

Should the United States and Europe's Economic and Monetary Union Stabilize the Exchange Rate?

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Should the United States and Europe's Economic and Monetary Union Stabilize the Exchange Rate?

A senior thesis submitted by

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with guidance from

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to the

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and

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ABSTRACT

This paper examines the likelihood that the United States would engage in a policy of exchange rate stabilization with the EMU. First, it examines the history of the exchange rate regimes in the United States and a review of literature on exchange rate theories. From a historical perspective, most literature and prominent economic theories focus on the Milton Friedman proposal of floating exchange rate regimes. Just as floating exchange rates were gaining prominence in the United States during the 1970s, European countries were attempting to compose a currency union which took the form of the European Monetary System in the late 1970s and eventually evolved into Europe's Economic and Monetary Union which completed its last stage of development January 1, 1999. The importance of fixed exchange rate regimes and theories, most notably, Robert Mundell's *Theory of Optimal Currency Area* is highlighted. In addition, the paradigm arguments on the relation between trade integration and synchronization of business cycles are discussed utilizing Paul Krugman and Tony Venables' specialization hypothesis (1996) and comparing it to Jeffrey Frankel and Andrew Rose' endogeneity hypothesis (1998). Second, this analysis shows that the United States' economy is at a critical point in time in which it must reevaluate its stance on floating exchange rates. Particular attention is paid to current economic conditions in the United States and the EMU such as: the purchasing power of the euro with respect to the U.S. dollar, the recent decline of the dollar, the lackluster performance of the EMU with regard to some macroeconomic variables, and the profligate spending by the U.S. government which has contributed to the tremendous budget deficit. Third, this paper analyzes six properties of optimal currency area criteria: degree of economic openness, trade integration and similarity of economic structure, financial market integration, synchronization of business cycles, price flexibility, and mobility of labor as a factor of production. The countries of France and Germany are utilized as benchmarks (if they satisfy the criterion) against which the United States and EMU are compared. The time periods of (1946-1972) and (1973-2003) are utilized to highlight the advantages and disadvantages of various exchange rate regimes and to try and shed light on the endogeneity hypothesis and specialization hypothesis. This thesis concludes that France and Germany failed to satisfy certain OCA criteria such as business cycle synchronization, price flexibility, and mobility of labor as a factor of production. Although France and Germany did not fulfill all of the OCA properties, the United States and the EMU appear to be farther from optimality, only satisfying mobility of labor as a factor of production. Finally, according to this paper neither the endogeneity hypothesis nor the specialization hypothesis dominates. Therefore, the United States should not stabilize rates with the EMU because it will most likely incur greater costs than benefits since it does not form an optimal currency area with the EMU. Intermediate exchange rate policies should be evaluated and further research conducted to enhance OCA criteria and make it a more scientific and effective tool for policymakers. The findings of this paper shed light on the history of exchange rate regimes, exchange rate theories, and current economic conditions that warrant a reevaluation of the United States' foreign exchange rate position while at the same time indicating which characteristics of the U.S. economy satisfy optimality and emphasizing the importance of further research in this field.

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“We, at the Federal Reserve, have expended an extraordinary large amount of resources to try to forecast the value of the dollar and foreign exchange markets. And what we have determined is it is an exceptionally difficult thing to do. We have been no more successful than the odds you get from the tossing of a coin.”

U.S. Federal Reserve Chairman, Alan Greenspan,

at the 21st Annual Monetary Conference

November 20, 2003

(“The Future of the Dollar: The Passing of the Buck,” 2004).

I. INTRODUCTION

Long-standing research and general economic consensus have conceded to the belief that flexible exchange rates and greater monetary independence are beneficial for developed economies. The flexible exchange rate regime instituted in the United States in 1973 made it possible for the Federal Reserve to lower the interest rate eleven times in 2001 in order to increase the money supply to combat the recession. Just as the U.S. benefited from a flexible exchange rate, countries that attempted to peg their currency suffered. When Argentina instituted “convertibility” (a very hard peg with a zero rate of crawl), the country initially experienced growth, only to be undone by a recession and deflation period which led to a massive run on the banking system and the currency (Fronti, Miller, and Zhang, 2004).¹ Likewise, Mexico spent \$25BN in reserves and borrowed \$25BN more to defend the peso in 1994 (Obstfeld and Rogoff, 1995). Huge capital losses resulting from speculative attacks on pegged exchange rates reiterated the long-held belief that flexible exchange rates are the policy of the future. The advent of the euro in January of 1999 marked a watershed event for economic monetary policy and a possible resurgence of fixed exchange rate regimes for developed countries. Not only did the introduction of the euro bring into question the exchange rate system in the U.S., but current economic conditions such as the depreciating dollar and the increasing globalization of economies make the U.S. speculate about various exchange rate regimes.

This study determines whether the U.S. and Europe’s Economic and Monetary Union (EMU) should engage in stabilization of the euro-dollar exchange rate in the future. This paper analyzes the history of exchange rates, paying particular attention to the demise of fixed

¹ Emerging markets are not the only ones to suffer from fixed exchange rate vulnerabilities. In September of 1992, the Bank of England had a capital loss of \$5BN in an effort to prevent the collapse of the pound (Obstfeld and Rogoff, 1995).

exchange rates after the Bretton Woods system. Prominent exchange rate theories proposed by Milton Friedman (1953) and Robert Mundell (1963) and the associated advantages and disadvantages of alternative regimes are discussed. The endogeneity hypothesis (Frankel and Rose, 1998) and the specialization hypothesis (Krugman and Venables, 1996) are highlighted to determine the relation between trade integration and synchronization of business cycles. Finally, this analysis looks at the current economic conditions of the United States and Europe's Economic and Monetary Union.

To determine how far the United States is from a situation that would call for exchange rate stabilization of some sort, the Inter-European economies of France and Germany are compared to the United States and the EMU for two time periods; Bretton Woods System (1946 – 1972) and Post-Bretton Woods System (1973-2003). Two different time periods were utilized to examine how changes in policy regimes affect exchange rates and to test the endogeneity hypothesis and the specialization hypothesis. By utilizing Mundell's criteria for optimal currency areas; the correlation between these economies, the degree of trade integration, the flexibility of prices and mobility of labor as a factor of production, and the synchronization of their business cycles are determined. Opponents of fixed exchange rate regimes argue insofar that France and Germany would not have satisfied the OCA theory as set forth by Mundell. This thesis aims to determine whether or not France and Germany satisfied the criteria for an optimal currency area and if a monetary union between these countries enhanced business cycle synchronization or hindered it. If France and Germany satisfied the OCA criteria and if these countries benefited from the implementation of the euro by increased correlation between business cycles, Europe's Economic and Monetary Union can be viewed as a success and France and Germany will be utilized as benchmarks when examining the United States and the EMU.

In beginning this analysis, the conjecture was that the United States and the EMU were further away from an optimal currency area than France and Germany, which would not lead to a fixed exchange rate regime, but perhaps an intermediate arrangement. This analysis purports that France and Germany did not satisfy all of the criteria for an optimal currency area. Therefore, the monetary union that France and Germany participate in cannot always be utilized in the analysis as benchmarks to compare the United States to Europe's Economic and Monetary Union. The main findings in this thesis conclude that France and Germany are poor indicators of an optimal currency area and the United States' business cycle is not highly correlated enough with the EMU's business cycle to warrant a fixed exchange rate arrangement.

History of Exchange Rate Regimes in the United States

Exchange rate regimes in the United States have changed drastically throughout the years. The United States participated in five major exchange rate regimes: Bimetallism, Classical Gold Standard, Interwar Period, Bretton Woods System, and Post-Bretton Woods System (Reinhart and Rogoff, 2004). These regimes reveal a trend from a fixed rate policy to a floating one. Prior to 1875, Bimetallism occurred in which both gold and silver were used for international payments. Therefore, the exchange rates were determined by the gold or silver content of the currencies. This system was replaced in 1875 by the Classical Gold Standard which lasted until 1914. Unlike during Bimetallism when the content of the currency determined its value, under the Classical Gold Standard governments actually fixed the price of their domestic currency in terms of gold and committed to buy or sell to anyone at this price. For example, the U.S. dollar was defined as 23.5 grains of gold or 371 grains of silver (Johnson and Swoboda, 1973). During World War I and World War II, major currencies suspended conversion of paper currency to

gold and imposed embargoes on gold exports. This policy was known as the Interwar Period and lasted from 1914 to 1944. By the end of WWII countries were experiencing high inflation and volatile exchange rate fluctuations.²

The high inflation and exchange rate fluctuations associated with the Interwar Period called for a change. In 1944 at a meeting in Bretton Woods, New Hampshire, nation leaders decided to fix their currencies to the dollar, which would be fixed to gold. The intention of the Bretton Woods system was to “have a system which would lead to a recovery of world trade and which avoided the destabilizing capital flows of the 1920s and 1930s” (Lord Robert Skidelsky, 1999). Under the Bretton Woods, system which would last from 1946 to 1972, the value of the U.S. dollar would be fixed to gold. Other countries would fix their exchange rates to the U.S. dollar, but would be allowed to fluctuate within 1% of the fixed level. Although Bretton Woods preserved a fixed peg of the center currency to gold, it had important characteristics of a managed float since the prices of other currencies were allowed to float within a certain level (1%). It is important to note that Bretton Woods was seen as a compromise between the two Western world powers, the United States and England (Dervis, 2004). While the United States was primarily concerned with having stable money, given the turmoil of the Great Depression, England was concerned with monetary independence. This exchange rate system allowed both the United States and England to have a nominal anchor for their exchange rate while it laid qualifications that enhanced the independence of central banks.

The Bretton Woods system was effective, for almost two decades, but the changing U.S. current account and money supply in the late 1960s led to its collapse (Eichengreen, 2004). During the recession of the late 1960s, the United States expanded its money supply to stimulate

² In 1923, Germany experienced hyperinflation in which their inflation rate was 200 billion% (Baldassarri, Paganetto and Phelps, 1992).

the economy. By expanding the money supply, the value of the U.S. dollar decreased drastically. While other countries in the past had held the dollar because it was pegged to gold and could be exchanged for gold, these countries now worried that the dollar would lose value in terms of gold. This precipitated a large selling off of the dollar by other countries and a large purchase of gold. As Figure 1 indicates, U.S. monetary gold stock decreased from approximately \$22BN in 1957 to \$9BN in 1971 while the rest of the world's monetary gold stock climbed from \$15BN in 1957 to \$30BN in 1971 (Eichengreen, 2004). Not only did the U.S. monetary gold stock decrease because countries were exchanging U.S. dollars for gold, but U.S. external dollar liabilities increased from \$43BN in 1969 to \$68BN in 1971 (Eichengreen, 2004). This fear and uncertainty about the value of the dollar forced President Nixon to suspend the convertibility of the U.S. dollar to gold in 1971, which led to the collapse of the Bretton Woods system.

Post-Bretton Woods

In the aftermath of Bretton Woods, each country chose either a fixed exchange rate policy, an intermediate arrangement, or a floating exchange rate policy. However, each policy had many variations. Under a fixed exchange rate policy in which the exchange rate of a currency is not allowed to fluctuate against another, a country could decide to have a traditional fixed exchange rate, a currency board, or a currency union. While a fixed exchange rate meant that the exchange rate was constant, a currency board was when by law, currency in circulation is entirely backed by foreign reserves of the central bank at the fixed rate, and a currency union was when two countries shared a common currency. Hence, varying types of fixed exchange rate policies enabled a country to choose which policy would be most effective.

Perhaps, the greatest variation of exchange rate regimes is found in the intermediate arrangement category. Under an intermediate arrangement an exchange rate is neither fixed nor free to float. Intermediate arrangements include: adjustable pegs, crawling pegs, basket pegs, and target zones or bands. An adjustable peg is defined as fixing the exchange rate, but without any open-ended commitment to resist devaluation or revaluation of the currency. However, a crawling peg corresponds to a pre-announced policy of devaluing the currency each week. A basket peg is when a country ties its currency to a “basket” of other currencies. Finally, a target zone or band is a situation when the government determines the upper and lower bands of the value of the currency. Market forces determine the movements of exchange rates; however when the exchange rate threatens to move out of the bounds, the central bank intervenes in the market (Levy-Yeyati and Sturzenegger, 2002). Finally, a floating exchange rate policy is one in which the exchange rate is determined by the market through supply and demand. Managed floats and free floats are both categorized as floating exchange rate policies even though under a managed float market forces determine the exchange rates only most of the time. Therefore, the varying degrees of central bank intervention allow for there to be many types of exchange rate policies that combine both floating and fixed aspects.

Although a great variety of exchange rate systems were employed after the collapse of the Bretton Woods system, the idea of a common currency for Europe began as early as the 1960s. The political and economic benefits from a common currency would include: facilitation of trade between the EU countries, strong growth rates, high levels of employment, and elimination of future wars and conflicts (Ministry of Finance). In 1969, the Member States began investigating the possibility of a monetary union in Europe. A few years later a currency cooperation, known as the “currency snake,” was implemented. Between 1973 and 1977, the

currency snake was in operation and while it was unable to lend any greater stability to the economy, it did increase Europe's ambition to create a currency union. In 1978, Germany and France took the initiative to establish the European Monetary System (EMS) at the Bremen Summit. Under the EMS, the Exchange Rate Mechanism (ERM) was utilized in which "the currencies of the participating countries were tied together by a system of fixed exchange rates, known as central parity rates" (Ministry of Finance). Therefore, the French franc was tied to the German mark as early as 1978. Although these currencies were allowed to fluctuate, if they varied too much against another, a central bank would intervene. In 1988 at the Hannover Summit, President of the Commission, Jacques Delors, revived the idea of economic and monetary union among the European countries. The Delors Report and the Intergovernmental Conference (IGC) on Economic and Monetary Union eventually led to the Maastricht Treaty, better known as the Treaty of European Union. As laid out by the Treaty, the economic and monetary union was to be established in three stages and January 1, 1999 was designated as the latest point for the beginning of Stage Three. While the Treaty began officially operating in November 1993, some countries such as the United Kingdom and Denmark were granted the right to remain outside the monetary union. Therefore, after the collapse of the Bretton Woods system while the United States experimented with managed floats and variations of pegged exchange rates, Europe was undergoing its age-old desire to establish an economic and monetary union to integrate European economies.

II. REVIEW OF LITERATURE AND EXCHANGE RATE THEORIES

Milton Friedman and Robert Mundell

Michael D. Bordo and Barry Eichengreen's 1993 book, *A Retrospective on the Bretton Woods System: Lessons for International Monetary Reform*, describes the introduction of the Bretton Woods System, its implementation, and demise. While the United States was under the Bretton Woods system, a number of economic theories pertaining to exchange rate policies emerged. Two of the most famous and well-respected theories are by Milton Friedman (1953) and Robert Mundell (1963). Milton Friedman discussed the advantages of floating exchange rates. According to Friedman, "floating exchange rates have the advantage of monetary independence, insulation from real shocks, and a less disruptive adjustment mechanism in the face of nominal rigidities." Friedman believed that the advantages of floating exchange rates were that the country can conduct independent monetary policy, exchange rates could adjust automatically to achieve external balance, and floating exchange rate regimes are not subject to speculative attacks on the country's currency. Friedman's theory of floating exchange rates seems to have shaped the economic views of the twenty-first century. As Figure 2 reveals, choices of exchange rate regimes have changed from 1984 to 1999. While 64% of countries surveyed were under a fixed exchange rate system in 1984, only 38% were under a fixed exchange rate system in 1999 (European Central Bank, 2001). In addition, only 8% of the countries in the 1984 survey were independent floats whereas 28% of the countries surveyed in 1999 had a floating exchange rate policy (European Central Bank, 2001). Therefore, Friedman's floating exchange rate theory appears to be well-accepted.

Recent advocates of floating exchange rate regimes include economists: Maurice Obstfeld and Kenneth Rogoff. Obstfeld and Rogoff's 1995 paper, "The Mirage of Fixed Exchange Rates," describes the choice between fixed and flexible exchange rates as one that is becoming "moot." Obstfeld and Rogoff argue that only small tourist economies or oil

sheikdoms can institute a fixed exchange rate policy and that today's giant world powers would not be able to institute a credible exchange rate peg.

While much of the exchange rate debate focuses on either fixing the exchange rate system or letting it float, Guillermo Calvo and Frederic S. Mishkin in their paper, "The Mirage of Exchange Rate Regimes for Emerging Countries" (2003), believe that the question should center on institutional traits in the country. In particular, emerging markets have different traits than developed economies and should be examined carefully when deciding between a fixed or floating exchange rate policy. According to Calvo and Mishkin, the standard framework assumes the ability to set up institutions that assure a fixed exchange rate, presumes that a time-consistent choice is made on the exchange rate regime, and pays no consideration to transaction costs and liquidity considerations. It is evident that the standard model for deciding exchange rate policy has shortcomings and does not adequately help emerging market economies. To highlight some of the main issues confronting emerging markets, Calvo and Mishkin identify institutional features that are common for emerging markets: "weak fiscal, financial, and monetary institutions; currency substitution and liability dollarization; and vulnerability to sudden stops of outside capital flows." Proponents of fixed exchange rate regimes argue that this regime choice is particularly beneficial for emerging markets because it enables the country's currency to be tied to a nominal anchor and gives the economy some stabilization. Therefore, the exchange rate theory is far from over and is still debated. Just as Calvo and Mishkin state, "one exchange rate regime does not fit all (or always)."

The Theory of Optimal Currency Area

In contrast to Friedman's theory, Robert Mundell's 1961 paper, "A Theory of Optimal Currency Areas," argued that, ideally, economic similarity, not political boundaries, should define the geographic area spanned by a common currency. The principal advantage of an optimal currency area would be that it would decrease transaction costs. However, the greatest disadvantage of such a system would be the loss of the shock-absorber properties of flexible exchange rates and independent monetary policies. In this paper, Mundell advocated for a fixed exchange rate system between two countries as long as the countries were economically integrated and exhibited synchronized business cycles. He believed that:

the choice between fixed and floating depended on the sources of the shocks, whether real or nominal and the degree of capital mobility. In an open economy with capital mobility a floating exchange rate provides insulation against real shocks, such as a change in the demand for exports or in the terms of trade, whereas a fixed exchange rate was desirable in the case of nominal shocks such as a shift in money demand (Mundell, 1961).

Mundell is duly noted for several developments of exchange rate theory. According to Mundell, countries experience a trilemma in that they can only choose two of the three following goals: open capital markets, monetary policy independence, and pegged exchange rates (Figure 3). During the Bretton Woods System, the United States chose the fixed exchange rate and independent monetary policy and therefore, abandoned perfect capital mobility.

Mundell's theory of optimal currency area is the primary instrument used in this analysis to determine whether the U.S. and Europe's Economic and Monetary Union should engage in a stabilization of the euro-dollar exchange rate in the future.³ In Mundell's paper, "A Theory of Optimal Currency Areas" (1961), he argued against a system of national currencies connected by flexible exchange rates. The alternative that he developed was a system where currencies were not defined by national borders, but by geographic areas in which other criteria were high. An

³ The United States is often believed to be an optimal currency area. Some economists argue that the United States could be divided into the 12 Federal Reserve Districts and the dollar bills bearing the seals of the 12 regional banks can be viewed as 12 separate currencies. The fact that each dollar from the separate districts exchange for one another means that they have a permanently fixed exchange rate (Wynne, 1998).

optimal currency area (OCA) is defined as “a region for which it is optimal to have a single currency and a single monetary policy” (Frankel, 1999). Mundell encouraged fixed exchange rates between countries that had similar economic conditions and in which factor mobility was high. He developed four main criteria that must be met for a region to be an optimal currency area. The first criterion is that the countries involved should be exposed to similar sources of disturbances (common shocks). Next, the relative importance of these common shocks should be similar (symmetric shocks). The third criterion states that countries should have similar responses to common shocks (symmetric responses). Finally, if countries are affected by country-specific sources of disturbance (idiosyncratic shocks), they need to be able to adjust quickly. The basic idea behind OCA theory is that countries satisfying Mundell’s criteria would have similar economies, therefore a common monetary policy response would be optimal. A country should choose between a fixed and flexible exchange rate system on the basis of the economic characteristics of the regions. Just as Friedman was an advocate of flexible exchange rates and their advantages, Mundell believed that fixed exchange rates also had their advantages, especially when they were used between countries whose domestic financial markets were integrated. Some of the advantages associated with fixed exchange rates were that they reduced exchange rate risk, encouraged foreign trade and foreign investment, avoided competitive devaluation, and avoided speculative bubbles in the country’s currency. Each country should resolve its own tradeoff between fixed and flexible exchange rates.

Endogeneity Hypothesis vs. Specialization Hypothesis

When deciding whether or not a country should adopt a fixed or flexible exchange rate regime, the effects of each regime must be analyzed post-implementation. According to Figure 4,

any country which exhibits a high degree of economic integration and a high correlation of business cycles, would likely be above the OCA line and be a good candidate for a common currency (Anyanwu, 2002). In contrast, any country that falls below the OCA line, usually exhibiting a low degree of economic integration and a low correlation of business cycles, should float independently. This conventional view of optimal currency area theory has been analyzed in depth by economists such as: Paul Krugman, Barry Eichengreen, Tamim Bayoumi, Jeffrey Frankel and Andrew Rose. From these economists two opposing views developed regarding the costs and benefits from a fixed exchange rate regime and whether or not a country should adopt a common currency or freely float. Bayoumi and Eichengreen, in their paper, "Shocking Aspects of European Monetary Unification" (1993), and Krugman and Venables (1996) are advocates of the specialization hypothesis. According to Krugman's specialization hypothesis, a common currency reduces transaction costs, removes obstacles to trade, and encourages economies of scale (Krugman, 1993; Krugman and Venables, 1996). As countries become more integrated, they will specialize in producing goods and services where they have a competitive advantage (Berthola, 1993; Rauch, 1994; and Bayoumi and Eichengreen, 1996). As the participating countries in the currency union become more specialized, they will become more vulnerable to supply shocks and therefore, their business cycles will become less correlated. As evidenced in Figure 5, an increase in trade integration decreases the correlation of business cycles (incomes) and a country would move away from the OCA line, from point A to point B (Anyanwu, 2002). Therefore, a fixed exchange rate system may in fact increase specialization and make the participating countries worse currency partners.

A paradoxical argument is raised by Frankel and Rose (1998) who are proponents of the endogeneity hypothesis which states that a currency union increases trade integration and

correlation of incomes or business cycles. This positive relationship between economic integration and business cycles is rooted in the idea that “monetary integration reduces trading costs beyond the elimination of the costs from exchange rate volatility” (Anyanwu, 2002). Moreover, a commitment for a currency union is viewed as durable and will increase foreign direct investment and political integration. In turn, a country participating in a fixed exchange rate regime will benefit from reciprocal trade, economic and financial integration, and business cycle synchronization. As illustrated in Figure 6, countries which are initially at point C will likely move to point D once an economic union is implemented since a currency union will increase correlation of business cycles (Anyanwu, 2002). Business cycles will become more correlated among countries in a currency union because of the “increasing propensity for partner countries to import from each other, from productivity shocks spilling over via trade, or the disciplining effect of a monetary exchange rate arrangement” (Frankel and Rose, 1998). If the countries engaged in the economic union were to form a monetary union, this would further increase trade integration and correlation of business cycles, moving the countries from point D to point E in Figure 6. The opposing hypotheses on the correlation of business cycles and its relation to trade integration are still debated, proponents of fixed exchange rate regimes tend to follow Frankel and Rose’s (1998) endogeneity hypothesis and proponents of floating exchange rate regimes follow Krugman and Venable’s (1996) specialization hypothesis.

III ANALYSIS OF CURRENT ECONOMIC CONDITIONS

An Overview: The EMU and the Euro

Although Friedman's theory of floating exchange rates dominated the last thirty years for most developed economies, exchange rate stabilization and the eventual introduction of the euro in Europe in 1999 brought fixed exchange rates to the forefront of economic policy since the collapse of the Bretton Woods system. In a paper by Thomas Courchene and Richard Harris, "North American Monetary Union: Analytical Principles and Operational Guidelines" (2000), the authors argue that the advent of the euro signals both a "de-nationalization" of national currency regimes as well as a "progressively integrated global economy that emerged for supranational public good." Mundell recognized that his theory of optimal currency area was politically unfeasible because sovereign nations would never abandon their national currencies for a single currency. However, the introduction of the euro has proven that countries could abandon their national currencies yet maintain their national identities. For this reason, Mundell has been recognized as the "Father of the Euro."

In 1999, Europe's Economic and Monetary Union (EMU) composed of 12 countries adopted the euro as the national currency. The adoption of the euro was the last stage of the EMU's creation. The EMU is the second largest economic power in the world as of 2004 with a GDP of over \$7 trillion dollars only five years after the euro was introduced (Bernanke, 2004). This currency union was the elimination of a long integration process for the countries of Europe. Dating back to 1958, when the European Economic Union was founded in the Treaty of Rome, European countries were attempting to increase competition and decrease trade barriers to enable Europe to grow through trade. The establishment of the European Central Bank (ECB) in 1998 laid the groundwork for a single currency in 1999. Although the euro was introduced then, it was not a currency in circulation until January 2002. The value of the euro reflects a currency union in which the money is interchangeable between the 12 countries so that there is

no need to convert prices when trading. However, the value of the euro when it was initially introduced reflected the value of the basket of national currencies at their exchange rate at that given day. At introduction, the value was fixed by the European Council by a unanimous vote to prevent manipulation of exchange rates and to guarantee a fair and sound value of the euro for every country.

While the purchasing power of the euro was the same as that of the national currencies when divided by their respective exchange rates, a challenge that did confront these European nations was that of denationalization. By accepting the euro as a national currency and joining the EMU, a country would abandon its national currency. In order for the euro to be widely accepted and survive, the benefits of accepting the euro must outweigh the political, economic, and cultural costs of discarding the national currency.⁴ The success of the euro and its integration into the international realm means that the euro is here to stay. From 1999 to 2004, the average inflation rate of countries who have adopted the euro has been approximately 2% (European Central Bank, 2001). The euro is the second most actively traded currency in foreign exchange markets worldwide, accounting for 37% of foreign exchange transactions (European Central Bank, 2001). Initially, the euro experienced a low exchange rate (\$.87) in the first couple of months of circulation, but by 2002 the currency had made significant improvements and was valued at \$1.14 (European Central Bank, 2001). A mere five years after its introduction roughly 50 countries are utilizing the euro as an anchor or reference currency in their exchange rate policies. Not only is the euro recognized as stable currency, but it is challenging the U.S. dollar and the Japanese yen in international markets. The shares of the euro in international debt securities have increased to 31% from less than 20% before the launch of the euro (Ferguson,

⁴ For example, an economic cost associated with adopting the euro would be losing the ability to use monetary policy to respond to idiosyncratic shocks.

2004). In contrast, both the shares of the U.S. dollar and the Japanese yen have steadily decreased over the 1999 to 2004 time period from 47% to 44% and from 17% to 9%, respectively (Ferguson, 2004). Therefore, although the euro has only been in circulation for three years, it is as powerful a currency as the U.S. dollar or Japanese yen.

Some monetary economists believe that eventually there will be at most three common currencies worldwide; the dollar, the euro and possibly the yen. Other theorists predict that in the near future a single currency will dominate worldwide. Recently, Robert Mundell speculated about a world currency created by a monetary union of the U.S., the EMU, and Japan (Liesman, 2003). Three common currencies, and even more implausible, one common currency, may seem unrealistic. However, common currencies are expected to dominate and replace national currencies. Z.A. Spindler in his paper, "Public Choice Perspectives on Monetary Regimes" (2004), states that common currencies can emerge "either spontaneously, as with unofficial dollarization, or as a result of deliberate, national policy, as with official dollarization, the creation of the euro or institution of the more recently proposed amero." While the idea of a currency called "amero" may seem incredulous to the average American, there is even speculation that an internet-based cyber currency or cyber-money may emerge (Courchene and Harris, 2000) Therefore, the currency and exchange rate policy debate is far from over and may even be beginning to resurface as a result of the EMU.

Performance of the EMU and the Euro

Opponents of stabilizing foreign exchange rates often point to the lackluster performance of the Euro-Zone areas. The introduction of the euro among the 12 countries in Europe was ideally supposed to decrease transaction costs, increase trade, increase GDP, decrease inflation,

and decrease unemployment. However, when comparing such macroeconomic variables to competitor countries such as the United Kingdom and the United States, it becomes evident that Euro-Zone areas have not superseded other countries in macroeconomic performance, and have even significantly lagged other countries in some aspects. Table 1 reveals the macroeconomic performance of the Euro-Zone compared to the United Kingdom and United States from 1986 to 2001 across such variables as: GDP growth (%), Inflation (annual rate, %), Unemployment Rate (%), and Current Account Balance (% of GDP) (Talani, 2002). There are three main conclusions which can be drawn from this data. First, across all variables, the Euro-Zone's performance has appeared to be quite volatile and fluctuate dramatically. From 1986 to 1995, the Euro-Area's GDP growth decreased from 3.4% to 1.6%, only to rise again in 2000 to 3.4% and then to fall again in 2001 to 2.8% (Talani, 2002). This fluctuating performance is indicative of the other macroeconomic variables for this time period. Therefore, no time trend correlation exists. Second, the Euro-Zone with the united currency and stabilization policy does not exhibit causality with high performance. Proponents of fixed exchange rate policies have long held the belief that a stabilization policy directly correlates with higher GDP growth, lower inflation, and lower unemployment. As evidenced in Table 1, the Euro-Zone does have the highest GDP growth (2.8%), yet this GDP growth is not significantly higher than the United Kingdom's (2.7%) to conclude that a common currency is correlated with high GDP growth (Talani, 2002). In addition, the Euro-area has the highest unemployment rate (8.5%) which is significantly higher than the United States' and the United Kingdom's which are 4.6% and 5.3%, respectively (Talani, 2002). Likewise, the Euro-zone's inflation at 2.3% is not as low as the United Kingdom's which is at 1.8% (Talani, 2002). Thus, the fixed exchange rate regime followed by most countries in Europe has not appeared to act as a competitive advantage. However, the third

conclusion which can be drawn from this data is that although the Euro-zone has fluctuating performance and lags certain countries, there is some evidence that performance may be improving. In 1995, the Euro-zone's GDP growth was at 1.6% and in 2001 the GDP growth was at 2.8% (Talani, 2002). The Euro-area's inflation decreased from 3.7% in 1995 to 2.3% in 2001 (Talani, 2002). Finally, the Unemployment Rate decreased from 10.2% in 1995 to 8.5% in 2001 (Talani, 2002). Therefore, proponents of stabilizing exchange rates compare the Euro-zone to its past performance whereas opponents of fixed exchange rate regimes compare the Euro-zone's performance to other countries. From this analysis it becomes evident that even though 12 countries in Europe have united under a fixed monetary system, the success of the Euro-zone continues to be quite controversial.

The debatable success of Europe's Economic and Monetary Union may be a direct result of the countries participating in the currency union and their seemingly lack of optimality criteria. According to a paper by Martin Feldstein, "The European Central Bank and The Euro: The First Year" (2000), cyclical and inflation conditions vary significantly among the 12 participating countries such that a "one size fits all" monetary policy is not suitable. Feldstein (2000) analyzed the euro one year after its introduction and concludes:

The value of the euro has declined by about 15 percent during the year relative to the dollar and even more relative to the yen. The European economy remained weak and unemployment remained at more than twice the level in the United States. The counterproductive tax and social benefit policies, the excessive regulations, and the anti-business policies of the governments in both France and Germany have contributed to both of these poor measures of performance.

Although Feldstein's conclusion appears quite premature considering current knowledge in which the euro is in fact stronger than the U.S. dollar, Feldstein's theory is pertinent. The hype that surrounded the introduction of the euro as a "strong new player in the global economy" was somewhat thwarted by the depressing economic performance of the euro in 2000. Since the full success of the EMU and the euro is uncertain, opponents of currency unions argue that "the euro

is likely to have adverse medium-term and long-term effects on employment and inflation and is likely to be the source of political conflicts within Europe and between Europe and the United States” (Feldstein, 2000). The uncertain merit of the euro and the EMU is caused by the participating countries who some economists believe lack the essential optimality criteria as proposed by Mundell.

According to Feldstein, variations in demand, immobility of labor, and weighted averages of the European economy contributed to the depressing economic performance of the euro. In 1999, Spain, Portugal and Ireland experienced very strong demand while Germany and Italy had relatively weak demand. The result of these idiosyncratic shocks was extremely high inflation for Spain and Ireland which threatened their competitiveness and hindered their new-found prosperity. It is important to note that these strong variations in demand among the 12 participating countries in the EMU are not likely to subside. As a result of differing industrial composition and varying economic policies, disparities of demand will most likely persist among individual countries. Not only must demand shocks be symmetric for regions to be considered optimal currency areas, but mobility of labor must be high. Although the countries in Europe are geographically in close proximity, they reveal an immobility of labor due to barriers of language and custom. Finally, the European Central Bank conducts monetary policy for “Europe as a whole” and thereby, uses weighted averages of the European participating countries. While this monetary policy may be appropriate for France, Germany, and Italy since they have the largest GDPs, it would be inappropriate for countries such as Spain, Portugal, and Ireland. This ineffective monetary policy, which fails to adequately govern smaller economies, has caused the Maastricht inflation principle to become violated which states that “the inflation rate of each country must not exceed the average of the lowest three countries by more than 1.5%”

(Feldstein, 2000). Therefore, the controversial success of the EMU and the euro hinges on the notion that the participating countries may in fact not meet Mundell's Optimal Currency Area theory.

The Recent Behavior of the U.S. Dollar

Not only did the advent of the euro spurn interest in fixed exchange rate regimes and currency unions, but the depreciating U.S. dollar leads some to suspect a currency crisis is imminent. According to Mundell, the U.S. dollar's decline and the large current-account deficit are particularly worrisome:

The current-account deficit has been hovering around record levels, north of 5% of gross domestic product. In dollar terms, it's about half a trillion dollars annually, or about \$1,800 for every American. All of that adds up to our cumulative U.S. debt outstanding to the rest of the world. That was a problem in the 1980s, but it's worse now because in the '80s, the U.S. was a net creditor country and now it is a debtor country. The U.S. debt is something like \$3 trillion, almost 30% of gross domestic product. So this is a major problem, not immediately, and not this current cycle, but it's a problem people will be anticipating over the next few years. What it means is that as a percentage of GDP, it will be 35% next year, eventually 40% and then at some point it is an accident waiting to happen – a big international crisis (Liesman, 2003).

A crisis in the value of the dollar could lead to big changes in the international monetary system. While creating an optimal currency area among the U.S., the EMU, and Japan may be difficult, many proponents of optimal currency theory predict the U.S. and the EMU as greater optimal currency areas (Ferguson, 2004). In comparing the U.S. dollar to the euro from 2000 to 2004, exchange rates have been extremely volatile. Monthly average exchange rates have dipped as low as \$.86 per euro (2000, 2001) and as high as \$1.3047 per euro (Yahoo Finance, 2004). It is important to note that from 2000 to early 2002, the exchange rate between the dollar and the euro exhibited serial correlation and an estimated constant mean of approximately \$.90 per euro (Yahoo Finance, 2004). From the middle of 2002 to 2004, the data exhibits a time trend in which the exchange rate is steadily increasing. This is particularly worrisome for the United

States' economy because a depreciating dollar causes imports in Europe to increase in value and hence, become more expensive to Americans while exports to Europe decrease in value, and become less expensive to Europeans. A depreciating dollar increases U.S. exports abroad; however leaves the U.S. with a trade deficit.

The United States is not taking an active stance, with respect to the dollar's sharp decline, but a laissez-faire approach. In a *Financial Times* article, "Dollar Hits New Low vs. Euro," U.S. Treasury Secretary, John Snow, stated that coordinated action to stem the dollar's decline was still some way off even as the exchange rate dipped to \$1.3030 per euro (Ferguson, 2004). The bearish dollar is becoming a topic of great concern in foreign central banks which may reduce their holdings of U.S. Treasury bonds. According to an *Economist* article, "The Future of the Dollar: The Passing of the Buck," the dollar's share of global foreign-exchange reserves has already fallen from 80% in the mid-1970s to around 65% today. In order for a currency to become a reserve currency certain criteria must be met. The currency must have a large economy, low inflation, confidence in the value of the currency, and open and deep financial markets. The euro-area may be surpassing the United States as a reserve currency economy. Not only is the euro area's economy not that much smaller than America's, but the EMU is the world's biggest exporter and the EMU's financial markets have become very deep and liquid. Unlike the EMU which is a net creditor, the United States has become a net debtor. The main fear is that the debtor would use devaluation to reduce its deficit. Indeed, the heart of the issue lies in the profligate spending by the U.S. government which has led to a tremendous account deficit. As foreign central banks worry about the value of their dollar reserves, they may have to buy more and more dollars in order to maintain the current value of dollar assets. This increase in dollar assets only increases currency risks for foreign central banks who should be

diversifying their reserves; which could lead to the downfall of the dollar. According to the Department of Commerce, U.S. net foreign assets as a percentage of GDP has decreased dramatically from almost 10% in 1982 to approximately -30% in 2004 (Figure 7). Ultimately, the current-account deficit cannot be corrected by a fall in the dollar alone and other factors such as savings need to mitigate the deficit. A failure to cut the deficit will inevitably lead to a sharp decline in the dollar and a likely recession.

Mundell believes that the United States is not far from a stabilization of rates and can benefit from a number of advantages. Some advantages associated with a stabilization of the dollar and the euro would be: reduced transaction costs, enhanced competition, price transparency, lower real interest rates, and anti-inflation strategy by joint central banks. Although it is highly unlikely that the United States would abandon the national currency and adopt the euro, an important question is how far away is the United States from coordinating actions with the EMU to stabilize rates. Followers of the Friedman view believe that the United States is quite far from stabilizing rates whereas followers of the Mundell theory believe that a stabilization or coordination of sorts is in the near future. The analysis that follows tests this question and attempts to determine which group (Friedman vs. Mundell) is correct.

IV. EMPIRICAL STRATEGY / METHODOLOGY

To test the likelihood of stabilization in exchange rate regimes between the United States and Europe's Economic and Monetary Union, this study utilizes Professor Mundell's optimal currency area theory and the associated criteria. The basic idea behind OCA theory is that countries should coordinate policy or join currency unions with other countries that exhibit synchronized business cycles, a high degree of trade integration, and flexible factors of

production. The analysis investigates the correlation among certain OCA properties between Germany and France and the U.S. and the EMU during two time periods: Bretton Woods System (1946-1972) and Post-Bretton Woods (1973-2004). Although Germany and France have elected to join the EMU, the OCA criteria may not be satisfied. This study tests the OCA theory using France and Germany as benchmarks and compares the synchronization of their business cycles and overall economy to that of the United States' and the EMU's. The true test will be whether or not the economies between the U.S. and the EMU are synchronized enough (compared to France and Germany's) to be viewed as an optimal currency area.

Two different time periods are utilized to reveal if the economies have changed since the demise of Bretton Woods in such a way to make stabilization optimal. Germany and France were chosen as benchmarks because both of these countries were two of the founding members of the EMU and provided leadership in its development. By using the Inter-European economies of Germany and France as benchmarks for the U.S. / EMU economies, this study reveals which areas of the business cycle between the U.S. and EMU are coordinated and how far the U.S. is from abandoning its laissez-faire exchange rate policy to stabilize rates.

Optimal Currency Area Criteria / Properties

To determine the business cycle synchronization, degree of trade integration, flexibility of prices, and mobility of labor as a factor of production, six OCA properties are investigated. These properties include: degree of economic openness, trade integration and similarity of economic structures, financial market integration, price flexibility, and mobility of labor as a factor of production.

Degree of economic openness is one of the most important properties in this analysis. The higher the openness, the more the domestic rate of inflation is determined by the prices of internationally traded goods. Also, the higher the degree of openness, the less useful an independent exchange rate policy becomes to affect changes in relative prices and competitiveness. The degree of economic openness can be measured by the amount of exports and imports of goods and services as a percentage of GDP.

Not only must a high degree of trade exist between the two countries, but the trade must be integrated and the economic structures must be similar. If trade is integrated and economic structures are similar within a group of countries, these countries are less likely to be subject to asymmetric shocks and their business cycles are more likely to be synchronized. To measure trade integration between countries, this analysis measures the percentage share of France and Germany in the exports of the U.S. and compared it to the percentage share of the U.S. in the exports of France and Germany. The similarity of economic structures was measured using: Labor Force, percentage change in Labor Force, Unemployment Rate, and Employment Contribution among main sectors of production.

Financial market integration is important in the optimal currency theory because if assets can be transferred between countries, it can smooth the impact of idiosyncratic shocks. There are a number of ways to assess financial market integration. In this analysis financial market integration is measured by: Federal Funds Rate, and the percentage of GDP that constitutes Foreign Direct Investment.

Since the synchronization of business cycles is the basis for establishing an optimal currency area, this study includes this criterion in the analysis. When business cycles are

synchronized, there is less of a need for an independent monetary policy to smooth the cycles. Business cycle harmonization can be easily measured by GDP and percentage change of GDP.

When prices are flexible and can adjust quickly to idiosyncratic shocks, an independent monetary policy is less useful. To measure this criterion, prices and percentage change in prices (inflation) are analyzed.

Finally, mobility of labor as a factor of production is essential for a region to be recognized as an optimal currency area because the greater the mobility of labor between countries, the faster a country experiencing an idiosyncratic shock can adjust. The greater the mobility of labor, the less useful an independent exchange rate policy becomes. Mobility of labor is measured by the number of Europeans moving to the U.S. and the number of U.S. citizens moving to Europe.

V. EVIDENCE

Data Limitations

It is important to note that two time periods are used in this analysis (1946-1972) and (1973-2003), wherever possible. In some cases, information dating back past the 1970s is not retrievable, and therefore, only a (1970-2003) comparison can be made. In addition, some data on the EMU are not accessible; in this case a composite average of France and Germany's data are utilized as a substitute for the EMU. In this study, whenever the composite index of France and Germany are used in place of the EMU, no distinction is made and the index is just referred to as the EMU. This notation is used to make the analysis more clear and understandable.

However, the individual tables and figures do distinguish between purely EMU data and the composite index. The main sources of information in this study come from the *World Bank World Development Indicators*, *IMF Direction of Trade Statistics*, *IMF International Financial Statistics*, and the *Migration Information Source*, *Global Data* as well as other pertinent research papers and studies.

Assumptions

Since France and Germany were the founding members of the EMS which eventually became Europe's Economic and Monetary Union, it is essential to determine whether or not France and Germany satisfied Mundell's optimal currency area criteria. If France and Germany did satisfy all of these criteria they would exhibit predictable co-movements (high correlations) among business cycle characteristics (GDP, interest rates, and inflation), high degrees of trade integration, and high mobility of labor as a factor of production. If France and Germany satisfied any criterion, they would be utilized as a benchmark to compare the United States' economy to the EMU's. For all of the criteria that France and Germany did not satisfy, the United States and EMU would be analyzed comparatively against France and Germany.

The two time periods under study occurred during different exchange rate regimes for France and Germany. From (1946-1972) France and Germany's currencies were tied to the United States' dollar which was fixed to gold (Bretton Woods System). This fixed exchange rate regime would likely exhibit high correlations among business cycle characteristics, high degrees of trade integration, and high mobility of labor as a factor of production. From (1973-2003), France and Germany experienced varying regimes. As early as the 1960s, thoughts about a currency union between European countries became relevant. Although from 1973 to 1978,

France and Germany were under independent exchange rate regimes, for all intended purposes, they seem to have been under a fixed regime since in 1978 the French franc was tied to the German mark and ever since these currencies have been under a stabilized monetary policy. Therefore, two hypotheses can be purported. First, France and Germany should have exhibited high correlations in terms of macroeconomic performance (OCA criteria) from (1946-1972) in order for the countries to satisfy Mundell's criteria and create a currency union which began as early as the 1960s. Second, since these countries were officially tied together in 1978, the correlation between their economies should be greater from the (1973-2003) time period than for the (1946-1972) time period. Guided by the widely-accepted endogeneity hypothesis (Frankel and Rose, 1998) which purports that a monetary or currency union exhibits higher degrees of correlation across business cycles than merely an economic union, a higher correlation from (1973-2003) for France and Germany would appear more likely since during this period these countries engaged in a more disciplined monetary exchange rate arrangement.

If France and Germany met all of the six criteria proposed by Mundell, they would constitute an optimal currency area and the United States would be compared to the EMU from (1973-2003) utilizing the criteria France and Germany fulfilled. If France and Germany did not fulfill a criterion, these countries would be deemed inadequate for an optimal currency area and a different benchmark would have to be utilized for the United States and the EMU. For business cycle characteristics which includes: GDP, percentage changes in GDP, interest rates, and inflation rates, a concrete benchmark can be utilized instead of merely the comparative approach. Based on a study conducted by Clark and van Wincoop, in their paper, "Borders and Business Cycles" (1999), international and intra-national borders are analyzed to determine the effects of trade. According to Clark and van Wincoop, "intra-national business cycle correlations

approximate 0.70 for regions within countries.” Since under an optimal currency area, countries under one monetary authority can be regarded as regions within a country, it can be argued that countries within an optimal currency area should have business cycle characteristics that are correlated at least 70% of the time. When analyzing business cycle properties, if France and Germany’s business cycle properties had a correlation of 0.70 or greater for the time period (1973-2003), they could be utilized as the benchmark for the United States and the EMU for the same time period. If France and Germany’s business cycle characteristics were not correlated at least 70% of the time, the United States would use Clark and van Wincoop’s 0.70 benchmark. For the criteria which do not fall under business cycle characteristics, a comparative approach is utilized in which trends and plots of data are evaluated using France / Germany data and U.S. / EMU data from 1973 to 2003.

Finally, this analysis studies two time periods to determine the validity of the endogeneity hypothesis (Frankel and Rose, 1998) and the specialization hypothesis (Krugman and Venables, 1996). Two important assumptions are made in this paper. First, it is assumed that France and Germany’s currency union was a more disciplined exchange rate policy than the Bretton Woods system. This is mainly because in 1978 the French franc was pegged to the Deutsche mark while under the Bretton Woods system, some fluctuation of exchange rates was allowed. Second, it is assumed that the United States, unlike France and Germany, participated in greater monetary independence Post-Bretton Woods (1973). Therefore, if the business cycle synchronization of France and Germany increased from (1946-1972) to (1973-2003) this is evidence of the endogeneity hypothesis (increased trade integration from a more stringent exchange rate policy increases business cycle synchronization). Likewise, if the business cycles of France and Germany decreased from (1946-1972) to (1973-2003), this is evidence of the specialization

hypothesis. For the United States, the opposite is true. An increase in business cycle synchronization between the United States and the EMU would be evidence of the specialization hypothesis and a decrease in business cycle synchronization would be evidence of the endogeneity hypothesis.

Degree of Economic Openness

One of the primary benefits of a currency union is enhanced trade integration between countries. Two regions of the same country trade significantly more with each other than if an international border were to separate them. Anderson and van Wincoop (2001) estimate that the presence of an international border reduces trade among industrialized countries by 30%. Even when there are no explicit trade restrictions in place, national borders tend to be associated with different currencies. The elimination of border costs by having a single currency such as the euro might have a positive and significant effect on trade between countries. In a model by Alesina and Barro (2002), it is determined that the adoption of a common currency reduces trading costs between two countries such that under reasonable assumptions about elasticities of substitution between goods, countries that already have existing trade relations benefit from a currency union. Utilizing this model, Alesina and Barro (2002) conclude:

Countries that trade more with each other stand to gain more from adopting the same currency. Also, smaller countries should, *ceteris paribus*, be more inclined to give up their currencies. Hence, as the number of countries increases (and their average size shrinks), the number of currencies in the world should increase less than proportionately.

Consistent with these findings, France and Germany's creation of the EMS in 1978 followed by the official establishment of the EMU significantly increased trade for Europe as compared to the United States. In order to measure the increased trade from the adoption of the euro, this

analysis utilized the degree of economic openness or the percentage of GDP that was comprised of exports and imports.

Although trade was not extremely high among the United States, France, and Germany in the (1946-1972) time period, it increased substantially for France and Germany Post-Bretton Woods. As evidenced in Table 2, the average degree of economic openness or percentage GDP comprised of exports and imports for the United States, France, and Germany from 1946 to 1972 was approximately 7.1%, 4.9%, and 7.8%, respectively. During the Bretton Woods system, the United States' degree of economic openness appeared to be in line with the Inter-European countries. However, the time period (1973-2003) tells a somewhat different story. Table 2 and Figure 8 reveal the shocking changes in the degrees of economic openness between the Inter-European economies and the United States. France and Germany's degree of economic openness averaged 65.1% and 23.6% from 1973 to 2003, respectively. While the United States' degree of economic openness increased during this period as well, it remained at a relatively low level comparatively, 15.9%. The United States' low degree of economic openness is evident in Figure 8 in which the U.S. data is plotted against the EMU data. The large spread between the degrees of economic openness of the U.S. and the EMU indicate that the United States does not rely on exports and imports nearly as much as the European countries do to warrant a system of fixed exchange rates.

Trade Integration and Similarity of Economic Structure

Just as the degree of economic openness measures the percentage of a country's gross domestic product that is comprised of exports and imports, trade integration measures the percentage of one country's exports in the imports of the other country. Therefore, trade

integration is a more specific measure of economic openness since it segments a country's imports. This OCA property, trade integration and similarity of economic structure, seeks to determine the exact country or countries that have high trade integration and similar economic structures to benefit from a currency union. Countries that trade more benefit from currency unions because a common currency reduces transaction costs, diminishes the risk of exchange rate fluctuations, increases bilateral trade, and subjects the participating countries to greater symmetric shocks and therefore, more synchronized economies. According to the "gravity model" of trade, countries that trade more have a greater benefit from adopting a common currency because trade tends to raise the co-movements of outputs and prices. The gravity model states that "bilateral trade volumes are well explained by a set of geographical and economic variables, such as the distance between the two countries, and the sizes and incomes of the countries" (Alesina and Barro, 2002). Trade integration will be measured by the percentage of one country's exports in the imports of the other country and similarity of economic structures will be measured using the total labor force, unemployment rate, and the percentage of employment among main sectors of production.

Similar to the degree of economic openness which increased for all countries under study during the two time periods, trade integration increased as well. Data on this criterion was mainly gathered from the *IMF Direction of Trade Statistics*. According to Table 3, the percentage of Germany's imports from France increased from an average of 10.4% (1946-1972) to an average of 12.2% (1973-2003). The percentage of France's imports from Germany increased from an average of 12.9% (1946-1972) to an average of 16.7% (1973-2003). The percentage of France and Germany's imports from the United States decreased from an average of 8.5% (1946-1972) to an average of 5.6% (1973-2003). Finally, the percentage of United

States' imports from France and Germany increased from 6.6% (1946-1972) to 7.4% (1973-2003). Not only does this data suggest that France and Germany are more highly integrated economies in terms of trade than the United States is with the EMU, but Figures 9 and 10 indicate that the United States does not trade as extensively with the European countries as the European countries do with each other. It is important to note that trade is an integral element of the United States economy and the increased globalization of the U.S. economy, particularly with the Asian economies of China and Japan, may mean that France and Germany only constitute a small percentage of exports and imports. More convincing is Figure 10 which plots the trend lines for France, Germany, and the United States in terms of trade integration. Although all the trend lines follow relatively similar patterns, with sharp increases in the late 1970s, France and Germany's trend lines are significantly higher than the United States'. Ultimately, the United States does not share a substantial enough amount of imports and exports with the EMU to qualify for this criterion of optimality.

Equally as important as trade, economic structures between optimal currency areas must be similar in order for countries to respond symmetrically to similar sources of disturbances (common shocks). To analyze economic structures across various countries three measures will be utilized: total labor force, unemployment rates, and percentage of total labor force employed in agriculture, industry, and services.

Total labor force numbers were extracted from the *World Bank's World Development Indicators* and only date back to 1960. 1960 to 1972 are utilized as the Bretton Woods system. Table 4 reveals the labor force trends for the United States, France, Germany and the EMU. As depicted in Figure 11, the total labor force between France and Germany varies slightly. From 1973 to 2002, both France and Germany exhibit a positive trend line in which total labor force

increases steadily. However, Germany's total labor force appears to be just shy of doubling France's. In contrast, the United States and the EMU have a virtually identical labor force amount. From 1973 to 2002, both the United States and the EMU exhibit a steadily increasing labor force. The United States' labor force increases at a steeper rate and actually converges with the EMU's in 1997. Therefore, the United States and the EMU have fulfilled the criterion associated with labor force for similarity of economic structure.

Economic structure is not just limited to labor force, but also includes the unemployment rate. For two or more countries to be considered optimal currency areas it is important that they have similar unemployment rates. If two countries participated in a single monetary union, however they had vastly different unemployment rates, the monetary union's anti-inflationary policies would affect the country with higher unemployment rates more adversely than it would affect the other country. The magnitudes of a monetary policy may vary to such an extent that the two countries may suffer from asymmetric shocks. In this paper, unemployment rates were found from the *IMF Financial Statistics*. According to Table 5, the average unemployment rate from 1973 to 2003 for France, Germany, the United States, and the EMU are: 6.3%, 8.6%, 5.8%, and 10.6%, respectively. Although no country's unemployment rate is drastically out of line, it is important to note the spread between unemployment rates. Figure 12 reveals the unemployment rate spread. While the unemployment rate spread is 2.8% between France and Germany, it is 4.3% between the United States and the EMU. This 35% increase in unemployment rate spread is large enough for either the United States or the EMU to be adversely affected by a single monetary authority's policy regimes. Therefore, the United States does not fulfill this criterion.

The last metric utilized in this analysis of similarity of economic structure was the percentage of employment among main sectors of production, agriculture, industry, and services. Table 6 and Figure 13 reveal the trends in employment among the United States, France, Germany, and the EMU. In terms of employment in agriculture, France and Germany were more highly involved in agriculture than the United States. Although the U.S. and the EMU share similar agricultural employment trends (decreasing and negative relationship) after 1991, the EMU has significantly more employment in agriculture than the United States. In terms of employment in industry, both France and Germany and the United States and the EMU share a slightly decreasing trend. Finally, employment in services is virtually identical across all analyzed countries. France, Germany, the United States, and the EMU have positive and increasing employment in the service sector. Therefore, the United States and the EMU appear to satisfy some, but not all, of the trade integration and similarity of economic structure properties. France and Germany are definitely closer to fulfilling this OCA criterion than the United States and the EMU are.

Financial Market Integration

A study conducted in March 2001, “Financial Market Integration in Europe: On the Effects of the EMU on Stock Markets,” the European Central Bank analyzed the degree and nature of integration in European equity markets and the extent to which the EMU contributed to the financial integration process. The results of this paper indicate that “the degree of financial integration has been highly volatile over the years, but the reduced exchange rate uncertainty as well as monetary policy convergence of interest rates and inflation rates have been the driving force behind the financial integration process in Europe” (European Central Bank, 2001).

Although financial market integration has increased market efficiency and competition, it has also led the participating countries in the EMU to become increasingly interdependent. The European Central Bank concludes that the financial market integration in the EMU may require security market overseers to adopt a Euro-area-wide-approach.

The data collected in this study corroborate the findings of the European Central Bank. Two metrics were utilized: the Federal Funds Rate and the percentage of GDP that is comprised of Foreign Direct Investment. This data was gathered from the *World Bank, World Development Indicators* and the *IMF Financial Statistics*. The Federal Funds Rate, the interest rate on overnight loans between banks, was utilized instead of the discount rate or interest rate because more data was available on it for a longer period of time. Since the Federal Funds Rate closely tracks the interest rate and discount rate, it is an indicator to some degree of both business cycle synchronization and financial market integration. Table 7 reveals the discount rates compared to the Federal Funds Rate from 1970 to 1998 (Bianco, 1999). While in most years the discount rate and Federal Funds Rate differ, they have similar co-movements in that as one rate increases, so does the other. Since the Federal Funds Rate is also a measure of business cycle synchronization it will be analyzed in a similar fashion. Utilizing Clarke and van Wincoop's benchmark of 0.70 as the correlation coefficient, this analysis tests whether or not France and Germany's correlation of Fed Funds Rates are equal to or greater than 0.70 for the (1973-2003) period. If they satisfy this benchmark, they will be regarded as an optimal currency area and the United States and EMU will utilize France and Germany's correlation coefficient as the benchmark. If France and Germany do not satisfy this criterion, the United States and the EMU will utilize the 0.70 benchmark.

In a general sense, the United States, France, and Germany all exhibit similar trends from 1946 to 2003. All three countries experience increases in Federal Funds Rates from the (1946-1972) time period to the (1973-2003) time period. According to Table 8, the United States' Federal Funds Rate increased from 3.9% to 7.1%, France's Federal Funds Rate increased from 4.71% to 8.95%, and Germany's Federal Funds Rate increased from 4.1% to 5.6%. Upon closer examination of France and Germany, two important conclusions can be made. First, France and Germany do appear to satisfy Clarke and van Wincoop's correlation benchmark of 0.70. Table 9 indicates that France and Germany experienced predictable co-movements between Federal Funds Rates 73.5% of the time between 1973 to 2003. This high correlation suggests that France and Germany has satisfied this specific measure of financial market integration. Second, it is important to note that France and Germany have not always experienced such highly correlated Federal Funds Rates. From 1946 to 1972, France and Germany exhibited virtually a 0 correlation. Since Frankel and Rose's (1998) research purport that monetary or currency unions should be closer to OCA than merely economic unions, the disciplined monetary union that France and Germany participated in for most of the time period of 1973 to 2003 should have higher correlations than from 1946 to 1972. The data in this analysis supports Frankel and Rose's findings and is consistent with the endogeneity hypothesis. Therefore, France and Germany fulfilled the OCA property of financial market integration based on Federal Funds Rate and their history supports the endogeneity hypothesis in which the increase in trade integration from an instituted currency union increases the correlation of incomes or business cycles among the participating countries.

Although the United States' Federal Funds Rate shows an increasing trend from 1946 to 2003, upon a closer analysis the United States has moved further from OCA from 1946 to 2003.

According to Figure 14, while France and Germany became more highly correlated from (1946-1972) to (1973-2003), the United States became increasingly less correlated with France and Germany. From 1946 to 1972, the United States exhibited a 0.85 correlation with France and Germany. This high correlation coefficient is most likely a direct result of the Bretton Woods system of fixed exchange rates. From 1973 to 2003, the United States exhibits a -0.38 correlation with the EMU. Therefore, the United States does not fulfill an optimal currency area with the EMU because, utilizing France and Germany as a benchmark, the correlation of -0.38 is significantly less than the required 0.735. Although the United States failed to meet this OCA criterion of financial market integration based on Federal Funds Rates, it too supports the endogeneity hypothesis. While France and Germany's correlation of incomes or business cycles increased as a result of their more disciplined economic union in the latter time period, the United States' correlation of incomes or business cycles with the EMU decreased as a result of the United States' independent float.

The second metric used to test financial market integration was the percentage of GDP that constitutes foreign direct investment. In a study on exchange rate regimes and foreign direct investment, K. Niles Russ (2002) stated that uncertainty in exchange rates presents two risks for a foreign firm investing in another country. The first is a "direct risk that a depreciation of the home currency will cause a net loss if the fixed cost is paid before monetary shocks occur." And the second risk is in a "downward movement in the home country of the money supply which may cause a negative demand shock to sales in the home market, causing a net loss" (Russ, 2002). Since foreign direct investment as a percentage of GDP is a measure of how extensively two economies are joined together, the higher the constitution of foreign direct investment in GDP, the more successful a fixed exchange rate system becomes. Table 10 reveals the data

collected for the United States, France, Germany, and the EMU on foreign direct investment. It is important to note that data was only available as far back as 1970; therefore no comparison can be made between the two time periods under study. However, a number of deductions can be inferred. First, France, Germany, and the EMU have a similar percentage of foreign direct investment in relation to GDP at 3.6%, 2.3%, and 2.6%, respectively. The United States appears to lag behind with only 0.1% of its GDP comprised of foreign direct investment. Therefore, for all countries under analysis, the countries exhibit a small percentage of foreign direct investment, and the United States appears to have the lowest.

Although the evidence on foreign direct investment alone is not very convincing, the correlation of foreign direct investment is extremely in favor of financial market integration. According to Table 11 and Figure 15, the United States, France, Germany, and the EMU share predictable co-movements in terms of foreign direct investment. While France and Germany have an extremely high correlation of foreign direct investment trends at 0.95, the United States has a significant correlation of foreign direct investment with the EMU at 0.87 as well. In addition, Figure 15 is extremely convincing of the high degree of financial market integration in terms of foreign direct investment between France and Germany. France and Germany's percentages of GDP that is foreign direct investment seemingly mirror each other.

Evidently, the data appears to be perplexing. On one hand, France, Germany, and the United States have a very low percentage of GDP that is foreign direct investment (averaging less than 3.6%). On the other hand, France, Germany, and the United States all have high correlations among foreign direct investment. It is important to evaluate trends in foreign direct investment. According to Table 10, France's percentage of GDP that is foreign direct investment increased from 0.8% in 1975 to 16.6% in 2000, Germany's increased from 1.0% in 1971 to

15.1% in 2000. However, the United States' percentage of GDP that constitutes foreign direct investment did not increase as substantially. In 1970, the United States had 0.8% of foreign direct investment while in 1999 it had 6.1%. France and Germany's significant increase in foreign direct investment over the past thirty years could be a result of the monetary union pursued by these countries and the United States' mediocre increase in foreign direct investment could be attributed to its floating exchange rate regime. In either case, France and Germany are more highly correlated in terms of foreign direct investment, have higher percentages of foreign direct investment, and show a substantial increase in foreign direct investment over time when compared to the United States. This evidence indicates that France and Germany seemingly satisfy the OCA criterion of foreign direct investment while the United States is less likely to.

This analysis on financial market integration among the United States, France, Germany, and the EMU has important conclusions. Utilizing a strict benchmark proposed by Clarke and van Wincoop, France and Germany exhibit synchronizations between Federal Funds Rates whereas the United States does not. Although the data and analysis on FDI as a percentage of GDP is not as scientific, on a comparative basis the United States does not appear to be as integrated with the EMU as France does with Germany to warrant an optimal currency area. Therefore, France and Germany have fulfilled the OCA criterion of financial market integration when comparing these countries to the United States and the EMU.

Synchronization of Business Cycles

Business cycle synchronization is the key criterion of the OCA theory. According to this theory, "if the business cycles of two countries are highly synchronized or exposed to symmetric shocks and exhibit similar responses to these shocks a common monetary policy response does

not introduce imbalances between them” (Mundell, 1961). The higher the symmetry is between shocks, the lower the cost of sharing a common monetary policy. Since GDP increased over time for the United States, the EMU, France, and Germany, this analysis utilizes the percentage change in GDP as the basis for correlation. Utilizing Clarke and van Wincoop’s benchmark of 0.70 as the correlation coefficient, this analysis tests whether or not France and Germany’s correlation of percentage changes in GDP are equal to or greater than 0.70 for the (1973-2003) period. If they satisfy this benchmark, they will be regarded as an optimal currency area and the United States and EMU will utilize France and Germany’s correlation coefficient as the benchmark. If France and Germany do not satisfy this criterion, the United States and the EMU will utilize the 0.70 benchmark.

Table 12 reveals this increasing trend in GDP growth from 1946 to 2003. From 1946 to 2003, the average GDP for the United States increased nine-fold, the average GDP for France increased 14 times, the average GDP for Germany increased 7 times, and the average GDP for the EMU increased 5 times. Since all countries are likely to experience an increase in GDP, the percentage change in GDP was utilized in this analysis. Table 13 indicates the correlation trend. From 1973 to 2003, France and Germany exhibited a low correlation between the percentage changes in their GDPs. A correlation of 0.32 purports that only 32% of the time did France’s change in GDP share a predictable co-movement with Germany’s. Interestingly, France and Germany’s percentage change in GDP were more highly correlated during the (1946-1973) time period exhibiting a correlation of 0.57. While this data shows that France and Germany did not satisfy the 0.70 hurdle rate in either period, it does reveal that France and Germany may be experiencing idiosyncratic shocks or may be responding asymmetrically to common shocks. Either way the business cycles of France and Germany have become less synchronized and

moved these countries farther from the OCA line. This evidence opposes the endogeneity hypothesis proposed by Frankel and Rose. During most of the time period of 1973 to 2003, France and Germany, specifically, pegged their currencies to each other and went even further to adopt the euro in January of 1999. This suggests that the monetary or currency union implemented from 1973 to 2003 was a more stringent and disciplined approach than the economic union of the Bretton Woods system. A more disciplined monetary arrangement, according to the endogeneity hypothesis, means that the economies of France and Germany should have become more synchronized in the latter time period. The fact that they decrease in business cycle synchronization supports Krugman and Venable's (1996) specialization hypothesis. Finally, France and Germany's correlation between percentage changes in GDP cannot be utilized when comparing the United States to the EMU since 0.32 is significantly less than 0.70.

Since France and Germany have not fulfilled this OCA criterion, an alternative benchmark of 0.70 must be utilized. From Table 13 and Figure 16 it becomes quite evident that the United States is just shy of meeting this property. With a correlation of 0.66 or 66.0%, the United States' percentage change in GDP follows the EMU's by only 66.0%. This correlation does not satisfy the hurdle rate proposed by Clark and van Wincoop. However, two important observations can be drawn from this analysis. First, the correlation between percentage changes in GDP has increased substantially from the time period (1946-1972) to the time period (1973-2003). From 1946 to 1972, the United States exhibited a mere 0.39 correlation with the EMU while from 1973 to 2003, the United States exhibited a significant 0.66 correlation with the EMU. This is counterintuitive considering that from 1946 to 1972, the United States was engaged in an economic union under the Bretton Woods system with European countries while from 1973 to

2003, the United States participated in an independent exchange rate regime. Second, the United States is currently more highly correlated with the EMU than the Inter-European countries of France and Germany are with each other. This is further evidence in support of the specialization hypothesis in which a fixed exchange rate policy and increased trade integration is associated with a decrease in business cycle synchronization while a floating exchange rate policy and decreased trade integration is associated with an increase in business cycle synchronization. Therefore, the United States does not fulfill Mundell's optimal currency area criterion based on business cycle synchronization and evidence suggests that if the United States does not engage in a monetary union with the EMU, the United States will continue to increase its synchronization with the EMU.

Price Flexibility

An essential adjustment mechanism for a country experiencing an idiosyncratic shock would be price flexibility. If a region within a currency area experiences an asymmetric shock, one way of adjusting would be to reduce nominal prices. Thus, "price level inertia" or the degree of "stickiness" of nominal prices is a measure of business cycle synchronization. Interestingly, the Commission (1990) estimated that prices are more sticky in the EU than in the United States, "in the event of a 1% price rise, it would take a similar rise in EU unemployment to prevent a rise in wages, but only a tenth of that in the U.S." Research (Vaubel 1976 and 1978; De Grauwe and Vanhavebeke 1993; von Hagen and Neumann 1994) states that "real wage and price levels tend to fluctuate less between regions *within* a currency area than *between* currency areas." Although this finding seems unlikely, there are many viable explanations. The simplest explanation is that regions within a currency area are hopefully optimal currency areas and

therefore, do not experience asymmetric shocks. If these regions do experience asymmetric shocks, the low responsiveness of prices may be a result of other adjustment mechanisms working. Prices and percentage changes in prices from the *Consumer Price Index* were utilized to determine the degree of price stickiness and price flexibility. Since the percentage changes in prices (inflation) can be regarded as an element of business cycle synchronization, Clarke and van Wincoop's benchmark of 0.70 as the correlation benchmark is utilized. The following analysis tests whether or not France and Germany's correlation of percentage changes in prices is equal to or greater than 0.70 for the (1973-2003) period. If they satisfy this benchmark, they are regarded as having an adequate price adjustment mechanism and the United States and EMU will utilize France and Germany's correlation coefficient as the benchmark. If France and Germany do not satisfy this criterion, the United States and the EMU will utilize the 0.70 benchmark.

Since the United States, France, and Germany all experienced increasing prices from (1946-1972) to (1973-2003), percentage changes in prices were utilized as a more accurate measure in this analysis (Figure 17). The correlation of inflation rates for France and Germany from 1973 to 2003 was approximately 0.26 according to Tables 14 and 15. Although this is an increase in price flexibility from the (1946-1972) time period (0.02), it is still relatively low and does not fulfill the benchmark established by Clarke and van Wincoop. In contrast, the United States' correlation of price flexibility with the EMU from 1973 to 2003 was roughly 0.51. Although this higher correlation suggests that the United States shares greater co-movements with the EMU in terms of prices than the Inter-European economies do, the correlation is too low to warrant an optimal currency area (it is less than 0.70). Therefore, neither France and Germany, nor the United States and the EMU qualify as optimal currency areas because their changes in prices do not move together.

Not only do the price changes not move together sufficiently, but price flexibility appears to be limited. Price stickiness appears to dominate in virtually all areas. The country with the highest price flexibility for the (1973-2003) time period is Germany with an average price change of 10.4%. Germany's fluctuating price levels are depicted in Figure 17. The United States' average price flexibility for the (1973-2003) time period is approximately half of Germany's (at 4.5%). Two important conclusions can be drawn from this analysis. First, France and Germany do not have extremely flexible prices which may result from the workings of other adjustment mechanisms such as mobility of labor or changes in wages and unemployment. Second, the United States' price levels are stickier than France and Germany's and does not fulfill this OCA property.

Mobility of Labor as a Factor of Production

In order for a region to become an optimal currency area it must have certain adjustment mechanisms to cushion the affects of asymmetric shocks other than reducing nominal prices. Mobility of labor as a factor of production can play an important and even dominant role as an adjustment mechanism. Recent research has concluded two main findings in regards to European migration versus United States migration. First, labor mobility is generally lower in European countries than in the United States. Piracha and Vickerman (2002) estimate that "the mobility levels in the U.S. are on average six times greater than in the United States." Second, labor mobility across European countries was found to be lower than the one within countries. According to a study conducted by De Grauwe and Vanhavebeke (1991), "the yearly flow of migrants among several Western European countries is less than 10 percent when compared with interregional migration." In a study by Puhani (1999), the elasticity of migration was estimated

with respect to changes in unemployment and income. Puhani utilized regional panel data for three European countries: Germany, France, and Italy and concluded that “labor mobility is highest in Germany, but even here it would take at least four years until more than half of a shock of unemployment is accommodated by migration.” Therefore, labor mobility is seen as a somewhat insufficient adjustment mechanism to absorb idiosyncratic shocks in the EMU. More convincingly, Decressin and Fatas (1995) researched 51 U.S. states and 51 EU regions from 1975 to 1990 and analyzed a region specific employment shock in the short-run. This research indicates that the employment shock is absorbed in vastly different ways in the United States and in Europe:

In the United States, the migration between regions acts as an absorber, while in Europe the participation rate is the absorber. More exactly, inside EU a negligible proportion of the labor demand shock is absorbed by migration throughout one year after the shock occurred while for the U.S. after one year the proportion is 52 percent (Decressin and Fatas, 1995).

While this research seems surprising, it supports the data gathered in this analysis. The data was gathered from *Migration Source, Global Data* and measures the net number of migrants over five year intervals from 1950 to 2000. As evidenced in Table 16 and Figure 18, the United States has had vastly different migration patterns than France, Germany and the EMU. While the average number of migrants over five years increased by roughly 188% from (1950-1970) to (1970-2000) for the United States, the average number of migrants over five years decreased by approximately 60% for France. In Germany, the average number of migrants over five years increased, but only by about 64%. Since data on migration was not available for the EMU over this long a period of time, a composite index of France and Germany was utilized. However, since France and Germany exhibited vastly different migration trends, the composite index represents more of a mean between two extremes and cannot be utilized. From this analysis and current economic research it becomes evident that the mobility of labor may not be as elastic for

the EMU as it is for the United States. The United States apparently does fulfill the OCA property for mobility of labor with the EMU.

This conclusion is surprising considering the close proximity and geography of the Inter-European countries under study; however, it is not a novel finding. Recent research indicates that the elasticity of migration is a product of wages and unemployment. Just as high wages favor immigration, high unemployment rates increase emigration. Not only are unemployment shocks absorbed differently between European countries and the United States, but there are a variety of features of labor markets in Europe which make migration difficult. In a speech on Europe's Economic and Monetary Union by Mark Wynne, senior economist and assistant vice president at the Federal Reserve Bank of Dallas, he states, "various languages, cultural differences, and the lack of a large central government make transfers to distressed regions difficult and impede the absorption of transitory shocks." Although the United States does not share a common language or culture with the EMU, its high mobility of labor between Europe indicate that if it joined with the EMU to create a currency union, migration may play an important role in cushioning shocks.

VI. CONCLUSIONS

Main Hypothesis to be Tested

Just as Milton Friedman's idea of independent exchange rates became widely-accepted and the U.S. stock market hit all time highs in the late 1990s, the introduction of the euro in 1999 combined with the currently outrageous budget deficits and weakening dollar have again brought

the theory of optimal currency area and fixed exchange rate regimes to the forefront of economic debate. What was once thought of as unthinkable, today many economists fear will become a reality; that the U.S. dollar will lose its dominant currency reserve status to the euro as a result of American policies. This is not the first time international reserve currencies have been replaced. “Over the past 2,000 years, the leading international currency has changed many times, from the Roman denarius via the Byzantine solidus to the Dutch guilder and then to sterling” (“The Future of the Dollar: The Passing of the Buck, 2004). The United States has benefited greatly over the past sixty years in which the dollar has existed as the leading international currency. In the wake of the declining dollar, the United States may consider pegging its currency to the euro in an effort to decrease exchange rate uncertainty, increase trade, decrease inflation, and decrease unemployment. The impact of trade cannot be underestimated. According to an article in the *Economist*, “Trade’s Bounty” (2004), economists estimated that “the American economy is roughly \$1 trillion a year better off thanks to ‘global integration.’ That means about \$9,000 of extra income for each American household.”

While trade has taken an increasingly important role in global economies and a fixed exchange rate system is likely to increase trade and stimulate economic growth, not all areas are optimal for a monetary union. By utilizing Robert Mundell’s optimal currency criteria, two conclusions have been inferred through this analysis. In some cases France and Germany could not be utilized as benchmarks for the United States and the EMU because they, as founding members of the EMS and EMU, did not satisfy optimality. Second, the United States appears to be farther from optimality than France and Germany are currently.

France and Germany as an Optimal Currency Area

The idea that France and Germany are not an optimal currency area has been proposed by many economists. In fact, Bayoumi and Eichengreen (1993) even went so far as to suggest that the United States and the EMU are more correlated than the Inter-European economies of Europe. The stunted performance of the euro and EMU after its immediate introduction may be a direct result of this lack of synchronization across European economies. From the analysis undertaken in this study, France and Germany fulfilled some, but not all, of the optimality criteria to be deemed an OCA region by Mundell. Table 17 reveals a synopsis of the results. According to this research, on a comparative basis from 1973 to 2003, France and Germany satisfied the following properties: degree of economic openness, trade integration and similarity of economic structure, and financial market integration. These countries did not fulfill business cycle synchronization, price flexibility, and mobility of labor as a factor of production. Not only have France and Germany failed to meet key adjustment mechanisms for a currency union, but it is unlikely that they will satisfy these criteria in the near future. Specifically, price flexibility and mobility of labor appear to be problematic areas for Inter-European economies. The stickiness of prices and the lack of migration that prevails within Europe's Economic and Monetary Union indicate that it may be a while before France and Germany actually meet optimality. Although the EMU has not suffered drastically poor macroeconomic performance as a result of a lack of synchronization, its thwarted growth is most likely a result of asymmetric shocks affecting certain countries and a lack of proper adjustment mechanisms.

Stabilization between the United States and EMU

Consistent with conjecture, the United States appears to be farther away from optimality with the EMU than France does with Germany. Although a stabilized exchange rate system

would have some inherent benefits, the costs of this exchange rate system significantly outweighs the benefits since the U.S. is far from being a region of optimality with Europe's Economic and Monetary Union. Of the six criteria analyzed, the United States only fully met one, mobility of labor as a factor of production. While the United States was close to fulfilling similarity of economic structure and financial market integration, it did not satisfy these criteria enough to merit meeting these OCA properties. In addition, the United States did not meet some critical criteria such as: business cycle synchronization, price flexibility, degree of economic openness, and trade integration. Although the United States is an active trade partner, the economies of France and Germany rely on each other for imports and exports far more than the United States does with EMU countries. By not having enough trade integration with the EMU countries, the United States would unfairly be subject to one monetary regime that may help EMU countries, but severely damage the U.S. economy. To stabilize the declining dollar as a result of the growing budget deficit and increased inflation, the United States may attempt an intermediate exchange rate policy rather than a rigid fixed one. Intermediate policies such as target zones or basket pegs eradicate some exchange rate uncertainty and curb large fluctuations.

Endogeneity Hypothesis or Specialization Hypothesis

This study tests Krugman and Venable's (1996) specialization hypothesis and Frankel and Rose's (1998) endogeneity hypothesis by comparing two time periods when different exchange rate regimes existed. Since these hypotheses are only relevant for those properties dealing with business cycle correlations, financial market integration, business cycle synchronization, and price flexibility can be analyzed in this study. According to Table 17, financial market integration supported the endogeneity hypothesis, business cycle

synchronization supported the specialization hypothesis, and price flexibility supported neither the endogeneity hypothesis nor the specialization hypothesis. Since neither the endogeneity hypothesis nor the specialization hypothesis dominates, it can be argued that the synchronization of business cycles is not only affected by the degree of trade integration or economic openness, but perhaps by other exogenous variables.

Further Research

Although this thesis examines whether or not the United States should engage in a stabilization of exchange rates with the EMU by analyzing the various properties proposed by Mundell, there remain a number of areas for further research. First, the adoption of a fixed exchange rate system could be analyzed from a capital and labor markets perspective. Second, there is evidence that the OCA theory does not discriminate among its criteria and forces the use of all criteria in every case. Tal Sadeh, in his paper, “Managing a Common Currency: Political and Cultural Preferences” (2002), argues that different countries and cultures regard the different services that money provides with varying degrees of importance. In essence, the OCA theory views money as only for two purposes: a medium of account against the service it provides and a macroeconomic policy tool. According to Sadeh, OCA neglects the variety of service money provides, which includes but is not limited to; serving as a medium of account, a medium of exchange, a store of value, a precautionary device, a factor of production, a taxing device, and a macroeconomic tool. Therefore, further research may want to focus on potential members of currency unions and the relative importance of the different services that money provides. Finally, as evident in the above comparative analysis, determining OCA is not a black and white matter. In some cases, it is not very scientific. This unscientific nature of optimal currency area

theory is one of its biggest downfalls. According to Vaubel (1976-78), “There is no operational scientific method of measuring and comparing the costs and benefits of currency unification for a given group of countries.” Likewise, Willett (1994) states, “the theory of optimum currency areas points to many relevant considerations, but not with a level of operational precision that would lead informed economists to always reach the same conclusions.” Thus, further research could be collected on member countries that have formed a successful currency union and have fulfilled OCA criteria. Characteristics and properties of these member countries could be used as benchmarks to create a more scientific approach to OCA.

The findings of this thesis validate the importance of examining the various exchange rate systems at such a crucial time in the American economy. Britain was the world’s largest creditor in 1913 and only forty years later, after two world wars and economic problems, it was usurped by the U.S. dollar and became a net debtor. American policymakers are worried that as the budget increases along its profligate path, the dollar too will be taken over. As evidenced in this study, the dollar most likely will not be totally usurped and one world currency will unlikely dominate. However, a sharp decrease in the dollar would result in rising U.S. interest rates and a potential stagnant economy. Further research using the optimal currency area criteria, discussed in this paper, and concrete benchmarks based on regions that have fulfilled OCA properties will further illuminate the United States’ exchange rate policy and the likely costs of the U.S. implementing a system of stabilization with the EMU.

VII. REFERENCES

Alesina, Alberto F. and Robert J. Barro (2002), "Optimal Currency Areas," *Harvard Institute Research Working Paper* no. 1958.

Anderson, James E. and Eric van Wincoop (2001), "Borders, Trade, and Welfare," NBER Working Paper no. 8515 (2001), <http://www.nber.org/papers/w8515>.

Anyanwu, John C. (2002), "Estimating the Macroeconomic Effects of Monetary Unions: The Case of Trade and Output," *African Development Bank*, 2002.

Baldassarri, M., L. Paganeto, and E. Phelps (1992), "The International Distribution of Saving: Past, Present and Future," *World Saving, Prosperity and Growth*, 1992.

Bayoumi, Tamim and Barry Eichengreen (1997), "Exchange Rate Volatility: Implications of the Theory of Optimal Currency Areas," (August 1997).

Bayoumi, Tamim and Barry Eichengreen (1993), "Shocking Aspects of European Monetary Unification," NBER Working Paper no. 3949 (1993), <http://www.nber.org/papers/w3949>.

Bernanke, Ben S. (2004), "Euro at Five: Ready for a Global Role," *Institute for International Economics*, 26 Feb. 2004.

Berthola, G. (1993), "Models of Economic Integration and Localized Growth," in F. Torres and F. Giavazzi (eds), *Adjustment and Growth in the European Monetary Union*, Cambridge University Press, Cambridge, 1993.

Bianco, James A. (1999), "The Case for Higher Yields: Will It Be the Stock Market's End Game?" *Bianco Research, LLC*, 14 April 1999.

Bordo, Michael D. and Barry Eichengreen (1993), *A Retrospective on the Bretton Woods System : Lessons for International Monetary Reform*, National Bureau of Economic Research Project Report, (1993).

Calvo, Guillermo A. and Carmen M. Reinhart (2000), "Fear of Floating," NBER Working Paper no. 7993 (November 2000), <http://www.nber.org/papers/w7993>.

Calvo, Guillermo A. and Carmen M. Reinhart (2000), "Fixing For Your Life," NBER Working Paper no. 8006 (November 2000), <http://www.nber.org/papers/w8006>.

Calvo, Guillermo A. and Frederic S. Mishkin (2003), "The Mirage of Exchange Rate Regimes for Emerging Market Countries," NBER Working Paper no. 9808 (June 2003), <http://papers.nber.org/papers/w9808.pdf>.

Clarke, T.E. and E. van Wincoop (1999), "Borders and Business Cycles," *Journal of International Economics*, 1999.

Courchene, Thomas J. and Richard G. Harris (2000), "North American Monetary Union: Analytical Principles and Operational Guidelines," *Canadian Institute of Advanced Research (CIAR)*, (March 2000).

Decressin, Jorg and Antonio Fatas (1995), "Regional Labour Market Dynamics in Europe," *European Economic Review*, Vol. 39, 1995.

DeGrauwe, P. and W. Vanhaverbeke (1993), "Is Europe an Optimum Currency Area?: Evidence from Regional Data," in Paul R. Mason and Mark P. Taylor (eds) *Policy Issues In the Operation of Currency Unions*, Cambridge University Press, Cambridge.

Dervis, Kemal (2004), "The Bretton-Woods Institution after 60 Years: Some Thoughts on Market Governance and the Role of the IMF," (June 20, 2004).

"Dollar Hits New Low vs. Euro," *Financial Times*, 2004.

Dueker, Michael and Andreas M. Fischer (2001), "The Mechanics of a Successful Exchange-Rate Peg: Lessons for Emerging Markets," NBER Working Paper no. 0102 (April 2001), <http://papers.nber.org/papers/w0102.pdf>.

Eichengreen, Barry (2004), "Global Imbalances and the Lessons of Bretton Woods," NBER Working Paper no.10497 (May 2004), <http://www.papers.nber.org/papers/w10497.pdf>.

Feldstein, Martin (2000), "The European Central Bank and The Euro: The First Year," NBER Working Paper no. 7517 (Feb. 2000), <http://www.nber.org/papers/w7517>.

Ferguson, Niall, "A Dollar Crash?" *The New Republic*, 21 June 2004.

"Financial Market Integration in Europe: On the Effects of the EMU on Stock Markets," *European Central Bank*, March 2001.

Frankel, Jeffrey A. (1999), "No Single Currency Regime is Right for All Countries or At All Times," NBER Working Paper no. 7338 (1999), <http://www.nber.org/papers/w7338>.

Frankel, Jeffrey A., and Andrew K. Rose (1998), "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, July 1998.

Fronti, Javier Garcia, Lei Zhang, and Marcus Miller (2004), "Credit Crunch and Keynesian Contraction: Argentina in Crisis," October 2004.

IMF Direction of Trade Statistics.

IMF Financial Statistics.

Johnson, H.G., and A.K. Swoboda (1973), "Uncommon Arguments for Common Currencies," *Economics of Common Currencies*, 1973.

Kenen, Peter B (2000), "Fixed versus Floating Exchange Rates," *Cato Journal*. Vol 20. No. 1 (Spring / Summer 2000).

Krugman, Paul (1993), "The Narrow and Broad Arguments for Free Trade," *American Economic Review*, Vol. 83, No.2, May 1993.

Krugman, Paul and A.J. Venables (1996), "Integration Specialization and Adjustment," *European Economic Review*, Vol. 40, 1996.

Levy-Yeyati, Eduardo and Federico Sturzenegger (2002), "A de facto Classification of Exchange Rate Regimes: A Methodological Note," (2002).

Liesman, Steve (2003), "U.S. Dollar's Decline is Worrisome if Current-Account Deficit Isn't Cut," *Wall Street Journal*, 18 Dec. 2003.

Migration Source, Global Data.

Mundell, Robert A. (1961), "A Theory of Optimum Currency Areas," *American Economic Review*, (1961).

Neumann, M.J.M. and Jurgen von Hagen (1994), "The Strategy of Monetary Targeting: Can The German Experience Provide a Model for the ECB?" 1994.

Obstfeld, Maurice and Kenneth Rogoff (1995), "The Mirage of Fixed Exchange Rates," NBER Working Paper no. 5191 (July 1995), <http://www.nber.org/papers/w5191>.

Piracha, Matlook and Roger Vickerman (2002), "Immigration, Labour Mobility, and EMU Enlargement," 2002.

Puhani, Patrick (1991), "Transatlantic Differences in Labour Markets: Changes in Wage and Non-Employment Structures in the 1980s and 1990s," 1991.

Rauch, J. (1994), "Bureaucracy, Infrastructure, and Economic Growth: Evidence from U.S. Cities During the Progressive Era," NBER Working Paper no. 4973 (1994), <http://www.nber.org/papers/w4973>.

Reinhart, Carmen M. and Kenneth S. Rogoff (2004), "The Modern History of Exchange Rate Arrangements: A Reinterpretation," *The Quarterly Journal of Economics*, Vol. CXIX, Issue I, Feb. 2004.

"Review of the International Role of the Euro," *European Central Bank*, (2001).

Russ, K. Niles (2002), "Exchange Rates Regimes and Foreign Direct Investment," 20 April 2002.

Sadeh, Tal (2002), "Managing a Common Currency: Political and Cultural Preferences," 2002.

Skidelsky, Lord Robert (1999), "Do We Need a New Bretton Woods," (May 1999), <http://www.ipa.org.au/Speechesandsubmissns/LSBWoods.html>.

Spindler, Z.A. (2004), "Public Choice Perspectives on Monetary Regimes," *South African Journal of Economics*, (2004).

Talani, Leila Simona (2002), "The European Central Bank: Between Growth and Stability," 2002.

"The Future of the Dollar: The Passing of the Buck," *Economist*, 2 Dec. 2004.

"Trade's Bounty," *Economist*, 2 Dec. 2004.

Vaubel, R. (1976), "Real Exchange-Rate Changes in the European Community: The Empirical Evidence and Its Implications for European Currency Unification," 1976.

Willett, Thomas D. (1994), "The OCA Approach to Exchange Rate Regimes: A Perspective on Recent Developments," Claremont College's Working Papers, 1994.

World Bank, World Development Indicators.

Wynne, Godley (1998), "Money, Finance, and National Income Determination: An Integrated Approach," Economics Working Paper Archive at WUSTL, 1998.

Yahoo Finance, <http://finance.yahoo.com>.