the third (Nugent, 1992). The third implication of the findings is that policy makers should be

wary of prematurely discarding arguments which support deepening and oppose widening.

The results suggest that the EU has derived no significant diversification benefits (in the context of portfolio theory) from expanding beyond nine members-states. Therefore, the use of portfolio theory to assess alternative EU compositions suggests that arguments against EU expansion should continue to be carefully examined. These arguments can be summarized as follows:

#### **Argument 1**

Proponents of "deepening" argue that further EU expansion would make it harder to implement Maastricht and Single European Act directives in a uniform manner across the Union (Nugent, 1992). The option the UK and Denmark have been given to "opt-out" of the single currency EMU is presented as evidence. This lack of homogeneity in the application of regulations can prove to be detrimental to the EU's economic prosperity. Economic gains associated with fully completing the Single European Market's integration are subject to the unconditional adherence of all EU member-states to all of the Cockfield suggestions adopted by the Single European Act (Cecchini, 1988; Peck, 1989). Moreover, a truly Common European Market, as envisaged by the Single European Act, requires a uniform and comprehensive

implementation of Maastricht's European Monetary System (Swann, 1992).

## **Argument 2**

In the past, the inclusion of new member-states has made it harder to pass EU legislation in favor of fully completing the Common European Market (Nugent, 1992). For example, Swann (1992) reports that a regulation drafted in 1973 to give the European Commission merger-controlling powers was not passed into law until 1989. He attributes the 16 year delay, in part, to the post-1973 accession of Denmark, Ireland, the UK, Greece, Spain and Portugal. The resulting increase in diversity of national interests often lead to decision making gridlock. This was particularly true given that the enactment of legislation was preconditioned on unanimity within the Council of Ministers (the body which enacts legislation proposed by the Commission).

In an attempt to rectify this situation, the 1986 Single European Act and Final Act replaced the requirement of unanimity with one of a "qualified majority". Voting power within the Council of Ministers was divided as per table 17, and only 54 of the Council's 76 votes were needed to enact a law (Economist, 1993d). However, this system only partially overcame the impasse in decision making. A balance of power between two key interest groups did not take long to emerge. Countries organized themselves into voting cohorts based on

national economic interests. Nations which have consistently favored protectionism, be it through the use of subsidies or covert discrimination, include Spain (8 votes), Italy (10 votes) and Greece (5 votes). These nations formed the "Olive Belt Veto". Between 1986 and 1995, their combined 23 votes were enough to block proposed changes to Common Market rules with which they did not agree. Similarly, the faction traditionally favoring a genuine free and fair trading European Common Market were, until 1995, in a position to obstruct the passage of protectionist legislation. Germany (10 votes), the UK (10 votes) Denmark (3 votes) and the Netherlands (5 votes) formed the core of this latter voting block (Economist, 1994c; Economist 1994d).

**TABLE 17**  
**EU 12's POWER STRUCTURE IN THE COUNCIL OF MINISTERS**

	POPULATION (Millions)	VOTES IN COUNCIL
Germany	80.6	10
UK	57.9	10
France	57.5	10
Italy	56.9	10
Spain	39.1	8
Netherlands	15.2	5
Greece	10.3	5
Belgium	10.0	5
Portugal	9.8	5
Denmark	5.2	3
Ireland	3.5	3
Luxembourg	0.4	2
Total	346.4	76

Source: Economist, 1993d

The 1995 accession of Austria, Finland and Sweden helped



to change this situation. Both Austria and Sweden were awarded 4 votes on the Council, and Finland was awarded 3 votes. Consequently, the number of votes needed to formulate a "blocking minority" was raised to 26 (Arrowsmith, 1995). This means that the "Olive Belt Veto" now needs the five votes of "fickle Portugal" to block anti-protectionist EU legislation (Economist, 1994d). However, further EU expansion could throw the Council of Ministers back into decision making gridlock. This would be particularly true in the case of accession by the "Visegrad4" (Czech Republic, Hungary, Poland and Slovakia). Their population is such that they would receive more Council of Minister votes than Spain, Portugal, Ireland and Greece put together (Baldwin, 1995). These votes would most likely be added to the "Olive Belt Veto" or be used to form a third and independent interest group, given the state of the Visegrad4 economies.

### **Argument 3**

Table 18 reveals that there exists a significant difference in overall standard of living between the majority of EU incumbents and many of the countries currently seeking EU membership {i.e. the Czech Republic Slovak Federation (CFSR), Hungary, Poland, Romania, and Turkey}, if real per capita GDP is used to quantify a country's overall standard of living. According to Szilagyi (1994):

*[In looking at table 18] an imaginary line can be drawn between Netherlands and Spain. The...countries above this line constitute a relatively homogeneous group in terms of per capita GDP; the...countries below the line can be considered as another group..."*

**TABLE 18**  
**RELATIVE 1990 REAL PER CAPITA GDPs**  
**(AUSTRIA = 100)**

	GDP
Luxembourg	116.5
Germany	110.0
France	105.0
Sweden	103.3
Denmark	101.4
Austria	100.0
Finland	99.7
Belgium	98.8
Italy	96.4
UK	95.9
Netherlands	94.9
Spain	70.9
Ireland	64.1
Portugal	52.8
CFSR	50.4
Greece	44.3
Hungary	37.8
Poland	30.4
Turkey	27.7
Romania	20.6

Source: Szilagyi, 1994

Maastricht and Single European Act aim to reduce standard of living disparities across the EU. As such, nations currently seeking EU membership would place significant strains on the EU's budget and therefore have a debilitating effect on the EU's development (Nugent, 1992). In particular, Nugent is referring to Turkey and ECECs. Moreover, the accession of these states would create a

problem of migration to wealthier EU states, given the notion of Common European Citizenship introduced earlier in this paper.

#### **Argument 4**

The Single European Act commits the EU to practice human rights and to protect fundamental freedoms. As such, the induction of certain applicants may cause the EU international embarrassment (Swann, 1992). For example, Turkey has repeatedly been condemned by the international community for its human rights violations against Kurds. Therefore, the accession of Turkey may place the EU in an awkward situation on the international stage. Were this to affect the EU's credibility as a world leader, its power to negotiate global economic policy would be compromised.

#### **4.3.4. Studying the EU's Breakup**

EU "widening" and "deepening" have been the subject of intense discussion in recent years. However, the literature suggests that relatively little attention has been given to the possibility of an EU breakup. Some of the results presented in this paper suggest that the implications of an EU breakup should be studied. In the context of portfolio theory, no significant economic efficiency gains have been made by the EU when it expanded beyond nine members. Therefore, in light of the previous arguments against EU expansion, the following question should be explored: Should

the EU consider downswing its membership so as to include only those nations which are at the Union's "core"? The "core" nations will have to be identified. Also, a marginal analysis with respect to the costs/forgone benefits and the benefits/forgone costs derived from incremental decreases in the number of nations included in the EU will have to be carried out. This area of research is made more interesting when one considers the results of using the Markowitz Portfolio Model to assess possible EU breakup scenarios.

#### **Scenario #1**

Since Maastricht, the Union's primary focus has been shifting away from completing the Common Market and toward achieving Monetary Union by 1999 at the latest (Swann, 1992). Countries unable to meet the criteria necessary to move into stage three (i.e. the final phase of EMU, where the goal of having a common currency is to be achieved) of European Economic and Monetary Union (EMU) fear being left out of the Union's "hard core". For example, Spaniards fear that "their country will be left behind, forced to move closer to Morocco than to France" (Economist, 1995). Their concern may not be groundless. Germany's Christian Democrats did not refer to Spain in a 1994 discussion paper which describes the party's vision of the EMU's future (Economist, 1995).

Table 18 reveals that only Germany and Luxembourg are

**TABLE 19**  
**1996 PROJECTIONS OF EU 15 MEMBER-STATES' ECONOMIC**  
**PERFORMANCE VIS A VIS THE EMU'S CONVERGENCE CRITERIA**

	Inflation Rate	Long-Term Interest Rate	Budget Deficit to Nominal GDP Ratio	Gross Debt to Nominal GDP Ratio	Cummulative 1995 and 1996 Nominal Exchange Rate Devaluation (-) Revaluation (+)
Bel.	2.6%	8.0%	-4.0%	136%	+3.97%
Fran.	2.1%	7.5%	-3.9%	55.6%	-0.19%
GFR.	2.4%	7.3%	-2.0%	58.9%	+3.87%
Ita.	3.5%	11.7%	-7.9%	128.6%	-16.71%
Lux.	2.7%	6.4%	2.0%	9.9%	+3.97%
Neth.	2.5%	7.3%	-2.7%	78.0%	+4.02%
Den.	2.4%	8.7%	-2.2%	78.2%	+3.59%
Ire.	2.7%	8.5%	-1.5%	79.1%	-3.02%
UK	3.3%	8.1%	-3.4%	53.1%	-7.38%
Gre.	9.0%	20.8%	-12.9%	128.1%	-7.56%
Por.	4.4%	10.4%	-4.8%	72.3%	+0.41%
Spain	4.4%	8.8%	+4.7%	66.1%	-3.96%
Aus.	3.1%	7.5%	-4.2%	68.1%	+3.90%
Fin.	2.7%	8.7%	-2.3%	85.1%	+7.93%
Swe.	3.1%	10.8%	-7.3%	95.4%	-6.28%
EMU Criteria (Ceiling)	3.8%	9.8%	-3.0%	60.0%	±15%

Source: Arrowsmith, 1995; OECD Economic Outlook, 1995

Note: National inflation Rates were estimated using national price deflators of private consumption.

Note: Currency appreciations and depreciations are vis a vis the ECU.

expected to meet all of the EMU criteria by 1997.

Nonetheless, Ireland can also be considered a "hard core" member of the Union. The EU Commission considers that Ireland has met the Gross National Debt Criterion despite projections that the country's gross national debt to nominal GDP ratio will be 79.1% by 1997. This is because Ireland's gross national debt to nominal GDP ratio has been consistently diminishing at a satisfactory rate and is now

near the EMU criterion. France and the UK may also join Germany and Luxembourg in entering phase three of the EMU. This will require that the EU Commission be just as flexible about the Budget Deficit Criterion as it was about the Gross National Debt Criterion.

A "two-tier" EU may be created between 1997 and 1999 if Germany, Luxembourg, Ireland, the UK and France move into phase three of the EMU unaccompanied by the other ten EU member-states (Arrowsmith, 1995). Figure 14 and table 19 compare the growth and risk characteristics of the EU 15 to those of an EU solely comprised of EMU "hard core" members.

### **Scenario #2**

Both the UK and Denmark have been awarded the right to "opt-out" of European Monetary Union. Therefore, a "two-tier" EU may still be a possibility even if all 15 member-states meet the EMU criteria. The economic efficiency, in portfolio terms, of an EU 15 less Denmark and the UK is presented in figure 14 and table 19.

### **Scenario #3**

Germany, France, Belgium, the Netherlands and Luxembourg are the "heart" of Europe. "A closer Union...will depend entirely on these five states" (Russell-Walling, 1995). Germany is the EU's economic locomotive (Russell-Walling, 1995; Thurow, 1993). France is now "the strongest major

economy in Europe". It is currently pursuing a tight monetary policy so as to achieve a low rate of inflation and a stable exchange rate. Also, its economy is expected to grow by 2.8% in 1995, according to Barclays Bank. Belgium is Europe's capital and it has resumed steady annual economic growth of over 2% since 1993. The Netherlands is the EU's distribution center. A third of the Union's transcontinental trucks and half of its river barges are owned by Dutch firms. Finally, Luxembourg is the only country aside from Germany which meets the criteria necessary to enter into the third and final stage of EMU. Figure 14 and table 19 show the growth and risk characteristics of an EU made up solely of these five states which were original signatories of the 1957 Treaty of Rome.

#### **Scenario #4**

The EU's North and South have traditionally been opposed to one another on issues concerning free trade, relations with Eastern Europe and redistribution of income in the form of regional aid. The accession of Finland, Sweden and Austria into the Union has intensified this ongoing conflict. Like their northern EU neighbors, the three EFTA countries favor moving towards more open markets, intensifying relations with ECECs and cutting back on regional aid. As a result, "the role of Franco-German relations as a link between North and South and as the engine of the Union's future development will tend to grow" (Scharrer, 1995).

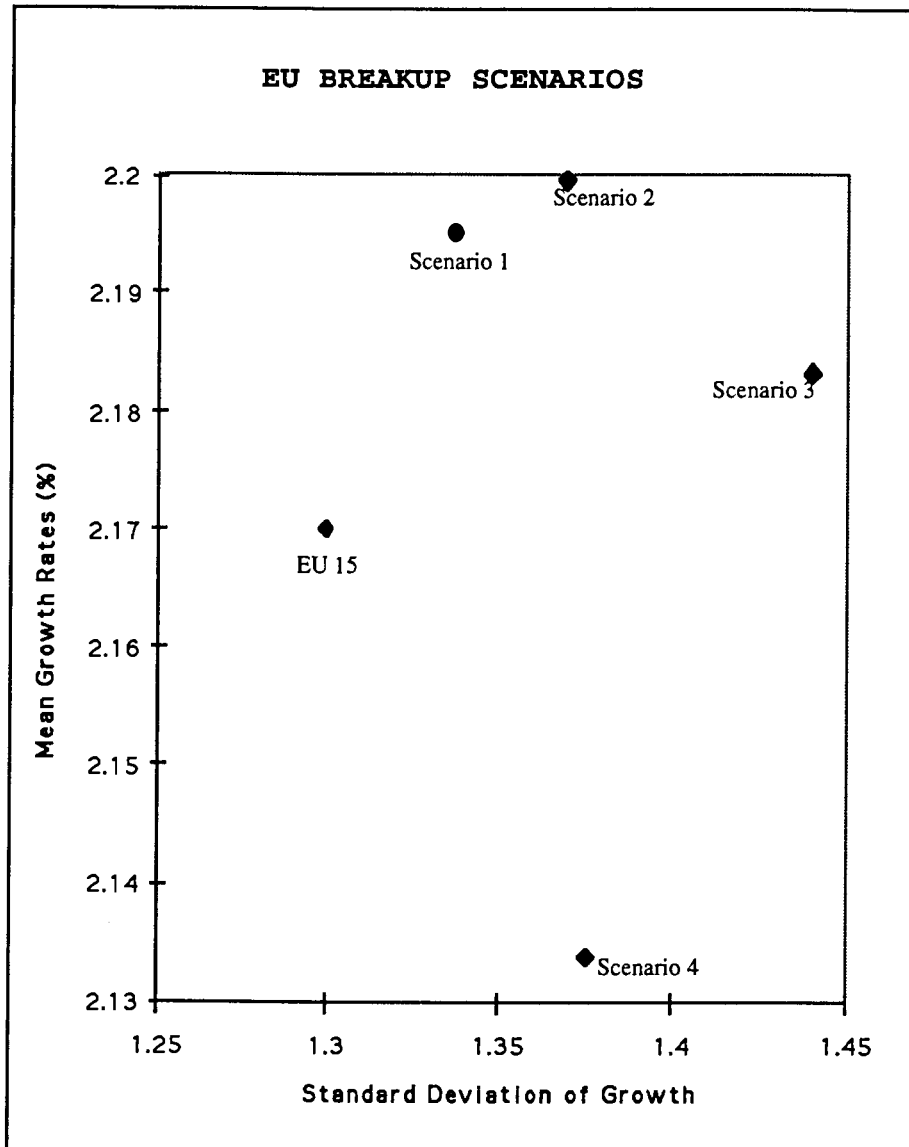
Figure 14 and table 19 explore what would happen to the EU's growth and risk characteristics in the unlikely event that Germany and France would leave the Union.

**TABLE 20**  
**EU 15 BREAKUP SCENARIOS**

		SCENARIO PORTFOLIOS			
	EU 15	Scenario #1	Scenario #2	Scenario #3	Scenario #4
Growth Rate (%)	2.170	2.195	2.200	2.183	2.134
Std. Dev.	1.299	1.337	1.369	1.440	1.375
Bel.	2.91	0	3.50	6.08	4.92
Fran.	17.63	30.97	21.20	36.75	0
GFR.	23.08	40.55	27.77	48.13	0
Ita.	16.56	0	19.92	0	27.92
Lux.	0.13	0.23	0.16	0.27	0.23
Neth.	4.20	0	5.05	8.76	7.08
Den.	1.53	0	0	0	2.57
Ire.	0.72	1.28	0.87	0	1.22
UK	15.35	26.97	0	0	25.89
Gre.	1.66	0	1.99	0	2.80
Por.	1.74	0	2.09	0	2.93
Spain	8.42	0	10.14	0	14.21
Aus.	2.30	0	2.77	0	3.88
Fin.	1.31	0	1.58	0	2.21
Swe.	2.46	0	2.96	0	4.15



FIGURE 14



Scenario #1: Germany, Luxembourg, Ireland, the UK and France

Scenario #2: EU 15 less Denmark and the UK

Scenario #3: Germany, France, Belgium, the Netherlands and Luxembourg

Scenario #4: EU 15 less Germany and France

Scenarios one and three each identify a "hard core" EU membership and suggest the possibility of creating EU portfolios which would consist solely of "hard core" nations. Figure 14 and table 19 reveal that neither of the EU portfolios suggested by scenarios one and three are first-order stochastically dominant over the actual EU 15 Portfolio. The European Unions proposed by scenarios one and three would enjoy a greater rate of economic growth than the actual EU 15. However, they would also be exposed to greater growth rate volatility (risk). The implications are twofold. First, it is not possible to rank scenarios one and three against the actual EU 15 Portfolio in terms of portfolio theory. The inconclusive nature of these findings suggest that a thorough marginal analysis needs to be conducted on the costs and benefits of creating a "two-tier" EU. Second, these findings suggest that "non-core" member-nations act to stabilize the actual EU 15 Portfolio's economic growth rate by contributing to the Union's economic diversity. This lends itself to the German notion that progression towards completing EMU should be slowed down so as to provide an opportunity for the economies of all 15 EU member-states to converge. Germany would like to avoid a "two-tier" Europe which may hinder the development of a deeper political Union (Business Europe, 1995; Russell-Walling, 1995).

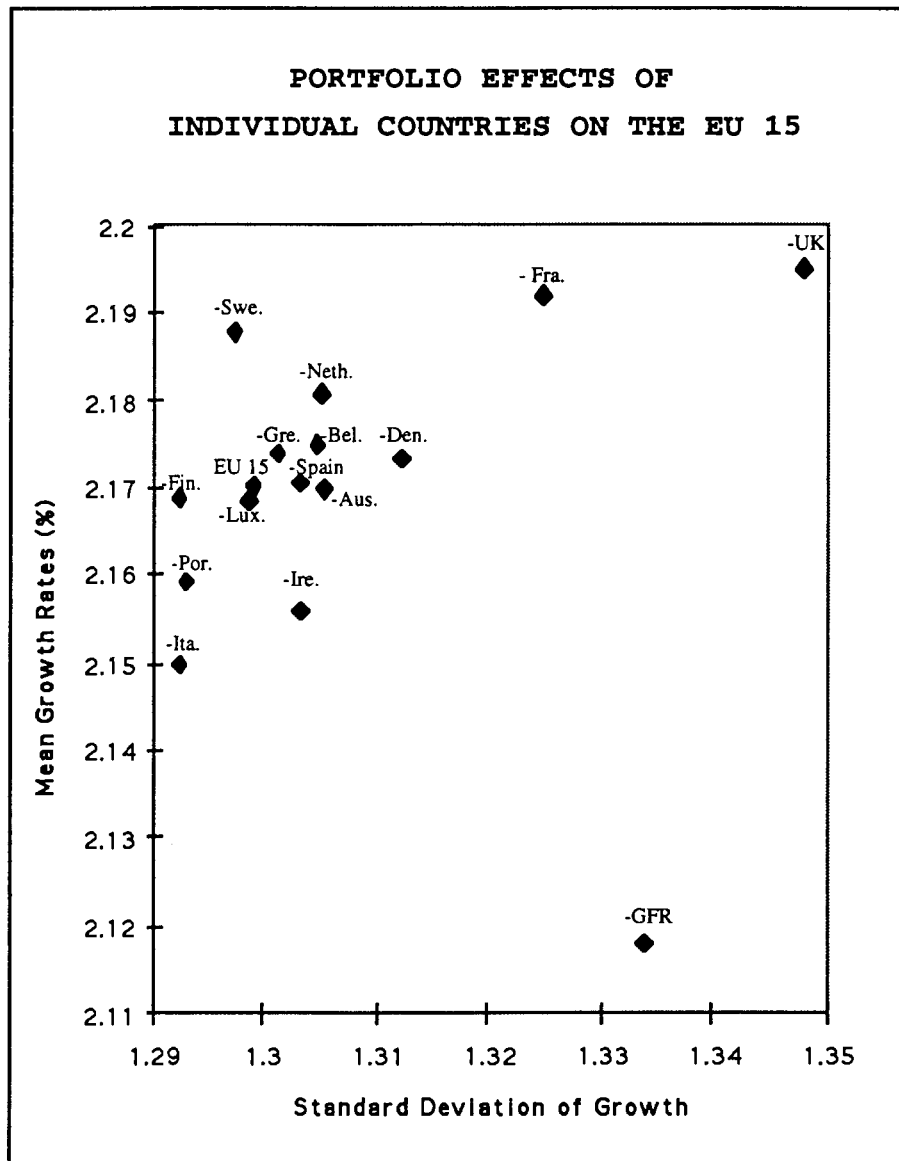
Scenarios two and four propose EU portfolios consisting of thirteen nations. Figure 14 and table 19 reveal that an

EU less Denmark and the UK (Scenario two) would grow faster but with more volatility than the actual EU 15. However, an EU less Germany and France (Scenario four) would grow slower and with more volatility than would the actual EU 15. The actual EU 15 is first order stochastically dominant over scenario four; an investor would prefer holding the actual EU 15 Portfolio over the EU 15 Portfolio less Germany and France. This finding is of little surprise when one considers figure 15 and table 20. Germany, which constitutes 23.08% of the EU 15 Portfolio, contributes to the diversification of the EU 15 Portfolio. Germany's growth rate correlates with that of the EU 15 less Germany only at .50, using the Pearson correlation coefficient. A two-tailed Student's t-test suggests that we cannot reject the null hypothesis of no correlation between Germany's growth rate and that of the EU 15 less Germany at a 0.025 significance level ( $P = 0.0420$ )<sup>3</sup>. Thus, Germany is able to increase the EU's growth rate while decreasing the EU's growth rate volatility despite the fact that German growth rate volatility is above average (see figure 1 and table 1). This finding lends support to the notion that Germany is an integral and indispensable EU member (Russell-Walling, 1995; Thurow, 1993).

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<sup>3</sup> Please refer to Appendix 2 for a discussion of how the Student's t-test is conducted.

FIGURE 15



**TABLE 21**  
**PORTFOLIO EFFECTS OF INDIVIDUAL COUNTRIES ON THE EU 15**

	Mean Growth Rate (%)	Standard Deviation of Growth
EU 15 - Belgium	2.175	1.305
EU 15 - France	2.192	1.325
EU 15 - Germany	2.118	1.334
EU 15 - Italy	2.149	1.292
EU 15 - Luxembourg	2.168	1.299
EU 15 - Netherlands	2.180	1.305
EU 15 - Denmark	2.173	1.312
EU 15 - Ireland	2.156	1.303
EU 15 - UK	2.195	1.348
EU 15 - Greece	2.174	1.301
EU 15 - Portugal	2.159	1.293
EU 15 - Spain	2.170	1.303
EU 15 - Austria	2.170	1.305
EU 15 - Finland	2.169	1.292
EU 15 - Sweden	2.188	1.297
EU 15	2.170	1.299

## CHAPTER 5 CONCLUSION

Portfolio theory can help policy makers better identify and/or clarify pertinent issues surrounding the formulation of economically optimal economic unions based on growth and volatility. In particular, I have introduced the possibility of using the Markowitz Portfolio Model as an accession criterion for economic unions (i.e. a means by which to determine whether an applicant nation should be admitted). However, in doing so, policy makers should keep the following in mind: Conclusions drawn from using portfolio theory as an assessment mechanism for the expansion of a union should not be used as the sole basis for making decisions. Instead, these conclusions should be studied in a context which includes a discussion of the given union's goals and already existing accession criteria. For example, a primary EU objective is the completion of the Common European Market. Therefore, a criterion based on portfolio theory can be considered to be only of secondary importance when compared to the Single European Criterion. That is, in the EU's case, a Portfolio Criterion needs to be applied in a flexible manner (e.g. it is desirable but not necessary that the Portfolio Criterion be met by an applicant-nation). Such a criterion is more likely to be of primary importance to economic unions still at the embryonic stage (e.g. that of the Middle East). It could prove instrumental in helping

this latter group of unions determine which and how many countries should be the founding members.

On a macro level, assuming that these findings are generalizable to other economic unions, they can be used to argue that unions whose membership stands close to ten nations need to conduct a particularly thorough cost-benefit analysis on any decisions concerning further expansion. This conclusion is of great significance given a belief shared by Cooper (1989), and Thurow (1993). These authors contend that the existence of economic unions which manage trade between themselves while practicing free trade within their respective boundaries is a necessary intermediate step in reaching the ideal of free world trade. There exists an inherent danger associated with this step. Managed trade between regional economic unions could give way to protectionism. Evolution towards free world trade could cease as trade-blocks revert to the protectionist practices exhibited in the early 1930s by the Japanese Co-Prosperity Sphere, the French Union, and the British Common Wealth/Empire. The French and Japanese have given credence to this threat. French Prime Minister, Edith Cresson, has been quoted as saying that "The Japanese have a strategy of world conquest. They have finished their job in the United States. Now they are about to devour Europe." (Nickerson, 1991). The Japanese, in turn, claim that Europe is headed

"in the direction of an exclusionary and protectionist trading block" (Ishikawa, 1990).

By providing economic unions with a rationale to stay small (i.e. less than nine nations), portfolio theory reduces the risk of having trade blocks revert back to protectionism. Smaller unions are less self-sufficient and therefore more dependent on trade. Also, they have fewer national interests to protect.



## APPENDIX 1 METHODOLOGY

### DETERMINING EU 12 COUNTRY WEIGHTS

#### Step 1: Determining National Real GDP Growth Rates

The first step needed to ascertain the EU 12 Portfolio's growth and risk characteristics is to determine each member-nation's average annual real GDP growth rate (i.e. expected return) and the standard deviation of that growth rate. The relevant figures are presented in table 22.

#### Step 2: Assigning Weights To Each Member Nation

The extent of each member nation's impact on the EU 12 has to be determined. Portfolio weights are therefore assigned to each member nation according to the relative importance of that nation's respective GDP within the European Union Portfolio. In doing so, the question of how to compare (or rank) 12 GDPs expressed in as many currencies has to be answered.

Real GDP refers to the physical volume of goods and services produced by a nation. Therefore, Purchasing Power Parity (PPP) ratios are used to compare real national GDPs of EU nations in this paper. PPP, in its absolute form, provides "the proper basis for comparing living standards,

TABLE 22  
REAL ANNUAL GDP GROWTH RATES

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	EU	Stnd. Dev.
Bel.	2.7	2.1	4.3	-0.1	1.5	0.5	2.2	0.8	1.4	2	4.9	3.5	3.2	2.3	1.9	-1.7	2.3	1.99	1.59
Fra.	3.3	3.2	1.6	1.2	2.5	0.7	1.3	1.9	2.5	2.3	4.5	4.3	2.5	0.8	1.3	-1.5	2.7	2.06	1.44
GFR.	3	4.2	1	0.1	-0.9	1.8	2.8	2	2.3	1.5	3.7	3.6	5.7	5	2.2	-1.1	2.9	2.34	1.88
Ita.	3.6	5.8	4.1	0.6	0.2	1	2.7	2.6	2.9	3.1	4.1	2.9	2.1	1.2	0.7	-1.2	2.2	2.27	1.72
Lux.	4.1	2.3	.8	-0.6	1.1	3	6.2	2.9	4.8	2.9	5.7	6.7	3.2	3.1	1.9	1.7	2.7	3.09	1.94
NetH.	2.5	2.4	0.9	-0.7	-1.4	1.4	3.1	2.6	2.7	1.2	2.6	4.7	4.1	2.3	1.3	0.4	2.5	1.92	1.56
Den.	1.5	3.5	-0.4	-0.9	3	2.5	4.4	4.3	3.6	0.3	1.2	0.6	1.4	1.3	0.8	1.5	4.4	1.94	1.68
Ire.	7.2	3.1	3.1	3.3	2.3	-0.2	4.4	3.1	-1.4	5.7	4.3	7.4	8.6	2.9	5	4.1	6	4.05	2.56
UK	3.5	2.8	-2.2	-1.3	1.7	3.7	2.3	3.7	4.4	4.8	5	2.2	0.4	-2	-0.5	2.2	3.8	2.03	2.35
Gre.	6.7	3.7	1.8	0.1	0.4	0.4	2.8	3.1	1.6	-0.5	4.5	4	-1	3.2	0.8	-0.5	1.5	1.92	2.10
Por.	2.8	5.6	4.6	1.6	2.1	-0.2	-1.9	2.8	5	5.5	5.8	5.7	4.3	2.1	1.1	-1.2	1.2	2.76	2.47
Spain	1.5	0	1.3	-0.2	1.6	2.2	1.5	2.6	3.2	5.6	5.2	4.7	3.7	2.2	0.7	-1.1	2	2.16	1.87
EU12	3.15	3.54	1.33	0.13	0.80	1.68	2.25	2.49	2.89	2.89	4.28	3.55	3.08	1.77	1.09	-0.51	2.76	2.19	1.30

Source: OECD Economic Outlook, 1995

for assessing resource allocation questions and for **examining** productivity levels internationally" (Ward, 1985). Moreover, the OECD Economic Outlook (1995) uses PPP ratios to compare the GDPs of European States.

The OECD categorizes GDP components into 220 homogeneous commodity groups as the first step in obtaining the desired PPP based comparisons. The average ratio between 1990 nominal currency denominated prices in different countries is then computed for each homogeneous commodity group. Finally, PPP ratios are calculated using the EKS (Elteto, Koves, and Szulc) aggregation method (see equation 3) (Szilagy, 1994).

### Equation 3

$$PPP^{EKS} (h/j) = [\prod_{r=1}^K PPP^F (r/j) + PPP^F (r/h)]^{1/K}$$

*"EKS type transitive parity between countries h and j can be expressed as the unweighted geometric mean of all indirect Fisher-type indices that can be deduced for this pair of countries via the direct Fisher-type indices of the other pairs. K stands for the number of countries involved and  $PPP^F$  for the Fisher type parities" (Szilagy, 1994).*

A number of caveats need to be stated with respect to using PPP-based real GDP comparisons:

- 1) The GDP of lower income countries (i.e. LDCs) is systematically revaluated while that of higher income countries (i.e. industrialized nations) is systematically devaluated when PPP ratios are used instead of nominal currency values to compare the real

GDPs of rich and poor countries. However, this systematic bias can be justified. The provision of services (which are labor-intensive) and that of non-tradable goods is relatively cheaper in poor countries than in rich countries because LDCs are richly endowed with labor. Tradable goods are also cheaper in poor countries because they are sold with an admixture of services. As such, it is reasonable to expect that the real GDP of LDCs be revaluated when compared to the real GDP of industrialized nations (Bhagwati, 1994).

Moreover, the systematic bias in question is not a significant problem when EU countries are compared. Table 23 presents the nominal exchange rate ratio between the Austrian Schilling and each of the EU's 12 national currencies plus that of Poland. Table 23 also presents the PPP ratios between Austria and each of the EU 12's member-nations plus Poland. The exchange rate to PPP ratios is at most 1.6% for EU nations. It is over twice that in Poland's case. The null hypothesis that the exchange rate to PPP ratios of EU nations is equal to that of Poland can be rejected at the .05 significance level when using the Student's  $t$  distribution (See equation 4).

2) The validity of PPP-based real GDP comparisons is confined by the fact that there exist systematic differences in the quality of goods and services between

countries. These differences are not reflected in prices. However, the impact of this "possible error or distortion is of a minor extent" (Szilagy, 1994).

**TABLE 23**  
**PPPs AND NOMINAL 1990 EXCHANGE RATES**  
**(Austrian Schilling = 1)**

	PPP		Exchange Rate	Ratio of Exchange Rate to PPP (PPP=1)
Belgium		<		
France	.4712	<	.4788	1.016
Germany	.1487	>	.1421	0.956
Italy	101.2080	<	105.4000	1.041
Luxembourg	2.8260	<	2.9380	1.040
Netherlands	.1542	<	.1601	1.038
Denmark	.6692	>	.5441	0.813
Ireland	0.0492	<	0.0532	1.081
UK	0.0429	<	0.0494	1.152
Greece	10.0307	<	13.9500	1.391
Portugal	7.3871	<	12.5420	1.698
Spain	7.7972	<	8.9950	1.148
Poland	226.1000	>	835.53	3.695

Source: Szilagyi, 1994

**EQUATION 4**

Reject the null hypothesis if:

$$\frac{\text{EU average ratio} - \text{Poland's ratio}}{\text{Std. Dev. Of EU ratio} / \text{sample size}^{1/2}} < t_{n-1, .05}$$

$$\frac{1.12 - 3.70}{.24 / 12^{1/2}} < t_{11, .05}$$

$$-37.24 < -1.80$$

The null hypothesis can be rejected at a .05 significance level, since -37.24 is smaller than -1.80. The evidence suggests that the average EU exchange rate to PPP ratio is significantly different than the Polish exchange rate to PPP ratio.

## CALCULATING THE EU 12 EFFICIENT FRONTIER

Economic efficient portfolio minimize growth rate variance (risk) for a given rate of growth (Markowitz, 1952). Computing the EU 12's efficient frontier can therefore be thought of as a constrained optimization problem where the objective is to minimize the portfolio variance. The problem is defined in equations 5A and 5B using the Lagrangian Multiplier. Equation 5C operationalizes the problem (Haugen, 1989):

### Equation 5 A (The Objective Function)

$$\begin{aligned} \text{Minimize } \sigma^2(r_p) &= X_a^2 \sigma^2(r_a) + X_b^2 \sigma^2(r_b) + X_c^2 \sigma^2(r_c) + \dots + X_l^2 \sigma^2(r_l) \\ &+ 2X_a X_b \text{Cov}(r_a, r_b) + 2X_a X_c \text{Cov}(r_a, r_c) + \dots + 2X_a X_l \text{Cov}(r_a, r_l) + 2X_k X_l \text{Cov}(r_k, r_l) \end{aligned}$$

Where: Belgium =  $X_a$ ; France =  $X_b$ ; Germany =  $X_c$ ; ... Portugal =  $X_k$ ; and Spain =  $X_l$   
Where: Portfolio =  $p$

### Equation 5B (Constraints)

Subject to a target expected return  $E(r_p^*)$

$$E(r_p^*) = \sum_{m=1} X_m E(r_m)$$

so that the sum of the portfolio weights are equal to 1.

$$1.00 = \sum_{m=1} X_m$$

Subject to no short sales

$$X_m \geq 0$$

**Equation 5C**  
**(Operationalization)**

$$\begin{aligned}
 \text{Minimize } \sigma^2(r_p) &= X_a^2 \sigma^2(r_a) + X_b^2 \sigma^2(r_b) + X_c^2 \sigma^2(r_c) + \dots + (1 - X_a - X_b - \dots - X_k) \sigma^2(r_l) \\
 &+ 2X_a X_b \text{Cov}(r_a, r_b) + 2X_a X_c \text{Cov}(r_a, r_c) + \dots + 2X_a (1 - X_a - X_b - \dots - X_k) \text{Cov}(r_a, r_l) \\
 &+ 2X_b X_c \text{Cov}(r_b, r_c) + \dots + 2X_b (1 - X_a - X_b - \dots - X_k) \text{Cov}(r_b, r_l) + \dots \\
 &+ 2X_k (1 - X_a - X_b - \dots - X_k) \text{Cov}(r_k, r_l) \\
 &+ b [E(r_p) - X_a E(r_a) - X_b E(r_b) - \dots - (1 - X_a - X_b - \dots - X_k) E(r_l)]
 \end{aligned}$$

Where:  $b$  = Lagrangian Multiplier

Where:  $X_l = (1 - X_a - X_b - \dots - X_k)$

For any given rate of return, we can solve for equation 4C by substituting in the values for the expected returns, variances, and covariances [see tables 1 and 3--note: expected returns = average growth rate; variance = standard deviation of growth<sup>2</sup>; and Covariance ( $r_a, r_b$ ) = Correlation ( $r_a, r_b$ )  $\sigma_{ra} \sigma_{rb}$ ].

**APPENDIX 2**  
**THE PEARSON CORRELATION COEFFICIENT**

**MEASURING THE ASSOCIATION BETWEEN GROWTH RATES**

The Pearson correlation coefficient is used in table 16 to determine the strength of the linear association between the EU 12's annual real GDP growth rate and that of Austria, Finland and Sweden. The Pearson correlation coefficient is defined as equation 6 (Norusis, 1993).

**Equation 6**

$$r = \frac{\sum_{i=1}^n (X_i - X_{avg.}) (Y_i - Y_{avg.})}{(n-1)S_x S_y}$$

$r$  = Pearson correlation coefficient

$n$  = The number of years observed

$X_{avg.}$  = The avg. annual real GDP growth rate of the EU 12

$Y_{avg.}$  = The avg. annual real GDP growth rate of either Austria, Finland, or Sweden

$S_x$  = The std. dev. Of the EU 12's growth rate

$S_y$  = The std. dev. Of either Austria, Finland or Sweden

**HYPOTHESIS TESTS ABOUT THE CORRELATION COEFFICIENT**

As suggested by Newbold (1991), I use the student's  $t$  distribution with  $(n-2)$  degrees of freedom to test the null hypotheses that the EU 12's growth rate is not correlated to that of either Austria, Finland or Sweden at a .05 significance level (see equation 7).



## Equation 7

Reject the null hypothesis if:

$$t_{n-2, .025} < \frac{r}{[(1-r^2) / (n-2)]^{1/2}} < -t_{n-2, .025}$$

The following is found in Austria's case:

$$t = \frac{.67}{[.5511 / 15]^{1/2}} = 3.4955$$

The probability is only 0.15% (.03% divided by two because a two-tailed significance test was conducted) that a Student's T random variable with 15 degrees of freedom exceeds 3.4955. Therefore, the null hypothesis that no linear association exists between the EU 12's growth rate and that of Austria can be rejected. That is, there is only a 0.3% chance that there exists no linear association between the EU 12's growth rate and that of Austria given that the sample correlation is .67.

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