

The Euro as an International Currency: An Evaluation of the Challenge to the Dollar Based on Currency Reserves and the Exchange Rate

Author: Ekaterina Kouznetsova

Persistent link: <http://hdl.handle.net/2345/501>

This work is posted on [eScholarship@BC](#),
Boston College University Libraries.

Boston College Electronic Thesis or Dissertation, 2007

Copyright is held by the author, with all rights reserved, unless otherwise noted.

The Euro as an International Currency:
An Evaluation of the Challenge to the Dollar Based on
Currency Reserves and the Exchange Rate

Ekaterina Kouznetsova

Professor Matteo Iacoviello

Honors Senior Thesis

Department of Economics

May 2007

Abstract

Since its launch, the euro has successfully achieved the status of an international currency, and the prospect of its ability to challenge the dollar is increasingly credible. This paper supplements the ongoing academic discussion by reevaluating the characteristics necessary for such a position in light of the most recent information available on the euro area, and then providing econometric evidence as support. I regress the lags of shares of dollar and euro reserves on the current shares and predict steady state values for each currency. I then regress the same lags, as well as the exchange rate lag, on the change in the euro/dollar exchange rate. I find, first, that the share of euro reserves, while still not as high as the share of dollars, is nonetheless significant: about 26%. Second, the euro/dollar exchange rate is only slightly affected by changes in the share of either currency's reserves. I conclude that confidence in the euro as an alternative international currency is growing, and that the euro has become a real challenge to the dollar.

INTRODUCTION

The launch of the euro has triggered a monumental transformation in the international monetary system. Throughout the eight years of its existence, the euro has experienced phases of intense growth and appreciation, as well as suffered interludes of weakness. But even during its low points, the euro has not significantly fallen in the international markets. In fact, it has remained strong enough to possibly finally encourage a shift in the monetary system: away from a single international currency and towards a multiple reserve system. The prospect that the euro will come to contest the dollar as an alternative international currency is growing more and more plausible.

The evolution of the European Union marks a milestone in world history. Never before has a group of sovereign nations agreed to merge into a single economic and political unit, giving up significant individual authority in the process. And yet that is what the European Union was successful in creating, establishing not only an integrated political system, but also a central European bank to set monetary policy and inaugurate a single currency: the euro. Since its formation, the euro area has been overall very successful. Its economy is one of the world's largest—second only to that of the United States. The area's financial markets have likewise become larger and more liquid. The euro comprises a significant share of the world's central banks' foreign reserve holdings. Currently, 25% of currency reserves held by the central banks are euro-denominated (a sizeable increase from the 18% of seven years ago). The European Central Bank supports maintaining price stability as its primary objective, adding to the solidity of the currency. In addition, the current condition of the economy of the United States is

creating some unease among investors. Of notable concern is the rising US current account deficit and large external debt.

Views on the issue are mixed. Some maintain that the euro, though successful enough since its launch, will not come to actually rival the dollar in the international finance field. The existence of the dollar's inertia is a great advantage for the currency: investors and the public are already so comfortable in using it, and transaction costs for the dollar are so low, that there does not necessarily seem to be a reason to diversify so soon into a new currency. Others contend that the European Union is still too decentralized, with each member country striving too hard to maintain state authority and distinctiveness to completely embrace the new currency. The reluctance of certain member states to adopt the euro—specifically the United Kingdom—is definitely a negative factor in euro internationalization. Several others maintain that the euro will not rival the dollar in the near future, but that in the long run such a challenge may eventually present itself.

Opposite views are held by those economists who believe that it is not unfeasible to predict the emergence of the euro as a strong adversary for the dollar. The growing US current account deficit, especially, may soon convince investors to diversify out of a currency on which they are losing capital and into a currency of nearly equal strength—the euro. Proponents of this view often argue that the reason this has never before been witnessed in history is the lack of a strong challenger for the dollar; the euro is the first currency to be able to play this role. Further, several economists have developed models that determine the possible future portfolio combinations of currencies, and have discovered that the euro should fare noticeably better than it is widely predicted to do.

Having gone through much of the literature on the subject, I discovered that most of the opinions described are based solely on theories and the conjecture of possible scenarios, but without any specific evidence from existing data. A few of the more recent publications do offer numerical proof to support their hypotheses. It is from examining these models that I develop my own econometric framework. I have chosen to concentrate my analysis on the shares of foreign reserves in the holdings of central banks and on the euro/dollar exchange rate. Of all other possible factors to focus on, these came up again and again in various scholarly articles, and the data on them available to me was rather straightforward to obtain and had a relatively high degree of accuracy.

This paper supplements the ongoing academic discussion on the euro's role as an international currency by not only reevaluating the characteristics necessary for such a position in light of the most recent information available on the euro area, but by then focusing on the shares of currency reserves of the world's central banks and the euro/dollar exchange rate more closely and suggesting econometric evidence to support the growing ability of the euro to afford a genuine challenge to the dollar. By studying the current reserve shares of euros and dollars based on previous holdings, I am able to determine long-run values for both currencies. As mentioned above, from 1999 to 2006, the share of euros has increased by 7%; the share of the dollar—decreased by 6% (from 71% to 65%). My long-run values predict consistent growth in the euro share to about 26%. I then assess the impact on the appreciation of the euro or dollar through the change in the exchange rate brought about by currency reserve holdings. I find the effect of the share of currency reserves to be relative small and felt only after a considerable lag. From these observations, I conclude that the euro has indeed grown strong since its

inauguration and has become a larger player in the international finance arena than is generally recognized by the public. I predict that the euro can only continue to become more robust and will in fact soon develop into a sizeable rival to the dollar.

The paper is structured as follows. First, I relate the history of the European Union and the euro. It is key to understanding the difficulties, as well as the accomplishments, of merging several nations' economies into a monetary union, and then instituting a single currency for them all. It is an entirely new system, and its structure is significant to the euro's performance. The next section explains economic theories and ideas relevant to the discussion. Particularly, I analyze the role of money in general as well as its function as an international currency. I consider the euro's accomplishments in light of these characteristics, and thus reevaluate its position in the international monetary system based on the most recent statistics available. The third section reviews key existing literature on the euro/dollar debate concentrating on those authors whose research greatly influenced my own. In the fourth section, I develop my own econometric framework, based on currency reserves and the euro/dollar exchange rate, and use it to evaluate the euro's position to challenge the dollar in the future. I conclude by summarizing my findings and relating them to the existing global economic environment.

The European Union is faced with a great task: to unite its member states into a cohesive and integrated political and economic entity that will permit its currency to challenge the reigning incumbent. No equivalent has existed before, and it is not implausible to believe that the countries of Europe will be successful in this endeavor.

Because the countries of Europe, none of them anything but second-rate powers by themselves, can, if they get together, be a

power in the world, an economic power, a power in foreign policy, a power in defence equal to either of the other superpowers. We are in the position of the Greek city states: they fought one another and they fell victim to Alexander the Great and then to the Romans. Europe united could still, by not haggling about the size of lorries but by having a single foreign policy, a single defence policy and a single economic policy, be equal to the great superpowers.¹

HISTORY

Launch of the European Union and the Euro

The history of the European Union can be traced back to post-World War II. Determined to rebuild the war-torn nations and to prevent future conflicts, six Western European countries formed the European Coal and Steel Community (ECSC) in 1952. Leaders had realized that the best way to ensure a lasting peace among European nations was to unite them both economically and politically.² As a next step, the same six countries—Belgium, Germany, France, Italy, Luxembourg, and the Netherlands—established the European Economic Community (EEC) and the European Atomic Energy Community (EURATOM) through the Treaty of Rome in 1958. A decade later, the six founder member states had achieved most of the aims described in the Treaty, and as a result their economies had grown increasingly intertwined. The EEC had become an important trading bloc on the international level as well.³ Soon, the Community concluded that economic and monetary union was to be made a formal goal.⁴

¹ Harold MacMillian (British Conservative Prime Minister, 1957-1963), 1979.

² Dominguez, 2006, 69.

³ Coffey, 2001, 3-4.

⁴ Dominguez, 2006, 69.

Several plans were submitted in 1969 and 1970, describing how the European Community (EC), as it was now also called,⁵ could potentially move toward a monetary union. They differed in their views on economic cooperation and coordination, such as the fixing of exchange rates or the freedom of capital mobility.⁶ Finally, the task fell to a group chaired by Pierre Werner, the Prime Minister of Luxembourg. The plan suggested both fiscal and monetary union.⁷ Its key point was to create a mechanism for managing currencies, titled the “snake in the tunnel.” The “snake” was a narrow margin of fluctuation for the EC members’ national currencies that was to move within the “tunnel” of the wider band of fluctuation for the US dollar. The margin was reexamined and widened after the dollar crisis of 1971. Still, not all the member states—whose number had grown by 1973, to include Denmark, the Republic of Ireland, and the United Kingdom—were satisfied with the arrangement. After only two months, the UK and Ireland had left the agreement; they were followed several months later by Italy and soon thereafter France.⁸ As a result, due to continued weakening of the dollar and the oil crises of the early 1970s, as well as these differences in member states’ national economic policies, the “Snake” system was dropped.⁹

Renewed efforts, prompted by both France and Germany, to resolve this instability resulted in the creation of the European Monetary System (EMS) in 1979. This decision was as much political as it was economic. Member states were growing wary of the inflationary effects of a floating exchange rate, as well as nervous with the

⁵ The Merger Treaty of 1967 combined the three existing communities: ECSC, EEC, and EURATOM. The term European Community (EC) came into use following this Treaty.

⁶ Coffey, 2001, 4-8.

⁷ Dominguez, 2006, 69.

⁸ Coffey, 2001, 11-13.

⁹ Dominguez, 2006, 69.

monetary policies conducted by the US administration. The leaders of France and Germany did not want to simply establish a joint float against the dollar; instead, they preferred a greater economic and political integration within the Community itself.¹⁰ And so the currencies of the EC member states—with the exception of the United Kingdom—joined the new exchange rate mechanism (ERM), based on fix but adjustable exchange rates. These were compared to a European unit of account, called the European Currency Unit (ECU), which was a weighted average of the nations' currencies.¹¹ Each currency could fluctuate on either side within 2.25 percent (the Italian lira was allowed a margin of 6 percent) against bilateral central parity rates calculated on the basis of the ECU. As a nation's currency neared the margin, its central bank was to preserve the parity through open market operations.¹² Thus, the EMS also stressed adjusting monetary and economic policies as a tool to achieve necessary stability. As monetary stability increased and capital controls were less stringent throughout the zone, member states with high inflationary rates were able to implement disinflation policies. Overall economic performance was steadily increasing.¹³

Further efforts to integrate several European states into an economic and monetary union resulted in the 1986 creation of the Single European Act (SEA). Between 1981 and 1986, three countries had joined the European Community: Greece, Portugal, and Spain. The Act created a single market.¹⁴ It also established a deadline—the end of 1992—for the elimination of barriers and restrictions on the movement of

¹⁰ Coffey, 2001, 14.

¹¹ Dominguez, 2006, 69.

¹² Lairson and Skidmore, 2003, 170.

¹³ Scheller, 2006, 19.

¹⁴ ECB, 2006, 5.

capital, goods, and people.¹⁵ Policy-makers agreed that a market without internal borders would help to unite national economies: individual policies for the national economies would have to fall to second place behind the policy for all member states. The idea of a single currency was also brought up. With greater integration, a single currency would act to eliminate exchange rate risks, reduce costs, increase transparency, and generally help the economic welfare of the European Community.¹⁶

It was also becoming evident toward the late 1980s that the role of Germany—and especially that of its central bank, the Bundesbank—was increasingly key to the success of the EMS.¹⁷ Germany had a large economy that grew even bigger with the unification brought about after the fall of the Berlin Wall. In addition, the Bundesbank was resolutely concerned with fighting inflation and working to keep its currency strong.¹⁸ As a result, Germany's central bank was very active in setting the monetary policy for Europe as a whole, which troubled other member states, especially France. In 1989, the European Council set up a committee, chaired by Jacques Delors, the President of the European Commission, to explore ways in which a monetary union could be more effectively achieved. The Delors Report outlined three stages of a plan to establish a monetary union. Each stage followed a precise timetable. In addition, it suggested the creation of an independent institution that would be responsible for the common monetary policy.¹⁹ This formed the basis for the Treaty on European Union.

This Treaty was signed on February 7, 1992, in Maastricht, Netherlands. With the Maastricht Treaty, as it is most commonly known, the European Community adopted

¹⁵ Lairson and Skidmore, 2003, 166.

¹⁶ Scheller, 2006, 20.

¹⁷ Lairson and Skidmore, 2003, 171.

¹⁸ Wyplosz, 1997, 5.

the name “European Union” (EU) to reflect both an economic and political union. The Treaty amended previous treaties, for example adding a chapter on economic and monetary policy. But most importantly, by drawing on and slightly amending the Delors Report, the Treaty outlined a timetable for three definitive stages towards a monetary union. Though the Maastricht Treaty was meant to enter into force at the start of 1993, due to delays in the ratification process from the side of Germany and Denmark, the Treaty actually came into effect towards the end of 1993.²⁰

Stage One involved achieving a single European market by removing all internal boundaries to the movement of people, goods and services, and capital within the member states.²¹ The Delors Report had decided that this stage was to begin in the summer of 1990.²² In addition to a single market, the first stage further separated nations’ central banks and their governments. As a result, services between banks and public authorities were limited. For example, banks were no longer allowed to grant overdraft facilities to public authorities.²³ The first stage lasted through 1993.

Stage Two began in 1994, with the establishment of the European Monetary Institute (EMI) in Frankfurt, Germany. Member states were to continue working towards a stronger economic convergence in their monetary and fiscal policies. The EMI was meant to help in the cooperation among the central banks.²⁴ A second task of the EMI was to take the necessary preemptive steps to allow for the eventual introduction of a single currency. Preparatory work was carried out concerning the exchange rate

¹⁹ Dominguez, 2006, 70.

²⁰ Scheller, 2006, 21.

²¹ ECB, 2006, 5.

²² Scheller, 2006, 22.

²³ Dominguez, 2006, 70.

²⁴ Dominguez, 2006, 70.

relationships between the future single currency and currencies outside the EU. In late 1996, the EMI presented a report that established the fundamental elements of a new exchange rate mechanism, also known as ERM II, which was adopted the following year. Member states began to implement policies that would allow them to meet the “convergence criteria” necessary for them to enter into Stage Three of the EMU.²⁵ By 1995, Austria, Finland, and Sweden had joined the European Union, bringing the total number of members to 15.²⁶ Of these 15 members, the EMI had decided that 11 had successfully fulfilled the criteria and would be permitted to enter the third stage. Finally, in the summer of 1998, the EMI was liquidated, being replaced by the European Central Bank (ECB).²⁷

On January 1, 1999, Stage Three of the EMU officially began. The conversion rates of the currencies of the 11 member states meeting the convergence criteria—Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain—were irrevocably fixed.²⁸ All these nations accepted the euro as their single currency. The European Central Bank was delegated all responsibility for conducting the now single monetary policy in the euro area.²⁹ A transitional period was implemented. From the start of 1999 until December 31, 2001, all agents denominating claims and liabilities or carrying out cashless transactions were permitted to use either the euro or the national currencies. In 2001, the number of member states participating in the euro grew to 12 with the addition of Greece. Finally,

²⁵ Scheller, 2006, 22-24.

²⁶ ECB, 2006, 5.

²⁷ Scheller, 2006, 25.

²⁸ See Appendix, Table 1.

²⁹ ECB, 2006, 6.

on January 1, 2002, euro banknotes and coins were put into circulation. As of the end of February 2002, the euro is the sole legal tender of the member states.³⁰

Convergence Criteria

The Maastricht Treaty outlines several criteria that member states must meet and agreements they must consent to before being permitted to join the single currency. A “Stability and Growth Pact” was agreed to by every nation entering the euro zone. The pact was designed to prevent member governments from engaging in deficit spending. The agreement itself is relatively rigid and restricts the extent to which a government may conduct fiscal policies.³¹ The Stability Pact went into effect at the start of January 1999, along with the launch of the euro. It was designed to help the euro maintain its value. Participating countries were to form stability programs intended to promote budgetary discipline. They were to set medium-term objectives for the budget as a ratio of their GDP, to develop measures to achieve these objectives, and make assumptions on expected economic growth, unemployment, and inflation.³²

But before a country in the European Union was allowed to adopt the euro and participate in the euro zone, the European Council had to conclude that it met the four necessary “convergence criteria”. This process was meant to ensure that only those countries with economic policies successfully working towards and focused on stability would be allowed to engage in the third stage of the monetary union.³³ If countries enter a single currency in different fiscal and monetary positions, the currency will prove to be

³⁰ Scheller, 2006, 25-27.

³¹ Coffey, 2001, 40.

³² Cowgill, 2004, “Stability Pact”.

³³ ECB, 2006, 6.

unsustainable.³⁴ The first criterion focused on price stability. A country's inflation rate was to be within 1.5 percent of the average inflation rate, which was measured with a consumer price index, of the three lowest rates in the EU.³⁵ The second condition dealt with low and stable long-term interest rates. A country's rates were not to exceed by more than 2 percent the interest rates of the three countries with the lowest expected inflation.³⁶ Third, the nation's exchange rate was to also be stable, remaining within the bands established by the exchange rate mechanism (implying participation in ERM II) for at least two years, and not devaluing against currencies of any other member states.³⁷ The fourth criterion dealt with a country's fiscal policy. The member states were required to maintain sound public finances in two areas: the government budget deficit to GDP ratio could not exceed 3 percent, and the government debt to GDP ratio could not exceed 60 percent at market prices.³⁸ After a country had met the fourth criterion and joined the euro zone, it was to maintain its fiscal policy, adhering to the Stability and Growth Pact.³⁹

Eleven of the fifteen members of the European Union met the convergence criteria in 1998, and were allowed to adopt the euro in 1999. However, a country that did not initially qualify might aim to better satisfy the criteria and join at a later point. Thus, Greece became the twelfth member of the euro zone in 2001, having fulfilled the necessary criteria. In contrast, Sweden had not fulfilled all necessary criteria. A 2003

³⁴ Wyplosz, 1997, 7.

³⁵ Dominguez, 2006, 75.

³⁶ Wyplosz, 1997, 7.

³⁷ Dominguez, 2006, 75.

³⁸ Cowgill, 2004, "Criteria for the Single Currency".

³⁹ Soon after its launch, however, several nations in the euro zone were in violation of the public debt rule of the Stability and Growth Pact. No fines were imposed; instead, the Pact was revised in 2005 in order to allow more flexibility for those countries undergoing reforms or business cycle recessions (Dominguez, 2006, 76).

Swedish referendum found that 56% of citizens were against adopting the common currency (42% were in favor). Sweden's decision of whether or not to join the euro zone has now become mostly political.⁴⁰ Essentially, the Swedish government is provided with a sort of formal loophole: by remaining outside the exchange rate mechanism (the ERM II), it avoids the third criterion to adopting the euro.

Denmark and the United Kingdom were the other two member states that declined to adopt the euro at the formal launch of Stage Three at the start of 1999. Neither country wished to participate in the monetary union and each was therefore granted an "opt-out" clause through the Maastricht Treaty. Denmark had originally rejected the Treaty in 1992, and the clause was put in place in order to persuade the member state to accept it. Later, in 2000, Denmark was the first EU state to be given a chance to vote on whether or not to adopt the single currency. 53.1 percent of voters rejected adherence to the euro area (46.9% were in favor).⁴¹ Even if Denmark were to fulfill the four convergence criteria, under the clause it is not forced to automatically proceed to the third stage of the EMU. The Danish krone, however, is part of ERM II and is pegged to the euro, allowing for a fluctuation of 2.25 percent on either side of the euro.⁴² Similarly, the leaders of the United Kingdom negotiated an opt-out clause that allowed them to remain a member state of the European Union, but did not force them to join the EMU. The clause allows these countries to retain existing powers in the scope of monetary policy according to their national laws. This perk is one of the main arguments against accepting the euro:

⁴⁰ BBC News, 2003, "EU regrets Sweden's vote on euro".

⁴¹ CNN, 2000, "Denmark rejects single European Currency".

⁴² Europa, 2006, "Denmark: EMU opt-out clause".

conservative nationalists in the United Kingdom retain a strong commitment to the preservation of British sovereignty.⁴³

At the current time—beginning of 2007—the European Union is comprised of 27 member states. Of these, 13 are part of the euro zone (Slovenia having joined on January 1, 2007), six are in the ERM II but not yet the euro zone and all the rest are not even a part of the exchange rate mechanism.

ECONOMIC THEORIES

Roles of Money

Money generally serves three purposes. First, it is a store of value. It is used as a means to “transfer purchasing power from the present to the future.” Second, it is a unit of account. It is the instrument through which prices and debts are referenced. It measures economic transactions. Third, money is used as a medium of exchange. It is required to purchase goods and services.⁴⁴ But money is not used exclusively in one country.

An international currency is defined as a currency “that is used outside its home country.”⁴⁵ Similar to the functions of money domestically, international money serves six roles, divided among private behavior and official (the decisions of countries’ central banks). Several economists, such as Paul Krugman, have set up a table to illustrate these

⁴³ Lairson and Skidmore, 2003, 174.

⁴⁴ Mankiw, 2003, 76-77.

⁴⁵ Frankel, 2000, 98.

capacities.⁴⁶ A currency acts as a store of value when—in the “banking” role—private actors use it to hold their liquid assets, or as a “reserve” currency when it is held in central banks. It can also be considered a unit of account when it is an “invoice” currency, such as when a currency is used to denominate trade contracts, or as a “peg”, when other countries fix their domestic currency’s exchange rate to the other currency. Finally, a currency serves as a medium of exchange when it is employed in private transactions, acting as a “vehicle”, or when it is bought and sold by the central banks, acting as an “intervention.”⁴⁷

International Currency

It is certainly advantageous for a country’s currency to hold an important position in the global economy. Most obviously, it is a benefit for that nation’s residents—for those people actually dealing with the money. It is far more convenient to carry out transactions in one’s own currency.⁴⁸ For private parties, these conveniences translate into three distinct areas: market barriers, transaction costs, and liquidity. Market barriers are lowered or eliminated altogether for the issuer when other individuals within the market are using its currency. As a currency becomes more internationalized and more parties use it in their transactions, economies of scale arise and the average cost of each transaction declines (to the currency’s issuer) with their increased number. Liquidity—“the ability to carry out a transaction whenever [one wants to] without incurring extra cost”—will also be higher the greater the number of transactions in the market.⁴⁹

⁴⁶ See Appendix, Table 2.

⁴⁷ Krugman, 1992, 167-168.

⁴⁸ Chinn, 2006, 6-8.

⁴⁹ Cooper, 2000, 179-180.

Next, it is apparent that using a certain country's currency would bring in more traffic for its domestic banks and institutions, granting them a comparative advantage over others.⁵⁰ Although it is not necessary that a bank use its own national currency for most of its transactions, banks whose domestic currency is widely used internationally do have a safety net that is afforded by the country's regulatory authorities.⁵¹ Further, the issuer of a global currency can be the "only true international lender of last resort."⁵²

A country that has its currency used internationally also holds the advantage of *seigniorage*: "the implicit transfer, equivalent to an interest-free loan, that goes to the issuer of money that is widely used and held abroad". An international currency can be thought of as "a claim that might never be exercised" because it has the potential to indefinitely remain in foreign circulation. Consequently, the issuer of the currency is able to procure large amounts of goods and services from the rest of the world at very low cost.⁵³ In order for a nation to hold another country's currency, it "must give up real goods and services, or ownership of the real capital stock." As a result, the country with the international currency is able to amass debts in its own currency at a lower interest rate. The more other nations choose to purchase that currency, the more they are financing that country's current account deficit, and so the more that it can stand to borrow.⁵⁴ Further, the privilege of financing external deficits with one's own currency protects the country from exchange-rate risk.⁵⁵ It also allows the issuer greater flexibility in the management of its macroeconomic policy. There is less constraint due to worries

⁵⁰ Chinn, 2006, 6-8.

⁵¹ Frankel, 2000, 104.

⁵² Portes, 2000, 2.

⁵³ Cohen, 2003, 577.

⁵⁴ Chinn, 2006, 6-8.

⁵⁵ Portes, 2000, 2.

about the stability of balance-of-payments that may result from pursuing international economic ambitions.⁵⁶

Finally, there is a level of political power associated with being the key-currency country. There is the advantage of high status and prestige generated by market dominance. Being the issuer of a key global currency results in a symbol of near hegemony or “soft power”: “the ability to exercise influence by shaping beliefs and perceptions.” It is considered highly impressive for a country’s currency to be so successful and widely accepted. Secondly, the issuing nation (or union) experiences direct political power that results from the countries that are monetarily dependent on it. The issuer is not only insulated from outside pressures and coercion on its domestic policy, but is in fact in the prime position to pursue its own foreign policy objectives, possibly even exercising some influence or coercion of its own internationally.⁵⁷

Yet there are also drawbacks to having the strongest international currency. Economists Menzie Chinn and Jeffrey Frankel suggest three reasons why countries would be reluctant to internationalize their currencies. First, it does not necessarily follow that having other countries hold one’s currency will lead to a “greater variability of demand” for it. By joining the foreign exchange market, a country would be allowing the demand for its currency to be reflected in its exchange rate, which can be dangerous. A second problem deals with the potential increase in demand for the currency. If foreign residents purchase assets in the country’s currency, it is possible for it to appreciate and thus make exports less competitive. Third, holding a key currency brings on a level of responsibility. The decisions made by the institutions and authorities in the

⁵⁶ Cohen, 2003, 578.

⁵⁷ Cohen, 2003, 578.

home country will have some degree of an effect on the world market. As a result, they must consider a much broader objective, rather than focusing solely on domestic monetary policy motives.⁵⁸

It has been argued that having a system which relies on a single currency is not as stable as a multiple reserve system. When one country's currency is the unrivaled international currency, the home government may be tempted to exploit some of the advantages described above, such as running deficits at the expense of other nations. "In this view, the existence of a second international currency creates a healthy rivalry that keeps both governments in line."⁵⁹ Thus, the emergence of the euro as an international currency rival to the dollar may result in a steadier international system.

The Euro as an International Currency

Economists propose several main characteristics that should be used in determining whether a currency can be considered an international currency. The dollar already satisfies all of these, and is considered the dominant global currency. It is important, then, to analyze to what extent the euro measures up to the dollar in these characteristics. If the euro can be credited as an international currency, it becomes possible to question whether it can compete with and eventually surpass the dollar as the strongest global currency.

One factor is the country's "size of its underlying economy and global trade."⁶⁰ Obviously, a currency in a country that has a significant role in international output,

⁵⁸ Chinn, 2006, 8-9.

⁵⁹ Frankel, 2000, 106.

⁶⁰ Bergsten, 1997.

trade, and finance will have a natural advantage over others.⁶¹ A study conducted by Eichengreen and Frankel found that “a rise of 1 percentage point in a key currency country’s share of world product is associated with a rise of 1.33 percentage points in that currency’s share of central bank reserves.”⁶² As of 2005, the GDP of the European Monetary Union was reported as \$9.8 trillion, whereas that of the United States—\$12.5 trillion.⁶³ The US economy still remains the world’s largest. The euro area has the world’s second largest economy.⁶⁴ Still, the two areas are close enough in size that they can be considered comparable. In fact, the EU has started catching up. As a recent issue of *The Economist* reports: “In 2006 GDP in the EU as whole grew by 2.9% and in the euro area by 2.7%. In the fourth quarter of last year the euro area’s GDP growth outstripped America’s for the first time in five years.”⁶⁵ And as more countries join the European Union, the economic area will expand, as will the area’s population.

A second criterion explores the history of the currency. If it has been used for an extended period of time, individuals and banks are more inclined to continue to use it. For example “the pound remained an important international currency even after the United Kingdom lost its position as an economic superpower early in the century.”⁶⁶ The euro was introduced only in 1999—relatively recently—and therefore the dollar has been the dominant global currency for a long time. “An incumbent international currency...has a built-in advantage when competing to retain its status.”⁶⁷ One explanation for this is that it is expensive to change from one money to another due to the

⁶¹ Frankel, 2000, 101.

⁶² Bergsten, 2005, 32.

⁶³ World Bank, Key Development Data & Statistics.

⁶⁴ Walter, 2005, 1.

⁶⁵ *The Economist*, 2007, “The quest for prosperity”.

⁶⁶ Frankel, 2000, 102.

⁶⁷ Eichengreen, 1998, 484.

costly process of financial adaptation. A new currency will start being used more often if “others appear likely to make extensive use of it too,” thereby making it cost-effective to adopt.⁶⁸ Another reason is that there is uncertainty associated with the emergence of a new global currency. Many actors are risk-averse and will opt to minimize any anxiety by continuing to work with the currency they have used in the past. Once a currency has gained a high level of acceptance among actors, it will continue to be the dominant one even amid the appearance of powerful competitors, simply because it has regularly been used in the past. “Even after America’s emergence as the world’s richest economy, it took literally decades for the greenback to ascend to top rank among currencies.”⁶⁹

A third factor deals with the country’s financial markets. It is important that “capital and money markets must be not only open and free of controls, but also well-developed, deep, and liquid.”⁷⁰ Having deep and liquid financial markets is important in allowing holders to diversify.⁷¹ They also help to keep transaction costs low, thereby encouraging more people to use them.⁷² By 2005, the euro has demonstrated good performance in financial markets, becoming larger and more liquid. For example, its share in international bond issuance has been relatively close to the dollar.⁷³ The Bank for International Settlements (BIS) in its 2004 (the latest) Triennial Central Bank Survey reported that “dollar/euro continued to be by far the most traded currency pair in April 2004, capturing 28% of global turnover.”⁷⁴ However, the European financial markets are

⁶⁸ Cohen, 2003, 581.

⁶⁹ Cohen, 2003, 582.

⁷⁰ Frankel, 2000, 102.

⁷¹ Frieden, 2000, 204.

⁷² Portes, 2000, 4.

⁷³ Walter, 2005, 4.

⁷⁴ BIS, 2004, 11.

highly decentralized.⁷⁵ Unlike the United States with its large financial market in New York, and the United Kingdom—in London—the European Union has no central financial market, which is a detriment to the euro.

A fourth factor to note is that of “the posture of the authorities.”⁷⁶ The system of the issuing currency can decide the extent to which they will focus on internationalizing their currency. For example, Germany’s Bundesbank was so concerned with domestic monetary policy control that it “systematically discouraged an international role for the D-mark during much of the postwar period.”⁷⁷ The Maastricht Treaty identifies the primary objective of the European Central Bank as that of maintaining price stability; economic growth is a second objective. And the ECB has stated in a monthly bulletin:

...[T]he international role of the euro is mainly determined by the decision of market participants in a context of increasing integration and liberalisation of product and capital markets world-wide. The Eurosystem therefore adopts a neutral stance, neither hindering nor fostering the international use of its currency.⁷⁸

Still, argues Charles Wyplosz: “The potential for the euro to replace the U.S. dollar as the world’s premier currency is one of the understated motivations of the EMU.”⁷⁹ The Bundesbank had a strong influence on the development of the EU’s monetary policy, tending to restrain the use of the euro. But as the euro area expands in its economic size, the ECB’s concern for monetary control may ease and the euro’s role as a global currency may become more prominent.⁸⁰

⁷⁵ Bergsten, 1997.

⁷⁶ Henning, 1997, 12.

⁷⁷ Henning, 1997, 13.

⁷⁸ European Central Bank, 1999, 45 in Portes, 2000, 15.

⁷⁹ Wyplosz, 1997, 15.

⁸⁰ Henning, 1997, 13.

Fifth, and very important, is the confidence in the value of the currency. The currency must be relatively stable. This will reduce the risk of holding assets denominated in it. The lower the risk, the more willing investors will be to hold reserves and assets in that currency. Again, “the Maastricht Treaty’s emphasis on price stability assures a reasonably firm monetary policy, and a stable unit of value.”⁸¹ Similarly, it is important to have a strong exchange rate. This, again, will reduce the risk of losing capital to those who hold assets denominated in the currency.⁸² Inflation needs to remain low to convince individuals of the currency’s strong value. The United States has become a very large debtor nation. This raises fears and increases the risk in holding dollars.⁸³ If the euro is the alternative international currency, individuals will be more willing to invest their money in the euro currency, as opposed to dollars.

The euro can certainly be classified as an international currency. What becomes critical, then, is to explore to what extent it is coming to rival the dollar. “The international use of the euro as a trade, investment, anchor, and reserve currency has increased considerably.”⁸⁴ Given the inherent difficulties for a new international currency, as well as the current dominance of the role by the dollar, how strong is the euro’s position to rival the dollar at the present time, and what more is it necessary for the euro to achieve in order to ever be able to do so?

⁸¹ Cooper, 2000, 184.

⁸² Frieden, 2000, 204.

⁸³ Frankel, 2000, 102.

⁸⁴ Walter, 2005, 5.

LITERATURE REVIEW

Opinions on the Euro's Ability to Dominate as the Global Currency

Even before its official start, economists and other scholars have been analyzing the prospects and consequences of a European monetary union. This has become increasingly the case after the inception of the European Union and the launch of the euro. Because no equivalent situation has existed before, economists can only at most speculate of the future of the euro and its ramifications on the rest of the global economy.

The literature available on this topic is sizeable and broad. There are nearly as many supporters of the euro and its ability to rival and surpass the dollar as the dominant global currency as there are skeptics and those who say the euro is either not strong enough to do so yet, or even that it can never happen. Though it is impossible to mention them all here, it is nevertheless important to review the leading literature on the subject. Several economists—Jeffrey Frankel, Menzie Chinn, Hélène Rey, Richard Portes, George Alogoskoufis, Kathryn Dominguez, Benjamin Cohen, Fred Bergsten, Barry Eichengreen, and Richard Cooper—have written extensively on this topic, and their articles have surfaced often and have been of great assistance to this paper. These are the ones reviewed here.

The economist Benjamin Cohen, upon reviewing the euro's performance four years after its launch, presents a skeptical assessment of its ability to come to rival the dollar. Having discussed the euro's performance thus far, he offers four interrelated reasons for his dim prognosis. First is the characteristic of inertia, which he further divides into the "pre-existence of already well-established transactional networks, which generate a well-documented stickiness in user preferences" and the "exceptionally high

level of uncertainty inherent in any choice between alternative monies.”⁸⁵ Next, is the high cost of conducting any business in euros, which he considers is unlikely to fall considerably lower than transactions costs for the dollar. Third, Cohen mentions that “anti-growth bias built into EMU” will negatively affect yields on euro-denominated assets.⁸⁶ Finally, he argues that the structure of the monetary union is too ambiguous, which will lead to confusion and doubt among the future users of the euro. He concludes that although the euro will be the leader in the region, reduce outside shocks with the help of the resulting regional stability, and “surely enhance Europe’s sense of its own identity,” it will not emerge as the second global currency.⁸⁷

A somewhat similar view is presented by Richard Cooper. He, too, does not believe that the euro will soon come to rival the dollar as a major international currency. More specifically, he predicts (as the article was written in 2000, only one year following the official launch of the euro but before the currency was put into circulation), that although the euro will be a symbol of monetary history and will certainly require alterations within the European system, it will not affect the international monetary system for many decades, “and in particular the international uses of the US dollar.”⁸⁸ His reasoning is based on the fact that network externalities exist that result from the experience and ease of using the dollar because it is so widespread, and that the euro so far functions mostly as a unit of account than an instrument for investment. As he argues, “having a common currency does not by itself assure a widely accepted and liquid store

⁸⁵ Cohen, 2003, 581.

⁸⁶ Cohen, 2003, 585.

⁸⁷ Cohen, 2003, 591.

⁸⁸ Cooper, 2000, 198.

of value.”⁸⁹ He expects the euro to eventually become an important international currency, but that the process will be very slow, and that the euro will “supplement rather than directly displace the dollar in its diverse international roles.”⁹⁰

An analogous argument is presented in an article by Barry Eichengreen, though his was written even before the launch of the euro, in 1998. He concentrates his attention on the euro’s role as a reserve currency. Relying on the contention of the importance of history and incumbency (a topic for which he is well-known) and the institutional structure of markets, Eichengreen presents historical support and then econometric evidence to suggest that the “dollar will continue to dominate international reserves for some time, absent economic mismanagement in the United States.”⁹¹ He deduces that the desirability to hold euros as a reserve currency will depend on how widely the currency is used for other international transactions more generally and whether the European Central Bank will be interested in day-to-day liquidity management and be prepared to accept lender-of-last-resort operations.

Still, not all economists share the views of those just mentioned. Richard Portes and Hélène Rey in an article written even longer ago—in 1997—argue in favor of the euro. They explore the effects of hegemony, seigniorage, and welfare, and then go on to build several analytical scenarios to offer specific estimates of the consequences of the euro: the “Pan Euro Scenario”, the “Medium Euro Scenario”, and the “Big Euro Scenario.” They provide numerical estimates of the foreign exchange market, the bond market, and welfare analysis. Those scenarios in which the euro shares international currency status seem very plausible to the authors. Especially if the ECB chooses to

⁸⁹ Cooper, 2000, 189.

⁹⁰ Cooper, 2000, 198.

“actively promote the international use of the euro, one cannot discount the possibility of an overt tug of war between the euro, the incumbent (the dollar) and the major other contender (the yen) for international monetary supremacy.”⁹² They conclude that the scale of the shock brought to the international monetary system is the key, and that it will most likely be large and sudden. As a result, authorities and those participating in the markets will more seriously approach the possibility of a euro rival to the dollar, which will permit the “global integration of financial markets” to transition to the euro faster than history has insinuated.⁹³

Analogous results are reached in a 1997 paper by George Alogoskoufis and Richard Portes. The authors “examine the prospective implications of the creation of the euro for the international monetary system.”⁹⁴ They first consider the various roles of the euro as an international currency: a means of payment, unit of account, and store of value—and how these roles will develop. Secondly, they concentrate on the effects on the short run and long run exchange rate between the dollar and the euro as a result of the EMU. The authors predict that the launch of the euro in financial markets in 1999 will disturb the dollar’s role as a major international currency. These effects will be the results of portfolio shifts favoring “a sharp appreciation of the new currency vis-à-vis the dollar.”⁹⁵ Initially, the current account surplus of the European Union will increase, leading to an overshooting of the long-run equilibrium of the euro’s exchange rate. After a while, a revaluation of the euro will result in a current account deficit and greater inflow of capital into the EU, increasing euro holdings around the world. Eventually, the

⁹¹ Eichengreen, 1998, 499.

⁹² Portes, 1997, 28.

⁹³ Portes, 1997, 29.

⁹⁴ Alogoskoufis, 1997, 59.

euro will weaken towards long-run equilibrium. Again, major change can occur only with the willingness of the ECB to allow the euro to act as an international currency.

Fred Bergsten in 1997, considering the possible impact on international markets from the emergence of the euro, concludes that the United States will encounter strong economic competition from the European currency. He, like many others, cites the importance of inertia in international finance. He also believes that the European Central Bank, through its mandate of price stability, is setting up the euro for a strong beginning. Bergsten then goes on to analyze five key factors establishing a currency in a global role, and the euro's potential function in each. And though he cites that widespread belief that a shift from dollars into euros would require a long period of time, he holds that "there is evidence from the history of major currencies that major shocks can produce rapid changes in portfolio composition."⁹⁶ In another article eight years later, he reviews the success of the euro over its first five years and considers how this has changed the global currency situation. Here, however, he concentrates on the question of whether and when the euro will actually be able to replace the dollar's hegemony. He specifically highlights: "It is thus clear that the euro provides the first real competition for the dollar since the latter's ascent to global currency dominance."⁹⁷ He cites four key variables that would strengthen the euro sufficiently enough for it to take on this role. He then considers four reasons for a continued appreciation of the exchange rate of the euro against the dollar, and ends with the resulting policy implications.

It would seem that earlier commentaries lacked the necessary evidence to correctly predict the future of the euro or to evaluate its achievements, and that it was due

⁹⁵ Alogoskoufis, 1997, 60.

⁹⁶ Bergsten, 1997, 3.

to this reason that the views varied considerably. However, even those articles written more recently—sometime during 2006— diverge somewhat in their opinions of the euro’s strength. Kathryn Dominguez, for example, agrees that the euro has enjoyed some success, but argues that “a strong case can be made that European monetary union has thus far proven to be no more than the sum of its parts.”⁹⁸ A main, underlying issue is that almost each country within the group agreeing to economic integration actually wants to remain largely as it was before the process. The distribution of power among those making decisions regarding Europe’s monetary policy and then implementing it are very decentralized. She recounts the history of the European Union, focusing primarily on the structure, objectives, and powers of the European Central Bank. Next, she reviews the euro’s global role and determines that it has not been strong enough to appropriate the dollar’s position. Dominguez cites that the euro’s role as a reserve currency is still evolving, and that the greatest increase in the use of euros occurred as a result of a larger portion of international debt being denominated in euros. Still, she argues, the euro is hindered by the “hesitation on the part of euro-zone countries themselves to embrace their newly created currency.”⁹⁹ The true test of the euro, therefore, she feels is still to come, as is the extent of the ECB’s influence.

Menzie Chinn and Jeffrey Frankel, also writing in 2006, have a more optimistic vision of the euro’s ability to rival the dollar. They believe the euro has been relatively successful since its launch, and that in fact it has “passed the most fundamental tests: the transition was relatively smooth, 12 countries today use the euro (and only the euro), and

⁹⁷ Bergsten, 2005, 32.

⁹⁸ Dominguez, 2006, 68.

⁹⁹ Dominguez, 2006, 86.

the new currency has entered into international use as well.”¹⁰⁰ The authors then describe advantages and disadvantages of an international currency, as well as a brief history of the dollar’s ascent into this role. In the paper, Chinn and Frankel choose to concentrate on the euro’s role as a reserve currency, estimating the effects of inertia and other factors they consider significant: size of the home country, inflation rate, exchange rate variability, and the turnover in the currency’s foreign exchange market. One finding shows that the functional form is non-linear. Another indicates that changes are felt, but only with a long lag.

In order to extrapolate these findings into the future, the authors generate four possible scenarios. The first two show the effects of various combinations of growth in the US or European economies. The third case incorporates Sweden and Denmark as part of the euro area, and the fourth includes the UK as well. For each of these, they consider four possibilities for exchange rate depreciation. They conclude that “the euro gains overwhelming dominance in the instance where the UK joins the euro *and* rapid depreciation persists indefinitely. In this combination, the switchover occurs in 2020 and eventually the euro accounts for more than 80% of combined USD and EUR holdings.”¹⁰¹ Their prediction for the euro dominating the dollar’s role as a global currency involve two important factors. First, that enough EU members join the euro so that its economy can become larger than that of the US, especially if the UK joins, bringing its large financial markets. Second, that US macroeconomic policy may potentially decrease confidence in the dollar due to resulting inflation and depreciation.

¹⁰⁰ Chinn, 2006, 3. *Note:* As of January 2007, the euro is being used by 13 countries (Appendix, Table 1).

¹⁰¹ Chinn, 2006, 36.

Finally, Richard Portes, along with Elias Papaioannou and Gregorios Siourounis, consider the impact of the euro and the outlook for the dollar in relation to optimal currency shares in international reserves. Like Chinn and Frankel, these authors concentrate on the composition of central banks' foreign exchange reserve holdings. By developing a "dynamic mean-variance currency portfolio optimizer", the authors are able to "obtain the optimal portfolio composition of central banks' foreign exchange reserves for the eleven years surrounding the introduction of the euro in 1999."¹⁰² They study specifically five main currencies: dollar, euro, Swiss franc, pound sterling, and yen. They compare these findings to pre-1999 optimum allocation for the French franc, the Deutsche mark, and the Dutch gilder. Finally, they present simulations of four large emerging market countries—Brazil, Russia, India, and China—with limitations signaling the variations in a central bank's preference to hold shares in the currencies of its peg, its foreign debt, and its international trade. The three main results are that the optimizer can correspond with the large share of dollar reserves; that the optimum portfolios show a lower weight for the euro than is currently being observed, signifying the euro's already "enhanced role" as an international currency; and three factors that would increase the optimal euro shares.¹⁰³

I found the literature above to be especially key in my research. Many of the theoretical definitions of an international currency and explanations of its role in the international monetary system were helpful in understanding the importance of the euro/dollar debate. It was especially useful to note the factors that were brought up often and by various authors, such as the effect of history on the role of the euro as an

¹⁰² Portes et al, 2006, 4.

¹⁰³ Portes et al, 2006, 1.

international currency and its importance in whether or not the euro could come to challenge the dollar. The models developed by the economists, particularly those which focused on the composition of central banks' foreign reserves, helped me to develop the framework necessary to later design my own models. Further, by reviewing which aspects of the euro's influence were only moderately considered, I am able to expand my research into that field.

Unfortunately, as it is clear from this evidence, most of the literature currently available on the euro-dollar debate is vague. Though economists may ardently predict outlooks in one direction or another, their support is relatively limited. Also, it is usually based more on economic theory than on econometric evidence culled from actual numerical data. This can understandably be attributed to the fact that the euro is still a comparatively new currency, having existed for only eight years. The more recent publications address some of these concerns by providing models that do provide some estimations or simulations. Consequently, this paper will expand the topic with a related method by approaching the question from two specific angles. Due to their evident significance in determining the euro's potential as the next great international currency, and in the relative straightforwardness of obtaining the necessary data, I will concentrate my econometric evidence on two factors: currency reserves and the euro/dollar exchange rate.

ECONOMETRIC FRAMEWORK AND RESULTS

Currency Reserves

As was explained earlier, banks use money as a store of value by holding reserves. Typically, the larger the bank—for example, a country’s central bank—the more the variety of international currencies it will hold. Banks diversify their reserve holdings to hedge risk. Thus, the amount of euros held by central banks is an important measure of its role as an international currency. Foreign exchange reserves are gaining importance in the international financial market.¹⁰⁴ The IMF Annual Report describes, at the end of 2005, that 98 percent of nongold assets were foreign exchange reserves.¹⁰⁵ The report also provides data on central banks’ holdings of the various currencies. A broad range of annual data for currency reserves is available.

Data

Central banks of countries around the world report their reserve currency data to the International Monetary Fund. It is then published in the IMF COFER (Currency Composition of Official Foreign Exchange Reserves) tables. Unfortunately, this data is not complete. “Countries that do not report the currency composition of their reserves to the IMF account for a large (and growing) share of global reserves.”¹⁰⁶ The IMF used to estimate reserves for non-reporting countries, but now leaves them out altogether.¹⁰⁷ Further, the IMF data tables are not country-specific. They are simply divided into three categories: all countries, developed countries, and developing countries. Individual

¹⁰⁴ Portes et al, 2006, 2.

¹⁰⁵ IMF Annual Report, 2006, Appendix, 127.

¹⁰⁶ Setser, 2006, 8.

central banks regard their currency holdings as “highly confidential.”¹⁰⁸ But even the “all countries” category does not include most East Asian economies, since the compliance with reporting there has tended to be low. Unfortunately, not only do these countries hold a large portion of total foreign reserves, “but anecdotal evidence suggests that they overly invest in dollar assets.”¹⁰⁹ Finally, the numbers are often inconsistent from one Annual Report to the next, especially among less developed nations which have generally “incorporated much more estimation of the reserve composition.”¹¹⁰ Specifically, the discrepancies begin with 2003 data.¹¹¹ This, of course, limits any econometric analysis.

From this data it is immediately evident that the euro is slowly growing in its position as a reserve currency.¹¹² Though its percentage of total reserves averages around the 20s, compared to the dollar’s in the 60s, the euro has nonetheless been successful since its introduction:

After adding to their dollar reserves at a disproportionate pace in 2003 and 2004 as the soaring dollar value of their existing euro reserves increased the euro’s share in their portfolio, central banks did the opposite in 2005—buying euros as the euro fell versus the dollar to maintain the euro’s overall share in their portfolio.¹¹³

Into the beginning of 2006, the amount of euro reserves held continues to grow; that of dollars—to decrease slightly. In 1999, the share of dollars averaged 71.18%; the share of euros—18.00%. By the third quarter of 2006, the share of dollars has fallen to 65.62%,

¹⁰⁷ Portes et al, 2006, 4.

¹⁰⁸ Chinn, 2006, 24.

¹⁰⁹ Portes et al, 2006, 4.

¹¹⁰ Chinn, 2006, 30.

¹¹¹ Of particular note is the inconsistency in the reports of dollar amounts, which were unfailingly lower for each quarter in the updated version (December 2006) of the data compared to the previous version (September 2006). The difference was sometimes as large as 0.10158% (first quarter 2003). However, the discrepancy in the euro amounts was varied: sometimes positive and sometimes negative in the updated version. Still, in the last three quarters, euro reserves were actually higher than previously reported.

¹¹² See Appendix, Figure 1.

¹¹³ Setser, 2006, 3.

while that of the euros has grown to 25.22%. Interestingly, developing countries hold a larger percentage of their reserves in euros, as opposed to developed nations.¹¹⁴

The data used in the following regressions ranges from the first quarter of 1999—the start of Stage Three of the EMU—to the most recently updated third quarter of 2006¹¹⁵. The data is quarterly, as this is how it is available from the IMF’s COFER tables. Because the IMF does not delineate this data by countries, I opted to use the figures presented under “all countries”, as I felt that they would provide the most inclusive results. Although the IMF supplies reserve holdings for nine various currencies, I chose to concentrate solely on the dollar and euro shares, as they are the two most directly relevant to this topic. The data is provided as reserve shares in millions of dollars; I manipulated this to determine the percentage of total foreign exchange holdings held in dollars or euros.

Objective and Regression Method

The purpose of my work with the foreign exchange holdings of countries around the world is to attempt to ascertain the long-run values for both dollar and euro reserves. I am interested in finding the relationship between the current amount of reserves held in a specific currency and the previous total of reserves maintained in both that currency and others. Specifically, then, how does the proportion of currency reserves held in the previous quarter in dollar and euros impact both the share of dollars and euros in the next quarter?

¹¹⁴ IMF COFER tables.

¹¹⁵ As of March 2007, the most current data available was updated in December 2006.

I present four time series regressions for each the dollar and the euro. The four linear regressions relate the share of dollars to various combinations of lags in the share of dollars and euros; the same is then done to relate the share of euros to lags in the share of both currencies. Model 1 shows the relationship between the current share of dollars (or euros) and the lag of the same variable. Model 2 illustrates a similar correlation, but this time between the current share of the currency and two of its lags. Model 3 relates the share of dollars (or euros) to a lag in the dollar (or euro) share and to a lag in the euro (or dollar) share of reserves. Model 4 adds an extra lag to each of the currencies.¹¹⁶ For each model, I first consider the significance of each independent variable on the dependent variable, then combine these results to explain the model as a whole.

Regression Results

Table 3 shows that in the Model 1 regression for dollar shares the coefficient on the lagged shares is 0.9474. This implies that a one percentage point increase in last quarter's share of dollar reserves leads to an almost one percentage point increase in this quarter's share, and vice versa. A t-statistic of 14.16 makes the variable highly statistically significant. The results are similar in Model 1 for euro shares. The coefficient on the lagged share of euros is 0.9714, again implying that a one percentage point increase in last quarter's share leads to a nearly one percentage point increase in this quarter's share. The t-statistic for this variable is even higher than that of the dollar lag: 22.16. The adjusted R-squared values for each regression—0.8731 and 0.9441, respectively—suggest a reasonably good fit. The change in the amount of a currency that

¹¹⁶ See Appendix, Table 3.

is held by countries indeed does not appear to fluctuate very drastically from quarter to quarter. As a result, the regressions of Model 1 are helpful in establishing a straightforward relationship between a variable and its lag.

Next, it would be interesting to explore this relationship further and attempt to ascertain whether the shares held in even earlier quarters likewise have an effect on the current share of a currency. The Model 2 regressions for both the dollar and euro add a second lag of the currency into the model. And from this it becomes evident that the second lag is not as significant. The t-statistic on the lag2 variables are 0.22 for the dollar share and -0.58 for the euro share—very small. In addition, the t-statistics for the lag1 variables of the dollar and the euro have drastically declined to 4.71 and 5.61, respectively. The adjusted R-squared value for each of the regressions has also decreased slightly. These qualities seem to suggest that the second lag is a somewhat irrelevant variable.

Still, it has contributed to a change in the coefficients for the single lag variables. Interestingly, that of the dollar has decreased, whereas that of the euro has increased. This indicates that with a two-lagged model, last quarter's share of the dollar has a smaller effect on the present share. But last quarter's share of the euro has a larger effect on the present share. This may hint at the role of a currency's incumbency. The dollar has been the dominant currency for a long time, and so the share of dollars held in previous quarters will not significantly influence how much of the world's reserves are dollar-denominated. However, because the euro is a newer currency, the effect of the past on the present share of euros is stronger: perhaps countries that were hesitant to

diversify into euros are more likely to do so once they have proof that other states have been doing so.

Of the four models, Model 3 has the best fit. The R-squared values are the highest for both the dollar share and euro share. The regression on the dollar share shows that the lagged share of the dollar does not bear a strong influence on the current amount of dollars held as currency reserves. The coefficient on the lagged variable is only 0.0261, indicating that a one percentage point increase last quarter would have roughly only a 0.03 percentage point positively-related influence on the present quarter. Further, the t-statistic is a low 0.09, indicating that the variable is not initially very significant. The lagged euro share, however, is solidly significant with a t-statistic of -3.22 and a coefficient of -0.7473. The implication, then, is that this quarter's share of dollar reserves is more dependent on the share of currency reserves held as euros last quarters than the amount held in dollars.

This finding may again be the result of the dollar's already strong position as an international currency due to its advantage as a nearly risk-free asset. Banks and other financial actors trust the dollar and will therefore continue to hold a steady amount of it in reserves. Whether slightly less or more dollars were held in the previous quarter will not make much difference on the amount held today. Yet the share of euros from the past several months does seem to have an impact. The relationship is a negative one, demonstrating that an increase in the share of euros held last quarter should decrease the reserves being held in dollars. This may indicate that over time, as the euro becomes more widely used and reaches greater stability, some banks may choose to diversify away from dollars and into euros.

The results are slightly different in Model 3 of the share euro reserves. The lagged euro share is very significant with a high t-statistic of 8.10. The coefficient is 1.5632; this indicates that a one percentage point increase in last quarter's share of euros would have a one and a half percentage point increase on this quarter's shares! Further, the coefficient on the lagged dollar share is likewise positive. It, too, is a significant variable, with a t-statistic of 3.13. The impact on the current share of euros from last quarter's share of dollars is lower than the lagged share of euros, but is nonetheless almost 0.76%. The share of reserves held in euros is therefore dependent on more factors than is the dollar.

Because the euro has been in circulation for less than even ten years, some banks are still wary of holding large reserves of this currency. This may be one reason why the amount held previously can still have such a large effect on present-day shares. A currency that exhibits steadily growing shares as reserves can be considered stable. Further, as more banks hold euro reserves, the greater the incentive for other banks to opt for it as well: they will be able to carry out transactions with each other more easily if they all hold euros. So as the euro continues to prove itself in the markets, it will gain the reputation of being a liquid and stable currency—important characteristics of a currency that banks choose to hold as reserves. The positive relationship of current euro shares on lagged dollar shares may be an illustration of the euro's ability to come to rival the dollar. If the share of euros rises along with that of dollars, then banks are diversifying away from smaller currencies in favor of the more widely-accepted, international currencies. Thus, the two are viewed on a nearly equal level.

Finally, Model 4 for the share of both dollars and euros considers whether it would be helpful to include the second lags of both currencies. Unfortunately, the results suggest they are not that helpful. The adjusted R-squared values for both regressions are still relatively strong, but this may mostly be due to the larger number of variables used. The t-statistics of the dollar share regression are very low for all independent variables, and the coefficients are all very close. The results for the euro share regression are somewhat more helpful, with the lagged euro variable demonstrating statistical significance, and the lagged dollar nearly doing so as well. But overall, Model 4 is not as useful as Model 3 for explaining the effects on the currency reserve shares of banks.

Analysis

To continue with the analysis of the importance of the euro in currency reserve shares, I evaluate the long-run values for shares in both dollars and euros using coefficients from the regressions explained above. When the equations are derived from Model 1 and Model 2, it is possible to use simple algebra in order to find the long-run values.¹¹⁷ Table 4 shows these results. The values are very close for the dollar share, demonstrating that the lagged dollar shares have little impact on the current amount of reserves held in dollars. The values for euro shares vary somewhat between that for one lag and that for two lags. This implies, again, that the amount of shares held in previous quarters influences the current share. Although the dollar shares of approximately 65% are closer to the latest actual reported current amount held as reserves, the euro shares of

¹¹⁷ From the equation for one lag dollar shares: $Y_t = \alpha + \beta Y_{t-1}$, $Y = \alpha/(1-\beta)$; and $Y_t = \alpha + \beta Y_{t-1} + \lambda Y_{t-2}$, $Y = \alpha/(1-\beta-\lambda)$. Similarly, for one lag euro shares: $X_t = \delta + \epsilon X_{t-1}$, $X = \delta/(1-\epsilon)$; and $X_t = \delta + \epsilon X_{t-1} + \rho X_{t-2}$, $X = \delta/(1-\epsilon-\rho)$.

about 28% are slightly higher.¹¹⁸ Based on their histories alone, the shares of dollars are expected to remain relatively the same, while those of euros are expected to grow significantly. Thus, this simple analysis leads to the conclusion that the euro will slowly grow to become a strong rival for the dollar.

Using the coefficients from Model 3 and Model 4, it is possible to analyze the shares of currency currently held in reserves based on the impact of other currencies as well, and thereby calculate the steady-state of the system. There are several ways to perform the computation, for example again algebraically or with the use of matrices. However, once one or more lags are added into this system of equations, the use of the matrix becomes the most efficient method, since the calculations follow the same pattern with the addition of each lag and are simpler to compute.

The two equations used to calculate the steady-state system, with all lags¹¹⁹, are as follows:

$$Y_t = \alpha + \beta Y_{t-1} + \kappa Y_{t-2} + \gamma X_{t-1} + \rho X_{t-2} \quad (1)$$

$$X_t = \delta + \varepsilon X_{t-1} + \pi X_{t-2} + \zeta Y_{t-1} + \varphi Y_{t-2} \quad (2)$$

The first equation relates the shares of dollars at time t (Y_t) to the two lagged dollar shares at times $t-1$ and $t-2$ (Y_{t-1} and Y_{t-2}) and to the two lagged euro shares also at times $t-1$ and $t-2$ (X_{t-1} and X_{t-2}). The second equation is similar, with share of euros at time t (X_t) as the dependent variable. The system is solved by finding the long-run values for the share of dollars and the share of euros. To do this, it must be re-written in matrix form:

¹¹⁸ The third quarter, 2006, data reports dollar shares as 65.2131% and euro shares as 25.22248% (IMF COFER Tables).

$$\begin{array}{c}
 \left(\begin{array}{c} Y_t \\ X_t \end{array} \right) = \left(\begin{array}{c} \alpha \\ \delta \end{array} \right) + \underbrace{\left(\begin{array}{cc} \beta & \gamma \\ \zeta & \varepsilon \end{array} \right)}_B \left(\begin{array}{c} Y_{t-1} \\ X_{t-1} \end{array} \right) + \underbrace{\left(\begin{array}{cc} \kappa & \rho \\ \varphi & \pi \end{array} \right)}_C \left(\begin{array}{c} Y_{t-2} \\ X_{t-2} \end{array} \right) \\
 \downarrow \qquad \qquad \downarrow \\
 Z_t \qquad \qquad A
 \end{array}$$

With the equations in matrix form, it becomes simple to find the values for X and Y at time t (they are now Z_t) with the following equation:

$$Z_t = A + BZ_{t-1} + CZ_{t-2} \tag{3}$$

In order to find the long-run values, rather than simply the values at time t , equation 3 can be re-written as:

$$\bar{Z} = (I - B - C)^{-1} \cdot A \tag{4}$$

where I is the 2x2 identity matrix. When the inverse is multiplied by the values of A , two numbers emerge. These are the long-run shares of dollar and euros.

The results with one time lag, as shown in Table 4, are nearly 65% of shares in dollars and 26% of shares in euros. The dollar is clearly leading, but the euro is not very far behind. It is a sizeable competitor for the dollar, one that the world has not seen for a long time.¹²⁰ The dollar obviously does have the advantage of incumbency. But based on its history as well, the euro is expected to remain strong. As has been mentioned

¹¹⁹ For the sake of not repeating similar equations, I demonstrate here only the case with two lags, as it is longest and the most complex. The one lag calculations were performed by simply omitting components with $t-2$ variables in the equation and the values denoted by C in the matrix.

¹²⁰ The pound sterling, once also a global currency, in the third quarter of 2006, comprised only 2.32508% of the reserve shares of all countries (IMF COFER Tables).

earlier, the more the euro is used, the lower will be the transactions costs for it and the greater will be the demand for euros as reserves as other banks increase their holdings.

Once the second lag is added, the share of dollars increases to about 66% and the share of euros falls to slightly under 25%. The further back one explores the shares of euros, clearly the lower the long-run number will be—as a fledgling currency, the euro was not widely held as a reserve currency for several years. The dollar, by contrast, was held in larger amounts than it currently is. This accounts for the variations in results from one lag to two lags. But it may in fact be this finding that suggests the euro's strength. Since the long-run values for the two-lag model are slightly lower than the observed ones, then it is possible that the euro is already enjoying an increased international role, which is simply not yet reflected by the steady-state system described above. It may be “punching above its weight.”¹²¹ It may also be the case that the euro's increased international presence comes at the expense of other currencies, such as the yen or the pound sterling, rather than specifically the dollar, especially since the long-term values for the latter are close to the observed.

Until somewhat recently, the European Union's economy has actually been reported as not doing as well as that of the United States: “GDP per head in the euro area is almost 30% lower than in America, and the gap is widening: the OECD reckons that trend growth per person is only about 1.5% a year, compared with America's 2%.”¹²² Productivity growth has been slower in Europe (and speeding up in the US), and unemployment has been higher for some time. Yet regardless of this, the euro has successfully continued to slowly, but steadily, increase its potency as a reserve currency.

¹²¹ Portes et al, 2006, 1.

¹²² *The Economist*, 2007, “The quest for prosperity.”

One of the most important reasons behind the dollar's strength has been somewhat illusory confidence in the prowess of America's economy, on the "widespread belief that the American economy vastly outperformed the world's other rich-country economies in recent years." In truth, an article from *The Economist* argues, "the figures do not support the hype."¹²³ Most of the rapid GDP growth in the United States has been due to its faster-growing population relative to the European Union, as well as longer working hours and differences in measurement.¹²⁴

One would have expected the shares of the euro as a reserve currency to have remained low when the EU's economy was not faring as well as that of the United States. Instead, they stayed strong. Now, as the euro area's economic growth improves and reaches a sustainable rate, it is only expected that the euro will easily reach the reserve share amounts projected in the calculations above, if not surpass them altogether. The results demonstrate that if the euro continues at this steady pace, more and more banks will choose to hold more of their reserves in euros. The share of dollars is not projected as falling, but it will mostly likely not grow by any significant amount, and may in fact decrease somewhat if banks give up dollar reserves in favor of euro ones. From the long-run results of currency reserves regression analysis it is evident that the euro is not likely to slump as a key reserve currency.

Exchange Rate

Another topic often brought up in literature concerning the euro/dollar correlation is the exchange rate between the two currencies. As mentioned earlier, one of the

¹²³*The Economist*, 2006, "The falling dollar."

European Central Bank's main concerns is monetary stability. This includes steadiness in the exchange rate. A strong exchange rate will help to avoid capital losses for those who hold euro-denominated assets.¹²⁵ This includes central banks that hold euros as their foreign currency reserves. Therefore, there is a relation between the exchange rate of a currency and the amount of it held as reserves.

Objective and Regression Method

Having considered regressions determining a currency's share held as currency reserves, I now turn to variables influencing the exchange rate. Clearly, exchange rates are by their nature extremely volatile and difficult to predict. Nevertheless, I attempt several versions of a forecasting regression. There are many variables that impact exchange rates. But in keeping with regressions done above, I have chosen to concentrate on the lagged exchange rate, as well as lagged shares of each dollar and euro reserves. The forecasting regressions attempt to determine whether changes in the amount of a currency held by the public sector as reserves have a statistically significant impact on the appreciation of the currency.

Model 1¹²⁶ relates the change in the exchange rate¹²⁷ to a lag in the exchange rate, as well as a lag in the dollar share of currency reserves and a lag in the euro share. Model 2 drops lags in the euro shares, and concentrates solely on the impact dollar shares have on the exchange rate. Model 3 is similar, but looks only at the euro shares. Model 4 combines all variables. As with the models for shares in currency reserves, in the four

¹²⁴ *The Economist*, 2007, "The quest for prosperity."

¹²⁵ Frieden, 2000, 204.

¹²⁶ See Appendix, Table 5.

exchange rate models, I will first consider the impact of each independent variable on the dependent variable, and will then combine these points to explain the model as a whole.

Regression Results

Model 1 appears to have some of the most significant variables. The adjusted R-squared is low—only 0.3320. This is a reinforcement of the unpredictability of the exchange rate. Although it is possible to consider various variables that may exhibit impacts on it, it is nevertheless impossible to correctly predict future exchange rates. Obviously, if it were indeed feasible, many high profits would already have been made of the process. The t-statistic on the first independent variable—the lagged exchange rate—is low. It is higher for the other two variables, however. From this first regression, it appears that both the dollar and euro shares have an effect on the change in the exchange rate. Both are negatively related and have coefficients close to 0.05. This implies that a one percentage point increase in the share of dollars would have a 0.0532 percentage point decrease in the change in the exchange rate; an increase in the share of euros would lead to a 0.0475 percentage point decrease in the exchange rate. The fact that the coefficients are so low indicates the difference in the lag of changes in the exchange rate and in currency reserves. There are generally no sudden, large changes in currency reserves in the short run. Thus, any modifications in the exchange rate due to the share of reserves are disbursed over a longer period of time and therefore have a smaller impact in the short run.

¹²⁷ Exchange rate values relate the number of euros given for one dollar for each quarter from 1999-2006. Source: FXHistory from Oanda.com: The Currency Site, as of November 2006.

Both the share of dollars and the share of euros are negatively related to changes in the exchange rate in Model 1. A positive change in the exchange rate denotes a depreciation of the euro, whereas a negative change indicates an appreciation of the currency. Thus, an increase in euro reserves leads to a negative change in the exchange rate and therefore signifies an appreciation of the euro. This follows the idea that a strong exchange rate is stable and so encourages private actors to hold more of their assets in euros. Interestingly, the share of dollars is also negatively related. This may be explained, once again, by the incumbency of the dollar. Although an increase in dollar reserves leads to a depreciation of the dollar, it still remains a strong currency. Banks will continue to hold reserves of it, even if the exchange rate varies slightly.

Model 2 focuses even more on the historical aspect of the dollar. As was demonstrated in the regressions on currency reserves, adding a second lag does not necessarily provide more accurate results. In this case, the t-statistics for the lagged dollar share variables are relatively low, especially that of one lag. This is, again, most likely the result of the slower changeover process in currency reserves relative to that of the exchange rate. The coefficients on the dollar lag variables are positive. An increase in dollar share results in a positive change in the exchange, which, in turn, signifies an appreciation of the dollar. The lagged exchange rate now exhibits a higher t-statistic, making it more statistically significant. The negative coefficient is the result of its inherent relationship to the change in the exchange rate following its derivation.¹²⁸

Model 3 turns instead to the share of euros as reserves. The lagged exchange rate again has a significant t-statistic and the coefficient is negative, just as in the previous

¹²⁸ $\Delta E_t = (E_t - E_{t-1}) / E_{t-1}$. Thus, if E_{t-1} increases, the numerator decreases, while the denominator increases, causing the change in the exchange rate to decrease—a negative relationship.

regression. The signs on the euro lag coefficients, however, vary. That for one lag is positive, while that for the second becomes negative. Interestingly, the one-lag coefficients are very close for both the euro and the dollar (from Model 2). Their t-statistics are exactly the same. This would imply that when only one currency is concerned, they have a similar impact on the change in the exchange rate—almost as though the two currencies are on equal footing. The negative coefficient on the second euro lag can be explained in the similar way that the lagged euro was justified in the first regression. But the suddenly positive coefficient on the one-lag variable may suggest the explanation of the dollar share in Model 1—the euro’s increasing role as a reserve currency indicates that even though its exchange rate may be low, banks will still be willing to hold it as reserves, simply because of the benefits.

Model 4 exhibits no significant t-statistics. The R-squared is the second-highest of the four, but as in the regressions for the currency reserves, this may be due largely to the increased number of variables included. This is not a very good fit model. Clearly, of the four regressions, Model 1 exhibits the most interesting results. It is certainly obvious from at least Models 1, 2, and 3, however, that there is definitely a connection between exchange rates and currency reserves.

Analysis

Exchange rates are naturally volatile. It is typically impossible to predict a future exchange rate.¹²⁹ Similarly, because of the lack of pattern, it is difficult to find a distinct relationship between a currency’s exchange rate relative to other currency and the amount

¹²⁹ See Appendix, Figure 2.

of it held as reserves in countries' central banks. As evidenced by the regression results explained above, certain generalizations may be made, but it is nearly unfeasible to expound on conclusive facts that will be correct every time:

The long-term experience with the dollar as a reserve currency shows that there is a long-term correlation between the development of the exchange rate and the dollar's use as international reserve currency. ... But the euro did not follow the simple rule that a weak exchange rate automatically means losing ground as a reserve currency. Even when the euro was weak between 1999 and 2001, its share as a reserve currency increased from 17.9% to almost 20%.¹³⁰

Even though the exchange rate was low, there were enough countries that were confident in the euro to invest in it despite the lackluster record.

An important aspect to note of the euro exchange rate relative to other nations is that about 50 small and medium-sized countries currently “peg” their currencies to the euro.¹³¹ This means they fix their domestic exchange rate to that of the euro. Although this is the unit of account role of international money, rather than the medium of exchange function, it nonetheless has an impact on currency reserves. In order to help boost confidence in their own currency, these countries must hold official euro reserves in their central banks. These greater reserves will then increase confidence in the countries' exchange rate policy as well. Though most countries choosing to peg to the euro are new EU member states or from the neighboring areas, some other nations use the euro in their basket peg. These are countries with substantial reserve holdings and are outside the European “sphere of influence”, such as Russia and Libya.¹³² It is an

¹³⁰ Walter, 2005, 6.

¹³¹ Walter, 2005, 5.

¹³² Portes et al, 2006, 12.

important indicator of the euro's strength if large countries such as these hold euro reserves.

These larger countries, because of their considerable economies, are able to exert some influence on the exchange rate through their reserve holdings. As evidenced from Model 1 discussed above, shares of currency reserves do have some impact on the change in a currency's exchange rate. And thus if a currency is depreciating or otherwise demonstrating signs of weakness, these countries' central banks can intervene to influence the exchange rate. This has occurred before, such as in the mid-1990s when the dollar was weak and "G-7 central banks intervened and increased the market share of the dollar in their official reserves."¹³³ Further, when public and private investors choose the currency compositions of their portfolios, they tend to take into account both actual and expected exchange rates. But even in this situation, the exchange rate would have a very significant effect only in extreme circumstances.

Although the stability of the exchange rate is certainly an important characteristic of an international currency, it is not one of its main determinants. As it was mentioned earlier, the high volatility of exchange rates and their lack of predictability make them less important in long-term changes. In fact, Paul Masson and Bart Turtelboom conclude also from their research that dollar reserves would not be "a major influence on the exchange rate between the euro and the dollar, which is more likely to be influenced by the relative stance of monetary policies, relative cyclical positions, and policy credibility."¹³⁴ And as evidenced by the exchange rate regressions presented above, the exchange rate is clearly not very largely influenced by currency reserves in general.

¹³³ Boissieu, 2000, 257.

¹³⁴ Masson, 1997, 218.

Historic examples support these findings. The dollar—a widely-accepted international currency—did not witness a significant fall in its market shares when it experienced periods of weakness in the 1970s. And the euro, though somewhat weaker than expected after its launch, does not seem to have jeopardized its role in the international monetary system.¹³⁵

Conclusions from Empirical Evidence

The results of the above empirical research indicate that the euro has indeed become a strong competitor to the dollar in the area of foreign currency reserve holdings, and that the shares of euros should not decline at any point in the near future. Further, the exchange rate, though an important attribute to the euro's position as an international currency, is no longer greatly affected by the changes in the euro's share as a reserve currency. Investors and banks will most likely continue to increase their reserve holdings and strengthen the euro's role as a global currency. To this end, it is useful to consider the recent conditions of the world economy and to what extent this environment will continue to sustain a multiple reserves system.

A main concern of economists at the present time involves the issue of the increasing international debt and deficit problems of the United States. This connects to earlier discussion on the amount of a currency held as reserves. More specifically, as Chinn and Frankel explain, the role of currency as a reserve currency “is [one of the

¹³⁵ Boissieu, 2000, 257.

most] relevant...to the important questions of whether the United States will continue to be able to finance its current account deficit.”¹³⁶

The reserve currency status of the dollar allows the United States to take advantage of what is known as the “exorbitant privilege.” Countries whose currencies are not widely held as reserves have what is known as a “hard” balance of payments constraint; they must strictly monitor the balance between their assets and liabilities. But those countries whose currencies act as major reserve currencies—such as the United States—boast a “soft” balance of payments constraint, meaning they can allow liabilities denominated in their currency “to accumulate rather than use gold or foreign exchange assets.”¹³⁷ These countries are able to run very large and extended current account deficits by financing them with their own currency.¹³⁸

The US current account deficit, as of the fourth quarter of 2006, is recorded at \$856.7 billion. This is 6.1% of total 2007 GDP.¹³⁹ The “exorbitant privilege” effect furnishes the United States with quite a substantial increase in power in the short run. In the long run, however, a temptation presents itself, which “if...not accompanied by fiscal discipline...will be used as a way of building up...a substantial increase in indebtedness.”¹⁴⁰ Investors will become wary of the currency if this continues for too long. “The key question is therefore whether international investors will still accept taking capital losses on their dollar holdings and keep financing the US current account deficits at a low cost to the United States, as they currently do, or whether they will shift

¹³⁶ Chinn, 2006, 5.

¹³⁷ Mundell, 2000, 70.

¹³⁸ Portes et al, 2006, 26.

¹³⁹ *The Economist*, Economic and financial indicators, April 2007.

¹⁴⁰ Mundell, 2000, 71.

their wealth toward more stable nominal assets.”¹⁴¹ Further, as the US maintains its deficit, the dollar depreciates. As was evidenced by the empirical research presented in this paper, this will not have that significant of an effect in the short run. In the long run, however, it is possible that investors will begin to diversify their wealth out of dollars.

The instability of the dollar, caused mainly by the US current account deficit, may trigger portfolio shifts out of the dollar and into other currencies. As the strongest currency after the dollar, the euro may be the investors’ next choice. Due to its position as a main counterpart currency in the international monetary system, the euro stands to appreciate further. This will increase further the euro’s stability and will likely spur a greater shift of currency reserves in favor of the euro. Thus, the sustainability of the US current account deficit is mainly contingent on two factors. First, on how much longer foreign central banks will continue to intervene in the foreign exchange market to keep the dollar’s exchange rate strong. And second, on whether the banks will consider it more profitable to shift the bulk of their reserves away from dollars and into rival currencies.¹⁴² Perhaps if the US current account deficit were also somehow taken into consideration in the above model of the steady-state system of currency reserves, the results would have revealed a dollar with some trouble in retaining its share so solidly.

¹⁴¹ Rey, 2005, 115.

¹⁴² Chinn, 2006, 6.

CONCLUSION

This paper has considered the possibility that the euro will come to challenge the dollar as an alternative international currency. Several factors indicate that this is, in fact, a very plausible situation. The economies of the United States and the euro area are the largest in the world. The euro has demonstrated solid performance in the financial markets, which continue to become better developed and more liquid. The European Central Bank's emphasis on price stability lends more credibility to the euro, improving investors' confidence in the currency.

As the econometric evidence in this paper has shown, countries' central banks are increasingly turning to the euro as their choice of reserve currency. The share of euros is growing (it has increased by 0.55% between the first and third quarters of 2006 alone). The share of dollars is either stagnant or even declining (there has been a 0.72% drop in dollar share between the first and third quarter of 2006). Long-run values indicate that the increase in the share of euros will persist, averaging around 26%. In fact, the estimated shares are nearly equal to those currently observed (25.22% in the third quarter of 2006), indicating that the euro may already be enjoying an increased international role. In addition, low coefficients in the exchange rate models demonstrate that the exchange rate does not fluctuate much as a result of currency reserves. The confidence of banks in the euro appears to be resilient, and they will continue to increase their euro reserves. The share of euros—though not as high as that of the dollar—is steadily expanding.

It is important to acknowledge that although the euro performed well since its launch, there are still several factors that will affect its future accomplishments. The ECB must adopt a more resolute stance on whether or not it will encourage the use of the

euro as an international currency. Next, countries within the euro zone must be less hesitant to embrace their new currency. To that extent, the inclusion of those EU members choosing to remain outside the euro area—specifically the United Kingdom—will bring greater credibility to the euro. Furthermore, the condition of the US balance of payments will have an effect on the euro. If the current account deficit remains high, investors may opt to diversify out of the dollar in favor of the euro. Already, large countries, such as Russia, are choosing to hold a substantial share of their reserves in euros. It would be interesting and helpful to conduct future econometric research that would incorporate these factors.

In a relatively short period of time, the euro has become an important contender in the international monetary system. It has undoubtedly attained the status of an international currency, and therefore, the first real challenge to the dollar. It still remains to be seen whether the extent of its use over the next several years will be enough to overwhelm the use of the dollar.

APPENDIX—TABLES AND FIGURES

Table 1:
Fixed Euro Conversion Rates

1 euro	= 40.3399	Belgian Franc
	=1.95583	German Mark
	=166.386	Spanish Peseta
	=6.55957	French Franc
	=340.750	Greek Drachma
	=0.787564	Irish Pound
	=1,936.27	Italian Lira
	=40.3399	Luxembourg Franc
	=2.20371	Dutch Guilder
	=13.7603	Austrian Schilling
	=200.482	Portuguese Escudo
	=5.94573	Finnish Markka
=239.640	Slovenian Tolar (as of 1/1/07)	

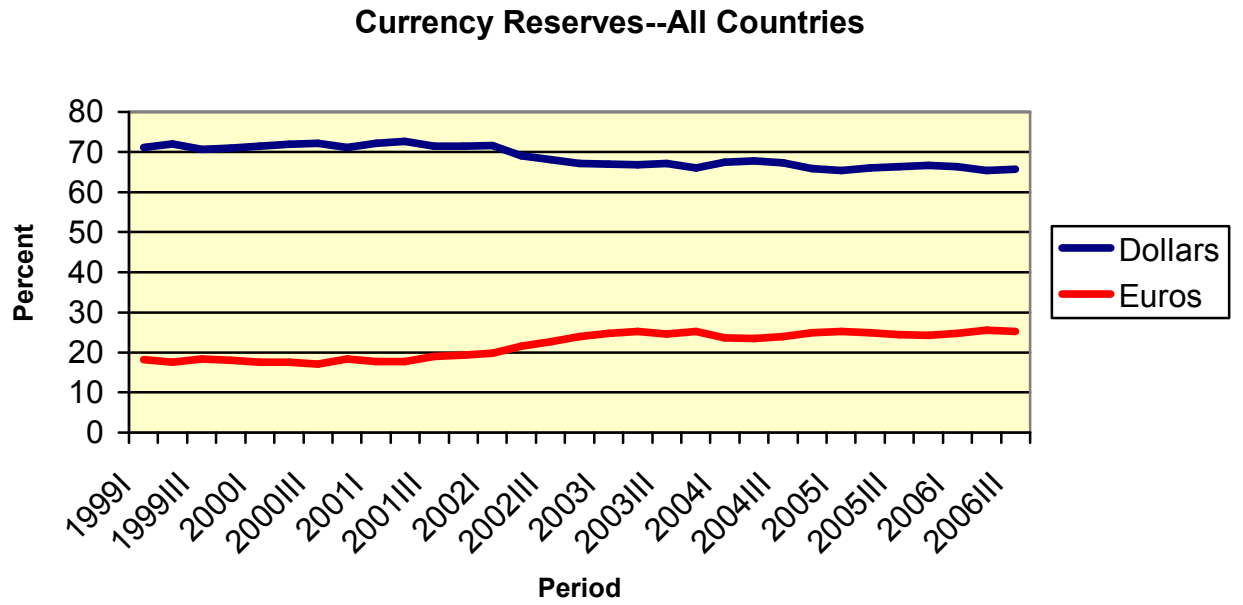
Source: Europa, “The Euro: Our Currency”.

Table 2:
Roles of an International Currency

	Private	Official
Medium of exchange	Vehicle	Intervention
Unit of account	Invoice	Peg
Store of value	Banking	Reserve

Source: Krugman, Paul. *Currencies and Crises*. Cambridge: The MIT Press, 1992.

Figure 1:



Source: IMF COFER tables, 2007.

Table 3:
Regression Results: Currency Reserve Shares

Period: quarterly data, 1999-2006				
Dependent Variable: dollar				
	Model 1	Model 2	Model 3	Model 4
Constant	3.435603 [0.75]	4.212553 [0.88]	83.02508 [3.31]	91.03238 [2.93]
dollarlag1	0.9474484 [14.16]	0.8926321 [4.71]	0.02608 [0.09]	0.311948 [0.71]
dollarlag2		0.042769 [0.22]		-0.3841244 [-0.75]
eurolag1			-0.74728 [-3.22]	-0.3835184 [-0.73]
eurolag2				-0.423829 [-0.70]
Number of obs	30	29	30	29
Adj R²	0.8731	0.8696	0.9049	0.8961
Dependent Variable: euro				
	Model 1	Model 2	Model 3	Model 4
Constant	0.8534615 [0.89]	1.181522 [1.19]	-64.2243 [-3.08]	-64.29752 [-2.48]
eurolag1	0.9714401 [22.16]	1.067776 [5.61]	1.563186 [8.10]	1.548587 [3.51]
eurolag2		-0.1112831 [-0.58]		0.0049091 [0.01]
dollarlag1			0.7594267 [3.13]	0.6561443 [1.79]
dollarlag2				0.1073966 [0.25]
Number of obs	30	29	30	29
Adj R²	0.9441	0.9421	0.9575	0.9531

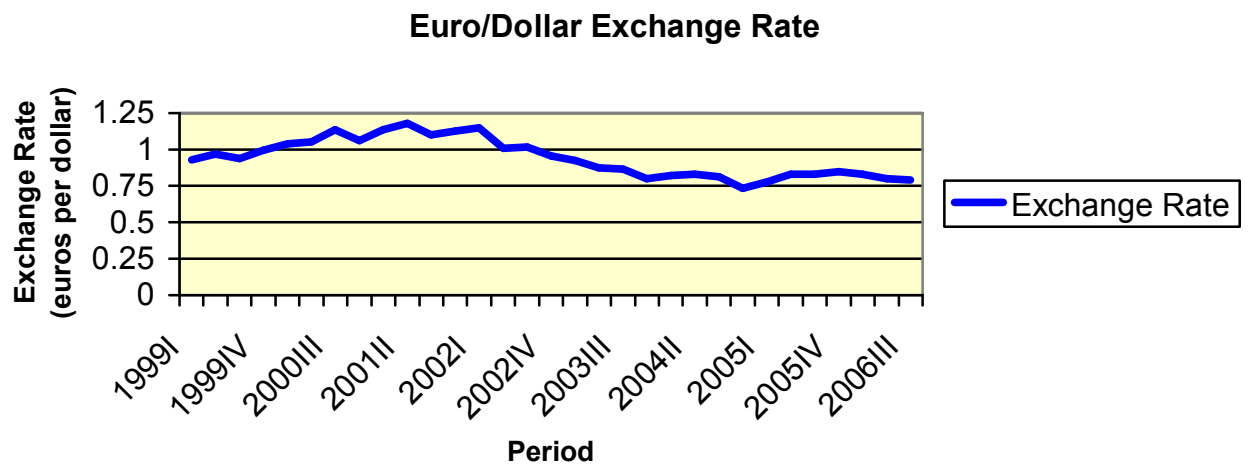
Source: See text.

Note: Value in brackets is the t-statistic for that variable.

**Table 4:
Long-Run Equilibrium Results**

		Dollar Share (%)	Euro Share (%)
Dollars only	one lag	65.37580207	-
	two lags	65.21090916	-
Euros only	one lag	-	29.88321038
	two lags	-	27.15699277
Dollars and euros	one lag	64.97707639	26.41928831
	two lags	66.28465066	24.72732541

Figure 2:



Source: Oanada.com, interbank rate, November 2006.

Table 5:
Regression Results: Exchange Rate

Period: quarterly data, 1999-2006				
Dependent Variable: change in exchange rate (xrchange)				
	Model 1	Model 2	Model 3	Model 4
Constant	4.772483 [2.84]	-1.007371 [-2.09]	0.7896284 [3.35]	4.537696 [2.37]
xrlag1	-0.0955137 [-0.64]	-0.3750854 [-2.20]	-0.4266281 [-3.25]	-0.2038428 [-1.10]
dollarlag1	-0.0531504 [-2.47]	0.0025319 [0.21]		-0.353069 [-1.10]
dollarlag2		0.0171419 [1.59]		-0.0129346 [-0.45]
eurolag1	-0.0475098 [-3.38]		0.0024035 [0.21]	-0.019501 [-0.57]
eurolag2			-0.0206707 [-1.69]	-0.0282299 [-0.79]
Number of obs	30	29	29	29
Adj R²	0.3320	0.1008	0.2394	0.2940

Source: See text.

Note: Value in brackets is the t-statistic for that variable.

Bibliography

- "The Quest for Prosperity." *The Economist*, March 17, 2007, sec. A Special Report on the European Union.
- "The Falling Dollar." *The Economist*, December 2, 2006, sec. Leaders.
- "Trade, Exchange Rates, Budget Balances and Interest Rates." *The Economist*, April 2007, sec. Economic and financial indicators.
- "FXHistory: Historical Currency Exchange Rates." Oanda.com: The Currency Site. <http://www.oanda.com/convert/fxhistory> (accessed November 28, 2006).
- "EU Regrets Sweden's Vote on Euro." *BBC News*, 2003.
- "Currency Competition: How the Dollar Might Lose its Status as the World's Main Reserve Currency." *The Economist*, September 29, 2005, sec. Finance and Economics: Economics focus.
- "Feeling Fitter." *The Economist*, October 7, 2006, sec. Finance and Economics: The euro area's economy.
- "Hard Currency, Tight Spot." *The Economist*, October 28, 2006, sec. Finance and Economics: Economics focus.
- "Rebalancing Act." *The Economist*, December 2, 2006, sec. Finance and Economics: The world economy.
- "An Uncommon Current." *The Economist*, November 18, 2006, sec. Europe: The euro.
- "Work in Progress." *The Economist*, November 29, 2001, sec. Surveys.
- Alogoskoufis, George and Richard Portes. "The Euro, the Dollar, and the International Monetary System" in *EMU and the International Monetary System*, edited by Paul Masson, Thomas Krueger and Bart Turtelboom, 58-78. Washington, D.C.: International Monetary Fund, 1997.
- Bank for International Settlements. "Triennial Central Bank Survey," 2004. <http://www.bis.org/triennial.htm>.
- Begg, David K. H. *EMU: Prospects and Challenges for the Euro*. Oxford, UK; Malden, MA, USA: Blackwell Publishers, 1998.

- Bergsten, Fred. "The Euro and the Dollar: Toward a 'Finance G-2'?" Chapter 27 in *The Euro at Five: Ready for a Global Role?* edited by Adam Posen, 27-39. Washington, D.C.: Institute for International Economics, 2005.
- . "The Dollar and the Euro." *Foreign Affairs* 76, no. 4 (1997): 83-95.
- Bernanke, Ben. "The Euro at Five: An Assessment" in *The Euro at Five: Ready for a Global Role?* edited by Adam Posen, 179-190. Washington, D.C.: Institute for International Economics, 2005.
- Boissieu, Christian. "The Euro and the Dollar: Currency Competition, Competitiveness and Policy Coordination." Chapter 15 in *The Euro as a Stabilizer in the International Economic System*, edited by Robert Mundell and Armand Cleese, 251-260. Norwell: Kluwer Academic Publishers, 2000.
- Chinn, Menzie and Jeffrey Frankel. "Will the Euro Eventually Surpass the Dollar as Leading International Reserve Currency?" *Presented at NBER Conference, Newport, RI* (Jan. 31, 2006).
- Coffey, Peter. *The Euro: An Essential Guide*. London; New York: Continuum, 2001.
- Cohen, Benjamin. "Global Currency Rivalry: Can the Euro Ever Challenge the Dollar?" *Journal of Common Market Studies*, vol. 41, no. 4 (2003): 575-595.
- Cooper, Richard. "Key Currencies After the Euro." Chapter 11 in *The Euro as a Stabilizer in the International Economic System*, edited by Robert Mundell and Armand Cleese, 177-201. Norwell: Kluwer Academic Publishers, 2000.
- Cowgill, Anthony. "Economic and Monetary Union." *Eurotreaties* (2004)
<http://www.eurotreaties.com/emusum.html>.
- Dominguez, Kathryn. "The European Central Bank, the Euro, and Global Financial Markets." *Journal of Economic Perspectives*, vol. 20, no. 4 (2006): 67-88.
- Eichengreen, Barry. "The Euro as a Reserve Currency." *Journal of the Japanese and International Economies*, vol. 12, (1998): 483-506.
- Europa. "Denmark: EMU Opt-Out Clause."
<http://europa.eu/scadplus/printversion/en/lvb/l25061.htm> (accessed March 2007).
- . "The Euro: Our Currency." Conversion rates. (2006)
http://ec.europa.eu/economy_finance/euro/transition/conversion_rates.htm.

- European Central Bank. *The European Central Bank, the Eurosystem, the European System of Central Banks*. Frankfurt am Main, Germany: Kern & Birner GmbH & CO KG, 2006.
- Frankel, Jeffrey. "On the Euro: Impacts on Members and Non-Members." Chapter 7 in *The Euro as a Stabilizer in the International Economic System*, edited by Robert Mundell and Armand Cleese, 93-109. Norwell: Kluwer Academic Publishers, 2000.
- Frieden, Jeffrey. "The Political Economy of the Euro as an International Currency." Chapter 12 in *The Euro as a Stabilizer in the International Economic System*, edited by Robert Mundell and Armand Cleese, 203-213. Norwell: Kluwer Academic Publishers, 2000.
- Funke, Norbert and Mike Kennedy. "International Implications of European Economic and Monetary Union." *OECD Economics Department Working Papers* no. 174 (1997).
- Henning, C. Randall. *Cooperating with Europe's Monetary Union*. Washington, D.C.: Institute for International Economics, 1997.
- International Monetary Fund. "Currency Composition of Official Exchange Reserves (COFER)." International Monetary Fund.
<http://www.imf.org/external/np/sta/cofer/eng/index.htm> (last accessed March 2007).
- . "IMF Annual Report 2006." (2006),
<http://www.imf.org/external/pubs/ft/ar/2006/eng/index.htm>.
- Krugman, Paul R. *Currencies and Crises*. Cambridge, Mass.: MIT Press, 1992.
- Lairson, Thomas and David Skidmore. *International Political Economy: The Struggle for Power and Wealth*. Third Edition ed. Belmont: Wadsworth, 2003.
- Mankiw, N. Gregory. *Macroeconomics*. 5th ed. New York, NY: Worth Publishers, 2003.
- Masson, Paul and Bart Turtelboom. "Characteristics of the Euro, the Demand for Reserves, and Policy Coordination Under EMU" in *EMU and the International Monetary System*, edited by Paul Masson, Thomas Krueger and Bart Turtelboom, 194-224. International Monetary Fund, 1997.
- Mundell, Robert. "The Euro and the Stability of the International Monetary System." Chapter 5 in *The Euro as a Stabilizer in the International Economic System*, edited by Robert Mundell and Armand Cleese, 57-84. Norwell: Kluwer Academic Publishers, 2000.

- Portes, Richard. "The Role of the Euro in the World: Past Developments and Future Perspectives." *European Parliament Committee on Economic and Monetary Affairs* (November 2000).
- Portes, Richard, Elias Papaioannou, and Gregorios Siourounis. "Optimal Currency Shares in International Reserves: The Impact of the Euro and the Prospects for the Dollar." (June 2006).
- Portes, Richard and Hélène Rey. "The Euro and International Equity Flows." *Journal of the Japanese and International Economics*, vol. 12, (1998): 406-423.
- . "The Emergence of the Euro as an International Currency." London Business School and CEPR; London School of Economics, 1997.
- Rey, Hélène. "The Impact of a Five-Year-Old Euro on Financial Markets" in *The Euro at Five: Ready for a Global Role?* edited by Adam Posen, 111-116. Washington, D.C.: Institute for International Economics, 2005.
- . "International Trade and Currency Exchange." Princeton University and CEPR, 1999.
- Scheller, Hanspeter. "The European Central Bank--History, Role and Functions." (December 2006), <http://www.ecb.int/pub/html/index.en.html>.
- Setser, Brad. "RGE Global Reserve Watch: Q@ 2006 Update." RGE Monitor. (2006), <http://www.rgemonitor.com>.
- Shams, Rasul. "Dollar-Euro Exchange Rate 1999-2004 -- Dollar and Euro as International Currencies." *HWA Discussion Paper* no. 321 (2005).
- The World Bank. "Key Development Data & Statistics." The World Bank Group. <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20535285~menuPK:1390200~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html> (accessed December 1, 2006).
- Walter, Norbert and Werner Becker. *The Euro: Well Established as a Reserve Currency*. Frankfurt am Main, Germany: Deutsche Bank AG, DB Research, 2005.
- Wyplosz, Charles. "EMU: Why and how it might Happen." *The Journal of Economic Perspectives*, vol. 11, no. 4 (Autumn, 1997): 3-21.