

The background of the slide is a composite image. It features a dark silhouette of a world map centered on the Americas. Overlaid on this are various elements of US currency: a large, faded portrait of George Washington from a one-dollar bill on the right; a circular seal of the United States Treasury in the center; and various serial numbers and text from currency notes, such as 'AB 0600', 'B2', 'B12829776 H', and 'WASHINGTON, D.C.' The overall color palette is a gradient from light blue at the top to a darker blue at the bottom, with a subtle orange glow behind the map.

The Use and Counterfeiting of United States Currency Abroad, Part 2

United States Treasury Department

The Use and Counterfeiting of United States Currency Abroad, Part 2

The second report to the Congress by the Secretary of the Treasury, in consultation with the Advanced Counterfeit Deterrence Steering Committee, pursuant to Section 807 of PL 104-132

March 2003



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Preface

For decades, people in other countries who face economic and political uncertainty have used United States currency as a store of value and as a medium of exchange. Estimates dating back as far as 1960 indicate that half of all U.S. currency in circulation is held abroad. Since currency can move undetected across borders, data and methods to estimate such holdings are inherently fragmentary and based on simplifying assumptions. Thus, estimates of the total share of U.S. currency held outside the United States are quite speculative. Nonetheless, the share has clearly grown over the past four decades. Today, we estimate that around sixty percent of all Federal Reserve notes in circulation, or about \$370 billion of the \$620 in circulation, is now held abroad.

U.S. dollars are often found in countries with volatile political and economic conditions. Accordingly, much of the growth in overseas dollar usage during the past two decades has occurred in Latin America and in formerly socialist countries. In many of these economies, citizens and small businesses continue to face unstable local currencies as well as underdeveloped banking and payment systems, and thus have difficulty accumulating savings and making transactions in local currencies. As a result, many residents of unstable or crisis-prone countries opt to carry out critical and large saving and transaction functions in other currencies, including the U.S. dollar.

The billions of dollars held overseas represent a windfall to U.S. taxpayers because of the seigniorage revenues generated by the added currency demand, and they also serve as a useful asset for dollar users outside the United States who have no other liquid and stable asset available. However, the circulation of large quantities of U.S. dollars outside the United States also presents challenges. In particular, the presence of U.S. dollars in areas outside the direct jurisdictional reach of the U.S. Secret Service makes them a potential target for counterfeiters, who range from organized professionals with sophisticated printing facilities and considerable skill to rank amateurs with access only to copying machines or inexpensive computer printers. Counterfeiting is primarily carried out for economic gain but may also be associated with other crimes, including drug trafficking, illicit arms dealing, and terrorism.

This study reaches three major conclusions about counterfeiting. First, the incidence of counterfeit dollar passing is generally very low both inside and outside the United States, notwithstanding occasional large seizures of uncirculated counterfeits. Second, overseas banks and law enforcement agencies are eager to develop expertise, technology, and communication links with the Secret Service to detect and suppress counterfeiting activity. Third, the International Currency Awareness Program (ICAP) has helped expand and strengthen working relationships between the U.S. Secret Service and foreign financial and law enforcement organizations.

This study updates the first report, which was issued to the Congress in 2000. Much of the information presented in that report remains valid today. As in the previous report, some figures and information were available only from discussions with various governmental and commercial sector officials; data gathered in such a way are inherently fragmentary. However, the models used in this report to estimate the share of currency held overseas and the quantity of counterfeits in circulation generate results that are consistent with the information provided by the teams' interlocutors.

This report was jointly drafted by the staff at the U.S. Treasury Departmental Offices, the U.S. Secret Service, and the Federal Reserve System for the Secretary of the Treasury. The agencies represent an interagency group, the Advanced Counterfeit Deterrence Steering Committee, which includes representatives of the Treasury Departmental Offices, the U.S. Secret Service, the Bureau of Engraving and Printing, the Board of Governors of the Federal Reserve System, and the Federal Reserve Cash Product Office. Contributing to this report were Ira Polikoff, Project Director for the International Currency Awareness Program, U.S. Department of the Treasury; Anthony Chapa, Special Agent in Charge of the Counterfeit Division, U.S. Secret Service; Ruth Judson, Economist, and Richard D. Porter, Senior Adviser, Division of Monetary Affairs, Board of Governors of the Federal Reserve System; and Jeffrey Pruiksma, Staff Director, Cash and Custody Function, Federal Reserve Bank of New York.

Executive Summary

Introduction

- This study is the second of three that will report on the results of a long-term investigation into the use and counterfeiting of U.S. currency abroad. The Treasury and the Federal Reserve are conducting the investigation pursuant to section 807 of PL 104-132, the Antiterrorism and Effective Death Penalty Act of 1996. The first report was issued in February 2000 and can be found on the Internet at <http://www.federalreserve.gov/boarddocs/press/general/2000/200002292/default.htm>.
- The audit program of the Treasury and the Federal Reserve has continued to open new lines of communication and data collection on the use and circulation of genuine and counterfeit U.S. banknotes abroad. New sources of information include high-level contacts in various foreign banking and law enforcement institutions, which have permitted the Federal Reserve and the Treasury to establish effective working relationships and channels for the timely transmission of information, and, ultimately, to work more effectively in the international arena. The Federal Reserve and the Treasury expect that these benefits will grow as the program continues.

Findings Regarding Currency Abroad

- Foreigners continue to hold U.S. currency for the same reasons that many once held gold coins outside of the countries where they were originally minted: Dollars are a safe store of value when the purchasing power of the domestic currency is uncertain or when other assets lack sufficient anonymity, portability, divisibility, liquidity, or security. As a safe asset in an unpredictable world, dollars often flow into a country to displace part of the domestic currency during periods of economic and political upheaval and often remain long after the crisis has subsided.
- Estimates by the Federal Reserve suggest that 55 percent to 60 percent of the \$620 billion in U.S. currency outstanding at the end of 2001, or \$340 billion to \$370 billion, was held outside the United States.

- Because currency can quickly move throughout the world, often without being detected, the determination of its location on any occasion is virtually impossible. Nonetheless, clearly the lion's share of overseas U.S. currency is in emerging market economies. We estimate that perhaps 25 percent of U.S. currency located abroad is held in Latin America, 20 percent in Africa and the Middle East, and about 15 percent in Asia. The remaining 40 percent of overseas U.S. currency is likely held in Europe and the countries of the former Soviet Union and their neighboring trading partners, such as Turkey.
- The circulation of U.S. currency overseas provides benefits to both the United States and foreign users. U.S. taxpayers gain by effectively receiving an interest-free loan in the amount of currency held overseas. Foreign dollar holders benefit by acquiring an asset that is liquid, secure, and stable in value, characteristics that are often unavailable in their own country's currency during and after periods of economic and political turmoil.

The Introduction of the 1996-Series New Currency Design (NCD) and the Upcoming 2003-Series Design

- A new currency design, known as NCD, was introduced in 1996, beginning with the \$100 denomination. The new design incorporated additional counterfeit-resistant features that make it easier for dollar users to authenticate the notes without specialized equipment.
- The incidence of counterfeiting of the new-design notes is dramatically lower than that of the older-design notes. Among the pre-NCD \$100s processed during 2001, the Federal Reserve Bank of New York, which processes by far the greatest portion of U.S. notes repatriated to the United States, detected 200 counterfeits per million notes processed, but among the NCD \$100s in that period, it found only 35 counterfeits per million notes processed.
- An education campaign preceding the NCD introduction to acquaint the international market with the new currency design and the no-recall policy on older-series notes

was broadly successful. As a result, both NCD and pre-NCD notes are now widely accepted in virtually all markets.

- After the initial launch of the NCD \$100s, the distribution of information for the lower-denomination notes was less successful; overseas banks, financial institutions, and law enforcement reported difficulties with obtaining printed materials in adequate quantity or in a timely manner.
- Another design change is due for 2003, with similar goals of incorporating additional user-friendly authentication features and more counterfeit-resistant features. The initial denomination in the new series to be issued will be the \$20, which is scheduled to debut in the fourth quarter of 2003. A worldwide education campaign for this new series is currently being organized.

Findings Regarding Counterfeiting

- The international popularity of the U.S. dollar has made it a tempting target for counterfeiters. However, the likelihood that a counterfeit note will be found in a batch of otherwise genuine overseas notes, is generally quite small, on the order of 1 or 2 counterfeits in 10,000 notes, about the same ratio as is found inside the United States.
- Worldwide counterfeit currency detection capabilities appear to be high. The ICAP teams found that at most commercial banks and money exchanges, clerks appeared to be able to detect even high-quality counterfeit dollars by hand examination of the notes, the most common and effective method. To maintain these capabilities, the U.S. Secret Service routinely arranges training programs on the detection of counterfeit currency in regions with significant counterfeiting activity or in areas in which dollar circulation has recently begun, such as Ecuador, which officially adopted the dollar and removed its own currency, the sucre, from circulation in March 2000.
- The Secret Service has found that, over time, the relationships that develop from day-to-day interactions between field agents and overseas agents encourage the Secret

Service's law enforcement counterparts to increase the priority given to the investigation of counterfeiting. In locations where permanent placement is not feasible, the Secret Service deploys task forces to target counterfeiters and provide training and support to local authorities.

- Given the nature of currency usage and flows, it is highly unlikely that substantial pools of counterfeit notes could circulate undetected for very long. Extensive data-gathering, discussions with currency dealers, observation of currency in circulation worldwide, and economic analysis all indicate that notes are exchanged sufficiently often that they regularly move through financial institutions and exchange houses, which we found to be generally capable of detecting counterfeits. Moreover, although some currency is held in homes or “under the mattress” as a precaution against unforeseen events, at least a small share of these notes is always being moved in and out of general circulation. As a result, notes sampled in cash deposits at Federal Reserve offices represent notes that have been in normal circulation along with notes that recently left the “mattress.”

Innovations to Combat Counterfeiting

- The Secret Service has developed a website that law enforcement agencies and currency handlers can use to report counterfeits. The website provides a useful mechanism for the Secret Service and the Federal Reserve to track worldwide counterfeiting and for financial institutions to check data on suspected counterfeits promptly and easily.
- The Federal Reserve Bank of New York’s Extended Custodial Inventory (ECI) program has also improved the repatriation rate of older-design notes and provides an efficient mechanism for the international markets to recirculate fit new-design notes.
- As a result of the ICAP trips and the operation of ECIs in Europe and Asia, it is now possible to determine in which cities and countries counterfeits are first detected in the wholesale collection chain. This new intelligence permits the Secret Service to respond more quickly and strategically to emerging threats.

Recommendations

- Since the Extended Custodial Inventory (ECI) program has improved the efficiency and stability of the international dollar banknote markets, contributed enhanced data and qualitative information on international U.S. currency flows, and aided in the more timely detection and reporting of counterfeit U.S. banknotes, it should continue to operate and possibly expand as conditions warrant.
- Given the NCD and upcoming new-design notes' greater resistance to counterfeiting, strategies to accelerate the repatriation of old-design notes should be considered.
- The Secret Service has obtained valuable information through the audit program, and should continue to draw upon information arising from the audits to evaluate its international strategy.
- The public education campaign contributed to the smooth reception of the new-design 1996-series (NCD) \$100 notes but had some major shortcomings for the introduction of the smaller denominations, particularly in overseas markets. In the future, dissemination of information on any new currency design—especially training and educational material for both cash handlers and the general public—should reach the international markets well ahead of the actual notes in an appropriate range of foreign languages and should be readily available well after the initial issuance of the notes.

1 Introduction

This study is the second in a series of three that are part of a long-term Treasury and Federal Reserve study of U.S. dollar usage and counterfeiting abroad undertaken as required by section 807 of PL 104-132, the Antiterrorism and Effective Death Penalty Act of 1996. The program is currently known as the International Currency Awareness Program (ICAP), and it is an extension of an earlier effort, known as the Joint International Study Team (JIST), that preceded the introduction of the 1996-series NCD \$100 note in March 1996. The JIST was an effort on the part of the Treasury and Federal Reserve to address three issues: patterns of use and circulation of U.S. currency overseas, counterfeiting of U.S. currency overseas, and appropriate planning for the introduction of the new-design \$100 note. The successful introduction of the NCD \$100 was viewed as extremely important because it represented the first significant redesign of U.S. currency in nearly sixty years. The Treasury and the Federal Reserve recognized that a smooth overseas introduction of the NCD note in 1996 was particularly important because the majority of \$100s in circulation were believed to be held overseas (table 1.1). Both ICAP and JIST activities consisted of study trips to areas of the world where dollars were known to circulate in significant quantities and, later, the establishment of facilities to encourage both recirculation of fit currency and repatriation of old-series currency.¹ In addition, the ICAP and JIST teams gathered information on the educational materials that should be distributed abroad and sought to inform market participants about the characteristics of the new notes. Part of the motivation for the educational campaign was to avoid the kind of confusion and panic that struck in Russia when the 1990-series \$100 note was introduced. In that case, the U.S. ambassador to Russia had to appear on local television to address rumors that older-series notes were to be recalled.

1.1 Design of the Study

The study takes account of all available information and understanding accumulated by the Treasury and the Federal Reserve about overseas counterfeiting and

¹ “Fit” currency is currency that has already been in circulation, but is still in sufficiently good condition, or “fit”, for further use.

currency holdings. In accordance with the congressional mandate, the study is based on three components: models of U.S. currency usage overseas, models of counterfeiting

Table 1.1
U.S. Banknotes in Circulation, \$100s in Circulation, and \$100s Held Overseas
 Billions of dollars, except as noted, at year-end

Year	Total (1)	\$100s (2)	Share of \$100s in total (percent) (3)	\$100s held abroad, wholesale (4)	Share of \$100s held abroad, wholesale (percent) (5)
1965	38.0	8.1	21.4	3.9	48.3
1970	50.8	12.1	23.8	5.7	47.5
1975	77.6	23.1	29.8	10.0	43.2
1980	124.8	49.3	39.5	23.8	48.4
1985	182.0	81.2	44.6	45.8	56.4
1990	268.2	140.2	52.3	85.7	61.1
1995	401.5	241.5	60.2	169.2	70.1
1999	601.2	386.2	64.2	254.6	65.9
2000	563.9	377.7	67.0	255.7	67.7
2001	611.7	421.0	68.8	279.5	66.4

Sources: Columns 1 and 2: Treasury Bulletin, various issues. Figures include vault cash but exclude coin.

Column 4: Federal Reserve Board Flow of Funds Accounts (Release Z.1).

abroad, and information obtained from country surveys with cash handlers and others knowledgeable about the extent of currency usage and counterfeiting issues abroad.²

The Federal Reserve and the Treasury have information on these subjects from a variety of sources, including U.S. Customs reports, shipment data from overseas banknote wholesalers and published proxies for those shipments, estimates based on in-

² In the early phases of this project, ICAP teams also carefully inspected or “audited” large samples of currency in commercial banks for the presence of counterfeits. However, these “audits” uncovered very few counterfeits, produced no other useful information, were costly to conduct, and were difficult to arrange. As a result, large-scale currency inspections were discontinued, but on an ad hoc basis, the U.S. Secret Service has inspected batches of counterfeits and suspected counterfeits on these overseas trips. From time to time, at the team’s request, banks have offered genuine notes for the team’s inspection so that the fitness, or condition, of such circulating notes could be directly established; on these occasions, the teams have had another opportunity to look for counterfeits.

country surveys from dollar-using countries, national surveys of domestic currency holdings, and a variety of empirical models developed by the Federal Reserve that estimate overseas flows or holdings based on realistic assumptions concerning international currency usage. On the counterfeiting side, the U.S. Secret Service collects information from around the world on counterfeits that have been passed or seized and related information from country surveys. In addition, the Federal Reserve collects data on counterfeits found in deposits at Federal Reserve Banks. Finally, using data on cash processing and on notes passed both domestically and internationally, the Federal Reserve has developed models to estimate the quantity of counterfeit currency in circulation.

1.2 International Demand for the U.S. Dollar

Because of its relative stability and near-universal recognition and acceptance, the U.S. dollar functions as both a store of value and a medium of exchange when other stable or convenient assets are not available. Thus, during times of economic or political crisis, cash in a stable and familiar currency such as the dollar is often sought as a portable and liquid hedge against possible devaluation. Similarly, dollars are a popular medium of exchange in regional or cross-border trade when credit markets are undeveloped or banks are underdeveloped or unreliable.

The Federal Reserve supplies currency on demand, so the quantity of currency in circulation increases when new demand originates anywhere in the world.³ Currency in circulation outside the Federal Reserve and the Treasury was about \$620 billion by the end of 2002.⁴ Current estimates indicate that the proportion of U.S. currency held abroad

³ As a share of domestic monetary aggregates in the United States, currency is relatively small: It comprises about half of the narrow monetary aggregate M1 and about 10 percent of the broader monetary aggregate M2. However, a large volume of currency is outstanding. Currency (including coin) in circulation outside banks as of October 2002 was about \$618 billion, or a little over \$2,200 for every U.S. resident. Adding vault cash held inside the United States increases overall currency holdings to around \$671 billion or about \$2,400 per capita.

⁴ Currency in circulation is measured two different ways, depending on whether vault cash and coin are included. The Treasury figures in table 1.1 include vault cash but exclude coin. The Federal Reserve's data, reported on the H.3 statistical release, include coin and vault cash. On a monthly average basis, vault cash ranged from \$42

is about 60 percent of the amount in circulation, or roughly \$370 billion. Most of the currency in circulation is in the form of banknotes. Table 1.1 shows the amount of paper currency in circulation as well as the amount in the largest active denomination, \$100s. In value terms, the share of Federal Reserve notes held as \$100s has increased from around 21 percent at the end of 1965 to around 70 percent at the end 2002. In addition, the share of \$100 notes estimated to be held outside the United States has also increased. As shown in the right-hand column of the table, the overseas share of \$100s rose sharply over the period from 1975 to 1995 and has remained relatively stable since then at around two-thirds of all \$100s.

The international circulation of U.S. currency in Europe expanded after World War I in the wake of the hyperinflation induced by the obligations arising from the Treaty of Versailles.⁵ At that time, U.S. currency was viewed favorably because the United States was still on the gold standard while Great Britain, whose currency was the most important rival to the dollar, remained off the gold standard until May 1925. Other countries, such as Panama, adopted the dollar as their official currency. More recently, dollar usage has expanded largely because of two events: the breakup of the former Soviet Union and episodes of high and volatile inflation in Latin America.

During a crisis, the degree of dollarization and the magnitude of the dollar inflows depend on a country's experience with dollars in the past and its economic circumstances. In particular, demand for dollars appears to depend on two factors. First, dollar inflows are generally higher in richer countries, where people are able to buy dollars. Second, the degree to which a country becomes dollarized depends on the level of development of, and the level of confidence in, the domestic banking system. The less confidence people have that the value of their bank holdings in either dollars or local currency will be protected, the more likely they are to want to hold dollars in cash. Similarly, the more developed the banking system, the more likely it is that people will have a wide variety of options for saving and for making transactions.

billion to \$46 billion during 2002. The value of coin in circulation at the end of the third quarter of 2002 was \$33.8 billion.

⁵ It was around this time that the Federal Reserve began to collect information on overseas currency shipments to and from Europe (Porter and Judson, October 1996, note 9).

Because many holders of U.S. currency view it as a form of insurance against future crises, they are reluctant to alter their dollar usage patterns even after the immediate crisis is past by either shifting out of cash holdings or by switching to another currency, such as the euro. Thus, although changing circumstances may occur in the countries the teams visited, underlying patterns of dollar usage are likely to change only slowly in countries that already use dollars. In countries that do not now use dollars to a significant degree, it is difficult to predict if and when a crisis prompting demand for a second currency might develop.

1.3 The Difficulty of Measuring the Extent of International Counterfeiting

The dollar's strong international presence and popularity make it an inviting target for counterfeiters: Where genuine dollars circulate and are accepted, counterfeits also have a chance of being accepted. Inside the United States, jurisdiction over counterfeiting cases is held by the Secret Service, which routinely receives information about counterfeiting from the Federal Reserve, commercial banks, and local law enforcement authorities. Outside of the United States, where, of course, it has limited jurisdiction, the Secret Service is both more dependent upon, and less connected to, other sources of information.⁶ Further, procedures invoked when counterfeit notes are found overseas vary widely. Thus, without ongoing, direct contact with its foreign law-enforcement counterparts, the Secret Service cannot assess the true nature of the counterfeiting threat it faces abroad. Preliminary results from our investigations indicate that Secret Service agents are now notified more promptly about suspected counterfeiting through the information channels and reporting mechanisms (e.g., the Secret Service counterfeit note search website) that have been developed.

1.4 Organization of the Remainder of the Report

The remainder of the report is organized as follows. Chapter 2 reviews the introduction of the 1996-series new currency design (NCD). Chapter 3 discusses the

⁶ The Secret Service is unable to act outside U.S. borders without the consent of the host country.

organization of the country trips and highlights of the information on currency usage obtained from them. Chapter 4 presents the estimates of the quantity and location of U.S. currency abroad. Chapter 5 discusses the business side of the international currency operations and the Federal Reserve's role. Chapter 6 explains how counterfeiting works and what is known about the geographic distribution of counterfeiting activity abroad. Chapter 7 presents a model and estimates of the overall potential size of international counterfeiting activity. A final chapter provides a brief summary and conclusion.

2 The New Currency Design: Introduction, Distribution, and Results

The introduction of the 1996 new currency design (NCD), although not a central responsibility of the ICAP teams, was an important development about which ICAP teams have been collecting information since the introduction of the \$100 note in March 1996.⁷ Properly educating the public at home and abroad will continue to be very important in light of the upcoming introduction of a new note design in late 2003. The 1996 design was developed to counteract several developing problems related to counterfeiting and authentication (determination that a note is genuine). First, unlike other currencies, the pre-NCD dollar designs had few counterfeit-resistant features that could be easily checked by a dollar user. Thus, some dollar users in the international market have had a strong preference for uncirculated currency still packaged in the Bureau of Engraving and Printing (BEP) wrappers.⁸ While the Federal Reserve Bank of New York could supply new (uncirculated) currency to these overseas users, it is less efficient for dollar users to return circulated currency and obtain new currency than it would be for them to simply recirculate the existing currency. Second, the pre-NCD currency, while easily recognized by users, had been essentially unchanged for six decades and was likely to become increasingly vulnerable to counterfeiting because of ongoing advances in color printing, computing, and electronic copying technology. A number of these concerns have been borne out. For example, the share of counterfeiting using inkjet printers increased in the late 1990s from less than 1 percent of counterfeits seized domestically in 1996 to more than 40 percent in 2001. The upcoming new note series will include both additional overt security features to ease authentication by individual dollar users and additional covert security features for use by law enforcement and the Federal Reserve.

⁷ The NCD denominations were issued at different times over the course of several years, beginning with the \$100s in March 1996 and ending with the \$5s and \$10s in May 2000.

⁸ These packages of new notes are called “cash packs” and contain 16,000 notes.

2.1 Overview: Goals, Programs, and Results

The goals for the new design covered three broad areas. First, since the NCD was the first major change in U.S. dollar design in decades, a smooth introduction was highly desirable. Second, the addition of counterfeit-resistant features that could be detected with the naked eye was designed to make dollar users more comfortable that they could authenticate their currency. By extension, it was hoped that dollar users would be more willing to accept recirculated currency. Third, the addition of new counterfeit-resistant features was expected to reduce the incidence of counterfeiting.

Table 2.1
Counterfeit \$100 Detection Rates at Federal Reserve Banks, Pre-NCD and NCD
Counterfeits per million notes of same type

Year	Total	Pre-NCD	NCD
1996	60.5	76.6	0.8
1997	66.7	158.0	7.6
1998	58.8	195.2	19.0
1999	52.1	199.5	27.1
2000	39.8	139.8	27.1
2001	48.1	200.3	34.8
2002	30.7	183.3	23.2

In order to meet these goals, the Treasury and the Federal Reserve took two concrete steps. First, the U.S. Treasury Department conducted an international education program, which facilitated the smooth introduction of the new design. Second, the Federal Reserve Bank of New York established a network of facilities to hold and redistribute U.S. dollars to the international market; these are discussed in chapter 5. These facilities, known as extended custodial inventories (ECIs), have aided in the recirculation of fit currency, which has lowered the cost of using dollars for international users. They have increased the ready availability of U.S. banknotes overseas, thus facilitating the penetration of NCD notes. Moreover, their presence has enabled the Federal Reserve to remove many of the pre-NCD notes from overseas circulation. Reducing the incidence of counterfeiting, the third goal, was also met. The rates of counterfeiting of the new design in 2002 through November were less than one-eighth those of the older-design notes, averaging just over 23 notes per million (table 2.1). The incidence of counterfeiting of new-design notes is very low. As the new-design notes

displaced older-design notes, overall counterfeiting rates declined—the rate for 2002 through November was nearly 50 percent lower than the rate for 1996.

The remainder of this chapter reviews the U.S. Treasury's program to introduce the NCD notes and the lessons drawn from that experience for the introduction of the next new-design note series. Additional details on the ECI program and its results are in chapter 5. Additional details about counterfeiting and the Secret Service's programs to reduce it are in chapter 6.

2.2 Introducing the New Currency Design: Lessons for the Future

The Department of the Treasury and the Federal Reserve System are responsible for producing and distributing currency respectively and for informing dollar users about design and policy changes related to the dollar.⁹ In the mid-1980s, the U.S. Department of the Treasury and the Federal Reserve System became concerned that U.S. currency would become increasingly vulnerable to counterfeiting because of continuing rapid advances in reprographic technology. As a result, the Treasury decided that a basic redesign of U.S. currency was necessary to maintain the security and integrity of U.S. currency. The new currency design would have several new counterfeit-deterrent features to keep U.S. currency one step ahead of advances in equipment, such as desktop computers, scanners, and printers, that could be used for opportunistic counterfeiting. Moreover, it was recognized that the ongoing improvements in reprographic technology would make the counterfeiter's job increasingly easy. To combat that threat, U.S. currency would have to undergo a sequence of basic redesigns every eight years or so, perhaps indefinitely or until the threat clearly diminished.

Because the new counterfeit-deterrent features would be effective only if consumers and cash handlers recognized and actively used them, an aggressive education campaign was undertaken to ensure that the public understood the new features of the NCD. The campaign drew on the combined resources of both public and private organizations to communicate key messages regarding the NCD to a broad international audience. These organizations included the U.S. Treasury Departmental Offices, the

⁹ The Treasury produces currency and is responsible for currency design. The Federal Reserve is the Treasury's agent for currency distribution.

Federal Reserve, the Bureau of Engraving and Printing, the U.S. Secret Service, other government agencies, including the U.S. State Department (U.S. embassies and the U.S. Information Agency), a private contractor, several communications subcontractors, corporate partners, association groups and the media.

The introduction of the 1996-series NCD currency was free of major problems, and in general the currency itself and the informational materials were well received. (Indeed, the Central Bank in Paraguay used the U.S. brochures as a model for promoting the introduction of a new design for its 50,000 guarani note.) The NCD notes moved into circulation without any significant disruptions both within the United States and abroad. Such a reception abroad was especially welcome because of the prospect of rejection of the old notes coupled with uneasiness about the new one, especially in countries like Russia, where U.S. currency plays an important role in the population's savings and in the country's banking system. Hence, a smooth introduction overseas was a critical concern throughout the planning process and received significant attention as part of the overall strategic plan.

Despite the general success of the \$100 NCD introduction, the follow-up campaigns for the NCD designs for the \$50s, \$20s, \$10s and \$5s were somewhat less successful. Throughout the ICAP visits, three types of changes were suggested for future currency design introductions. First, banks indicated that the elapsed time between the unveiling of the new note and its issue date was insufficient. Some banks and currency exchange houses, particularly in Latin America and the Caribbean, did not receive the relevant information until after the introduction of the new notes. Initially, this region was to have been given the same emphasis as Russia, but unfortunately the contractor chosen to implement the campaign did not recognize that a substantial quantity of dollars was held in Latin America and the Caribbean, particularly in Argentina and Peru. Similarly, the recent dollarization in Ecuador and El Salvador, which occurred in 2000 and 2001 respectively, came at a time when there was no effective information program in operation. In the future, distribution plans for educational materials will need to take more careful account of the time required for both shipping and distribution of these materials to various regions in the world as well as the appropriate response to take when events such as Ecuador's dollarization occur. Many central banks and bankers'

associations with whom the teams met indicated that they would be happy to assist in distributing materials to banks and other dollar handlers, and those channels should be used in addition to the other channels used for the NCD introduction, including commercial banks, the U.S. Information Agency and U.S. embassies and consulates.

Second, banks and other dollar users had great difficulty obtaining additional materials about the new currency after the immediate introduction period, and in some cases supplies of the materials were insufficient. Diplomatic contacts did not always know where to obtain more materials, and the materials themselves contained no information about where more copies could be obtained.

This situation existed in virtually every region visited by ICAP teams. To avoid repeating these difficulties, the next introduction should take three steps. First, since nearly every bank and institution has some Internet access, place the materials on the Internet. Second, designate a single central mailing address to which requests for information can always be directed. Both the Internet address and the mailing address should be clearly listed on all informational material. Third, keep adequate stocks of informational materials readily available even after the introduction has occurred to meet ongoing needs. These issues are being specifically addressed by the public relations firm that has been selected to conduct the domestic and international public education campaign for the forthcoming new note design, which is due to begin with the introduction of the \$20 in the fall of 2003. Key foreign countries for the campaign include Argentina, Ecuador, Mexico, Peru, Russia, and Turkey, but the campaign will also include countries in various stages of dollarization. In addition, the contractor is required to provide direct mail services to include addressing services, warehousing/clearinghouse services, and postage.

A third type of comment heard by ICAP visits involved requests for specific training on handling and authenticating NCD notes. Both cash handlers and law enforcement officials in countries visited expressed interest in training on the technical features, including the security thread, the optically variable ink (OVI), and the micro printing. In all instances, the Secret Service special agent assigned to the team made

arrangements with the appropriate field offices to provide the assistance requested. Future educational efforts will include additional technical advice and training.¹⁰

As of mid-2002, the proportion of NCD notes in the stock of circulating \$100 notes is 85 percent (the comparable figure for \$50s is 80 percent). The fact that 15 percent of \$100s are still of the old design seven years after the introduction of the new design indicates that the transition to the NCD notes has been slow but steady, and that the rollout strategy has not been overly aggressive. In fact, the promotional and educational messages regarding continued official acceptance of the old currency might be considered to have been a little too successful. The ICAP teams found that many dollar users had little preference for the new series notes. While counterfeiting is rarely a serious problem, especially given the superior resistance to counterfeiting of the new-series notes, a more rapid and thorough transition to the new series would be desirable. Moreover, as pre-NCD notes become less common, sorting, processing and authentication become more efficient for all cash handlers. To this end, a clear statement should be prepared to explain that while older-series notes will remain legal tender indefinitely, the security features of the new-series notes provide greater protection against counterfeiting and are preferable on that account.

¹⁰ For example, in 2002 in Latin America alone, the U.S. Secret Service planned and conducted sixteen counterfeit detection seminars in eight countries for nearly 5,000 banking and police officials.

3 Country Surveys of Currency Usage: The ICAP Trips

3.1 Background for the Currency Surveys

The NCD \$100 note represented the most dramatic design change ever seen in a Federal Reserve note. Some difficulties had followed the foreign introduction of its predecessor, the 1990-series \$100 note.¹¹ Hence, the Treasury and the Federal Reserve sought a smoother international introduction in 1996. During 1994 and 1995, teams from the Treasury and the Federal Reserve conducted a series of trips abroad with the goal of addressing three questions: First, where and how do U.S. dollars circulate outside the United States? Second, where and how do counterfeits circulate, and how are they detected and handled outside the United States? Third, what should be done to make the introduction of the 1996-series NCD notes as smooth and trouble-free as possible?

The teams usually consisted of officials from the Board of Governors of the Federal Reserve System, the Federal Reserve Bank of New York, the Secret Service, and the Treasury. The teams met with officials from U.S. embassies, consulates, and related institutions; officials of the host country finance ministries and central banks; counterfeiting enforcement officials; currency dealers and handlers at banks, currency exchanges, and valuables handling services; and various trade associations representing these groups. In addition, other authorities, organizations, businesses, and individuals were visited as conditions dictated.

In 1994 the teams first visited wholesale banknote distribution centers in Europe and Asia to assess the reception that a newly designed \$100 note might receive by the banks and other institutions involved in distributing U.S. currency internationally. Next, the teams visited the two countries that were believed to have the largest dollar holdings, Argentina and Russia.¹² Then, in September and October of 1995, a team visited the

¹¹ These notes, issued beginning in August 1991, featured a security thread and microprinting.

¹² As a precursor to the Russian trip, Treasury and Federal Reserve representatives also visited one of the new countries that had been part of the former Soviet Union, Belarus.

Middle East, a region that historically has been a significant importer of dollars. The countries visited on this trip were Turkey, Egypt, Bahrain, Saudi Arabia, and United Arab Emirates. After the 1996 legislation, Treasury and Federal Reserve officials made three trips to Asia to study dollar usage in eight economies: Cambodia, Hong Kong, Indonesia, Korea, the Philippines, Taiwan, Thailand, and Vietnam. In 1997, Treasury and Federal Reserve officials also conducted a trip to four countries in eastern Europe that were using dollars in the process of moving from a centralized, Soviet-style organization of their economies to market relationships: Bulgaria, Latvia, Lithuania, and Poland. In 1997 and 1998, two trips were made to six Latin American countries that have had varying degrees of dollarization over their history: Brazil, Colombia, the Dominican Republic, Mexico, Panama, and Paraguay. In 1998, a very brief trip was taken to South Africa, which has become an important source of counterfeits recently. In 1999, ICAP teams visited three other Latin American countries with varying degrees of dollar usage: Chile, Argentina, and Peru. In the time since the first report was written, ICAP teams visited China, Ecuador, El Salvador, Russia, South Africa, Switzerland, and Turkey.

Table 3.1
Regional Breakdown of ICAP Trips

Region	Number of economies visited	Countries
Africa	1	South Africa*
Asia	11	Cambodia, China, Hong Kong, Indonesia, Japan, Korea, the Philippines, Singapore, Taiwan, Thailand, Vietnam
Western Europe	2	Switzerland, United Kingdom (wholesale distribution centers)
Russia and eastern Europe	7	Belarus, Bulgaria, Latvia, Lithuania, Poland, Romania, Russia
Latin America	11	Argentina, Brazil, Chile, Colombia, the Dominican Republic, Ecuador, El Salvador, Mexico, Panama, Paraguay, and Peru.
Middle East	5	Bahrain, Egypt, Saudi Arabia, Turkey, and United Arab Emirates

*At a conference in South Africa in 2001, an ICAP team met with central bank officials from all of the Southern African Development Community countries: Angola, Botswana, Democratic Republic of the Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Seychelles, Swaziland, Tanzania, Zambia, and Zimbabwe.

Location	Time of visit(s)
Argentina	October 1994, November 1999
Bahrain	September 1995
Belarus	December 1994
Brazil	May 1997
Bulgaria	November 1997
Cambodia	January 1997
Chile	November 1999
China	October-November 2002
Colombia	October 1998
Dominican Republic	October 1998
Ecuador	May 2002
El Salvador	May 2002
Egypt	September 1995
Hong Kong	January 1995, October 1996
Indonesia	January 1997
Korea	July-August 1998
Latvia	November 1997
Lithuania	November 1997
Mexico	December 1996, April 1998
Paraguay	May 1997
Panama	October 1998
Peru	November 1999
Philippines	September 1996
Poland	November 1997
Romania	September 1998
Russia	August 1995, June 1997, June 2000
Saudi Arabia	September 1995
Singapore	January 1995, January 1997
South Africa	May 1998, June 2001
Switzerland	November 1994, April 2001
Taiwan	September-October 1996
Thailand	January 1997
Turkey	September 1995, April 2001
United Arab Emirates	September 1995
United Kingdom	November 1994
Vietnam	October 1996

The ICAP visits have resulted in numerous senior-level relationships among Treasury and Federal Reserve officials, U.S. diplomatic officials, and other agents posted

in other countries and commercial bankers, global and regional wholesalers, and valuables handlers. These relationships support the exchange of information, and can be instrumental in formulating responses to various international currency crises.

3.2 Criteria for Country Selection

Starting with the initial trips in 1994 in preparation for the introduction of the NCD \$100s in 1996, ICAP teams have made about two dozen trips to nearly three dozen economies connected with a total of almost four dozen countries, table 3.1. All regions of the globe have been covered with repeat visits to a few locations: Argentina, Hong Kong, Mexico, Russia, Singapore, South Africa, and Turkey.

The teams selected the locations (table 3.1) for visits and follow-up contacts on the basis of business, economic, and security considerations. Specifically, the teams visited places that had large dollar inflows or outflows, and in which dollar activity was otherwise indicated to be significant by Federal Reserve and Secret Service contacts and reports. One exception was Colombia: It was selected because it has consistently been a major source for counterfeits smuggled into the United States and successfully passed on to the public. In some of these economies, dollars enter the economy only through wholesale transit points; in others, dollars are a multipurpose asset and are used for savings, domestic transactions, and trade with neighboring countries. Many countries fall in between these two extremes.

3.3 Use of U.S. Dollars Abroad: Patterns

The dollar is widely used in many countries as a store of value, a transaction medium, and a unit of account even when it is not the official currency.¹³ In countries with underdeveloped banking sectors, cash is used to settle transactions of all magnitudes; in countries with the additional burden of unstable currencies, U.S. dollars are held in cash as a store of value, used for many transactions, and often are the unit of

¹³ For earlier estimates of the foreign component of currency stocks and flows and related issues, see, for example, Avery, Ellicheausen, Kennickell, and Spindt (1987); Blinder (1996); Feige (1996); Frankel (1995); Lindsey (1994-95); Mueller (1994-95); Porter (1993); Porter and Judson (April and October 1996); Obstfeld and Rogoff (1996); Seitz (1995); Sprenkle (1993); and Summer (1990, 1994).

account, especially for larger transactions. Even in some countries with developed banking sectors and stable currencies, dollars are the preferred currency for travelers, for cross-border trade, for settlement of large cash transactions, and for transactions in the informal or gray sector.

The countries visited by the groups provided examples of the varying conditions in which people choose to use and hold U.S. banknotes. Although the relative importance of particular reasons varies with economic and political conditions, we found five basic motivations for holding and using cash dollars. First, in times and places where the political or economic situation is uncertain, dollars are held for security against inflation and general calamity. Second, expatriate workers throughout the world often carry their earnings to their home countries in dollars, and between visits home, some of these workers hold dollars in cash rather than in a bank. Third, travelers to other parts of the world carry dollars because they are easier to exchange than local currencies. Fourth, cross-border trade in many areas is conducted largely in dollars. Fifth, the informal or “off the books” sectors in many economies are highly dollarized.¹⁴

Although the circumstances in each country are unique and it is difficult to generalize, during a crisis demand for U.S. dollars (or indeed any other currency that circulates widely outside its home country) tends to follow certain patterns.¹⁵ A crisis, often with both political and economic overtones, arises that leads to increased dollar usage. In many cases, growing fiscal deficits are eventually financed by rapid money creation, which leads to inflation. Surging prices sharply reduce the purchasing power of the domestic currency and the value of accumulated savings. Monetary and fiscal reforms are proposed or promised, but if they come at all, their arrival is usually slow and

¹⁴ It is often asserted that a major source of demand for cash dollars is the world drug trade. However, a high but plausible estimate of the total annual value of the worldwide drug trade would be about \$500 billion, with the amount in the United States about one-tenth of that. If currency turns over at the rate measured in consumer surveys, about once a week, and all stages of the drug trade use dollars, the drug trade would still require only about \$10 billion in currency, or less than 1.7 percent of the total quantity of U.S. dollars now in circulation.

¹⁵ Heymann and Leijonhufvud (1995) discuss the forces affecting currency holdings in countries experiencing high inflation but not hyperinflation. See also Obstfeld and Rogoff (1996), Vegh (1992), Savastano (1996), and Kamin and Ericsson (2003).

erratic. Inflation is correspondingly erratic, which in turn generates uncertainty about the future purchasing power of both cash and bank holdings denominated in domestic currency. Similarly, high and unstable inflation complicates the calculation and evaluation of any large or long-term financial transactions or investments, such as leases or time deposits.

Residents of countries experiencing these crises naturally seek other, more stable assets, and the dollar is often the most convenient and familiar of the available assets. Similarly, they seek to set prices and conduct financial negotiations in terms that are less likely to be affected by domestic inflation. Thus, as inflation accelerates, the first use of the dollar is as the unit of account for large-scale and longer-term transactions in the economy. As “dollarization” spreads, more transactions for large items like cars and real estate are either priced in dollars or conducted in dollars. As the realization that having dollars will prevent further losses spreads across the economy, dollar inflows accelerate. In a simple model of this process, the demand for the foreign currency (dollars) depends on the variability of inflation rates and on the difference between the inflation rates of United States and the developing country. The larger the variability and the difference, the greater will be the demand for dollars.¹⁶

The degree to which a country becomes dollarized and the degree to which residents prefer cash dollars to dollar-denominated bank accounts depend on confidence in the domestic banking system. Periodic bouts of inflation often wipe out the savings held in domestic currency, which encourages flight to other assets. Interest rate premiums and indexation of accounts for domestic inflation are alternatives to dollarization, but they are only effective when people have confidence that they will actually provide full protection against inflation. Similarly, allowing dollar-denominated deposits is not always sufficient to eliminate a flight to the cash dollar: The bitter experience of having one’s foreign currency account confiscated, devalued, or made inaccessible even once is enough to keep many people from trusting banks for a very long time.

A country’s demand for cash dollars also depends on its economic circumstances: To purchase dollars, countries must have something of value to exchange. Thus, richer

countries or countries with well-developed export sectors are more likely to be able to afford to buy dollars.

Although dollars flow into countries when the domestic currency weakens or political crisis looms, they often remain when the crisis passes. For example, an estimated 50 percent of the currency that flowed into Argentina in the late 1980s, into the Middle East before Operation Desert Storm, and into Taiwan after the 1996 crisis in the straits is still in those areas. Thus, it is reasonable to anticipate that dollars will remain abroad even after local currencies stabilize in parts of eastern Europe, the former Soviet Union, and Latin America.

3.3.1 Newly Dollarized Economies: Ecuador and El Salvador¹⁷

Ecuador and El Salvador both dollarized in the past two years, and in both countries dollarization proceeded fairly smoothly. However, their paths to dollarization were radically different. In January 2000, Ecuador found itself in political and economic crisis, with high inflation, a depreciating currency, and falling income. In these dire circumstances, Ecuador announced that it would begin withdrawing its national currency, the sucre, and shift to dollars over a short period beginning in March 2000. Despite the fact that Ecuador's dollarization was a move made in desperation, it initially worked to stabilize the economy.

In contrast to Ecuador, El Salvador dollarized in 2001 after having its national currency exchange rate pegged to the dollar for several years. Rather than recalling its national currency, as Ecuador did, El Salvador is simply not re-issuing colons when they are returned to the Central Bank in the normal course of business. The dollar has replaced the colon relatively quickly in the cities, but the transition has been slower in the countryside. As with Ecuador, the initial experience with dollarization has been positive.

¹⁶ See Obstfeld and Rogoff (1996, section 8.3)

¹⁷ The jury is still out on whether dollarization plays a role in improving the welfare of countries that adopt the dollar as their currency. In a comparison of countries that dollarized and those that did not, Edwards and Magendzo [2002] find that, in dollarized countries, inflation is lower but its volatility is about the same. However, they also find that real macroeconomic growth is lower, a result that they suspect may be due to greater difficulties in accommodating terms of trade or capital flow shocks.

Despite recently suffering two devastating earthquakes, a collapse of coffee prices, and a recession, El Salvador was able to benefit somewhat from lower interest rates and relative economic stability. Both countries are relatively small and poor, and thus the amount of U.S. currency in circulation in each is estimated to be relatively small, no more than \$1 billion in each.

3.3.2 Argentina: A Long-Term Dollar User

For the past several decades, Argentina has experienced high and chronic inflation. In spite of eight major stabilization plans (an average of two per decade) and countless other attempts at reform, Argentina never managed to reduce its annual inflation to a double-digit rate for more than a year at a time until the 1990s. The surges of hyperinflation in 1975 and in the late 1980s resulted in a persistent “dollarization” of the economy. Beginning in the 1970s, dollars were increasingly used for settling current transactions and as a unit of account.

In April 1991, Argentina embarked on its most successful and ambitious stabilization attempt, pegging its local currency to the dollar at parity using a currency board structure, in which the supply of domestic currency was rigidly limited by the amount of foreign reserves held by the central bank.¹⁸ The new policy reversed Argentina’s high inflation, which had averaged over 320 percent per year for the 16 years prior to the creation of their currency board. After the board came into existence, inflation was virtually nonexistent for over a decade. However, after a series of shocks and considerable difficulty in maintaining fiscal discipline, the dollar peg finally collapsed in late 2001, and Argentines saw their currency rapidly depreciate from a 1-to-1 peg to about 4 to the dollar. Clearly, while Argentina’s currency board brought some economic tranquility, especially in terms of reduced inflation and a lower level of interest rates, in the end the recurring fiscal problems overwhelmed the economy and policymakers opted to devalue the currency. The large group of dollar banknote holders in the country have benefited greatly from their decision to hold cash, and the dollar is

¹⁸ This policy had many interesting historical precedents in Argentina. See, for example, Della Paolera and Taylor (2001).

now more popular than ever. Well over \$20 billion in U.S. banknotes may have been in Argentina in the early 1990s and perhaps \$50 billion may be there now.

3.3.3 The Former Soviet Union

Russia and some other former Soviet republics have suffered from high inflation, economic instability, an underdeveloped banking sector, a history of confiscation of bank deposits and of unwarranted and inequitable currency recalls, and, until recently, lack of convertibility between local currencies and “hard” currencies such as the dollar. These conditions have contributed to a high level of dollar use in transactions, accounting, and savings.¹⁹ Across Russia, the majority of households hold some dollars, and many households use dollars as their chief store of value. The prevalence of dollars, the sophistication of users, and the degree to which news and rumors about dollars spread is quite high in Moscow and a few other financial centers but not elsewhere in Russia. The official attitude toward the prevalence of the dollar in Russia is mixed. Although dollars may be legally held in cash or in bank accounts, the Russian Central Bank supports “de-dollarization,” or a return to the ruble.

Interestingly, in the absence of a suitable alternative medium for transactions, dollars were used as a settlement medium within Russia and among countries that were formerly part of the Soviet Union after the collapse of communism but *before* the massive inflation of the 1990s. Though dollars had a substantial foothold in Russia, their usage grew further during the rapid inflation. On average, Russians imported about \$2 billion per month in U.S. currency from about 1994 to 1996.²⁰ More recently, in 1998 and 1999, dollar exports to Russia slowed somewhat, reflecting increased financing difficulties within Russia after the unexpected default on debt obligations in August 1998. The event caused some banks in the wholesale international currency trade to tighten the terms on which they made short-term credit extensions to Russian banks. In

¹⁹ Although the group visited only Belarus and western Russia, patterns of dollar usage are believed to be comparable throughout the former Soviet Union.

²⁰ Exports of dollars to Russia were probably high before 1994, but during the early 1990s, banks reporting their shipments to the Federal Reserve Bank of New York were reporting intermediate destinations (e.g., London or Zurich) rather than final destinations (e.g., Russia).

addition, Russia raised the tax on imported foreign currency. An important factor restraining currency imports into Russia could well have been the softness in the world oil market over the early part of this period, which reduced the resources available for dollar purchases from abroad.

The ultimate impact of the euro introduction on dollar usage in Russia is as yet unknown. The euro has certainly become the currency of choice for Russians headed for European destinations, and in this regard the dollar has been displaced to some extent. Nonetheless, the dollar is still very popular as a vehicle for cash savings, although there are some anecdotal reports that Russians began to shift their portfolios in 2002, when euro banknotes became available and when the value of the euro approached parity with the dollar.

3.3.4 Other Areas

Much of eastern Europe was highly dollarized in the early years after the collapse of the Soviet Union, but the use of dollars has waned as these countries have become more stable and have begun to develop a financial infrastructure. Nonetheless, dollars and other cash are still heavily used for tourism, for cross-border trade, and in the informal sector, with the euro increasingly used in and near the euro zone.

This transition is ongoing; during the mid- and late 1990s, dollars were estimated to represent about half of the currency stocks in the two Baltic countries we visited, Latvia and Lithuania. When the currency of Bulgaria, the lev, collapsed in 1996, falling to less than one-seventh of its purchasing power in dollars at the beginning of the year, the country imported as much as \$50 per person. Poland appears to be less dollarized than other eastern European countries in the formal sector, but the informal sector is still quite cash-intensive. Since the arrival of the euro, it is not known whether the euro simply replaced the German mark or whether it also began to displace the dollar.

In western Europe, the banking sector is highly developed, and the domestic currencies are stable. Thus, dollars are rarely used there as a store of value or means of transaction. However, several large wholesalers are based in western Europe; they supply dollars to, and buy dollars from, correspondents in eastern Europe, the Middle

East, and Africa and sell dollars to customers of their own branches for use in tourism and business in other parts of the world.

Similarly, banks in Hong Kong and Singapore trade dollars with clients for travel and for cash transactions, and they supply a large network of correspondent banks in countries where cash dollars are used heavily, including Burma, Cambodia, China, India, Indonesia, Korea, the Philippines, Taiwan, Thailand, Vietnam, and several East African countries. Dollars are the currency of choice in Cambodia and used to a considerable extent in Vietnam, especially in urban areas. Heightened political tensions between Taiwan and China have led Taiwan residents to import substantial amounts of dollars for use as precautionary savings, though anecdotal reports suggest that they might recently have begun to diversify into euros.

All forms of dollar usage are represented in the Middle East. Throughout the region, dollars are the preferred currency for travelers. In the Gulf States, local currencies are stable, so dollars are reserved for cross-border trade and travel. Traders from the rest of the Middle East and the former Soviet Union use dollars for their purchases. Residents carry dollars when traveling outside the region, and expatriate workers carry dollars to their home countries. In Turkey, dollars are used both for trade and travel and for domestic transactions and saving because of persistent high inflation. In Egypt, dollars are used very little except for travel.

Dollar usage has had a long history in Latin America and the Caribbean. Many Latin American countries used dollars exclusively or in large part at one time in their history: Argentina, Cuba, the Dominican Republic, Mexico, Panama, Peru, and Uruguay fall under this heading. Residents of these countries began to use dollars for the same reasons as in other countries, and the dollar is by far the most familiar of all foreign currencies in Latin America.

3.3.5 Remaining Geographic Uncertainties Regarding Currency Location

Although the teams were not able to visit every country in each region, educated guesses were made about dollar usage for several of the unvisited countries by drawing on a variety of economic intelligence and information from various businesses and Secret Service contacts. For example, large quantities of dollars clearly seem to be circulating

in parts of the former Soviet Union that were not visited such as Estonia, Kazakhstan, and Ukraine; in parts of eastern Europe; and throughout Latin America. Similarly, information obtained by the teams on their visits to South Africa indicates that the dollar is the dominant currency used for cross-border trade and tourism throughout Africa. Finally, there are strong indications that significant quantities of dollars are used in Cuba. In Asia, dollars are used for trade and savings, although gold is also used for savings in both Asia and the Middle East. A substantial quantity of dollars apparently flows into and out of China in connection with trading activity with Hong Kong, Russia, Taiwan, and Vietnam. While definitive information on cross-border dollar flows in Asia is difficult to obtain, the teams intend to refine their understanding of the magnitude and direction of these flows and the related stocks by further ICAP trips to China and the Indian subcontinent.

3.4 Judging the Plausibility of Overseas Dollar Holdings from Country Surveys

The Federal Reserve estimates that around 60 percent of all U.S. currency, or about \$365 billion, is held outside the United States.²¹ Since each dollar outstanding effectively represents an interest-free loan to the U.S. Treasury, the value of the external dollar circulation in interest costs avoided is on the order of \$14 billion to \$16 billion per year.²² As shown in table 1.1 above, the number of dollars in circulation has been

²¹For the original analysis on which these estimates are based, see Porter and Judson (April and October 1996). Current estimates suggest a range from around 55 to a little over 60 percent of banknotes are held abroad.

²²Technically, dollars held abroad do not reduce the level of either Treasury borrowing or Treasury interest payments. Rather, by expanding Federal Reserve liabilities (Federal Reserve notes outstanding) and, commensurately, Federal Reserve assets (U.S. government securities), dollars held abroad increase the quantity of Treasury liabilities held by the Federal Reserve and the amount of Treasury interest paid to the Federal Reserve. Since, at the margin, all Federal Reserve earnings are returned to the Treasury, the effect is that the Treasury avoids paying interest on the value of outstanding debt equal to the Federal Reserve notes held outside the country. For example, in 2001 the Federal Reserve returned \$26.1 billion to the Treasury, the bulk of which represented earnings from the assets funded by currency issuance. On the bases of our estimate that one-half to two-thirds of U.S. currency is circulating

increasing steadily since 1980, and a sizable share of this growth can be attributed to overseas demand. The dollar is thus a valuable export whose quality, or integrity, should be protected. As with many products, users have alternatives; in this case, alternatives include the British pound, euro, Swiss franc, Japanese yen, Hong Kong dollar, and Singapore dollar.

How plausible are the estimates that \$365 billion of U.S. dollars are held overseas? The nature of the aggregate estimate is the subject of the next chapter. The precise amounts that are held abroad have been the subject of a great deal of speculation for some time: As early as 1921, as the inflationary implications of the Treaty of Versailles were starting to leave an imprint, the Federal Reserve Bank of New York began publishing estimates of currency flows to Europe.

Table 3.3 presents some preliminary results from the various Treasury and Federal Reserve surveys. As expected, the per capita estimates tend to be higher in countries that have experienced high rates of inflation, even when the peak inflation experience occurred much earlier. The estimates suggest that the 2.6 billion residents in the thirty-two countries visited held around \$95 on average. Since these countries represent about 40 percent of the world's population and appear to hold around \$250 billion in currency, the countries not yet visited might well hold enough dollars to account for overseas holdings in the neighborhood of \$365 billion.²³ In particular, table 3.3 does not include estimates for several countries in Latin America and in the former Soviet Union with high dollar usage.

Thus, the country trips tend to confirm the relatively large estimates of overseas currency. But one substantial area of uncertainty remains. Domestic survey evidence on individual holdings of currency in the United States shows only about 10 percent of the total U.S. currency stock as being located inside the United States.²⁴ If 60 percent or so

overseas, the marginal value of external dollar circulation can be estimated at \$14 billion to \$16 billion.

²³ Per capita holdings in the countries not yet visited would only need to be about \$30 to be consistent with the overall estimate that 60 percent of U.S. currency is held abroad.

²⁴ Both the direct survey evidence on currency usage in the United States (Porter and Judson April 1996) and Sprenkle (1993) argue for a small proportion, around 10 percent, of U.S. currency being held within the United States.

were held abroad, this leaves 30 percent of the currency stock unaccounted for. The true domestic figure is very likely larger than 10 percent, but the possibility that foreign holdings are substantially larger than 60 percent cannot be ruled out.

Table 3.3
Foreign Holdings of U.S. Currency from Federal Reserve and Treasury Surveys

Economy	Amount of currency (billions of dollars)	Population (millions)	Average recent inflation (percent)	Per capita currency holdings (dollars)	GDP held in the form of U.S. currency (percent)*
Argentina	50	37.4	3.3	1,300	17.5
Belarus	3	10.4	62.6	288	5.8
Brazil	1	164.5	205.5	6	0.1
Bulgaria	1	8.3	100.0	120	2.8
Cambodia	2	11.2	5.6	179	25.2
Chile	0.25	15.0	10.7	16	0.4
China	50	1284.3	7.2	39	0.9
Colombia	2	38.6	23.7	52	2.4
Dominican Republic	1.5	8.0	21.3	188	3.9
Ecuador	1	13.2	34.3	77	7.3
Egypt	1	64.8	12.8	15	0.4
El Salvador	1	6.6	5.3	152	7.5
Hong Kong	2	6.5	3.7	308	1.2
Indonesia	2	209.8	9.2	10	0.3
Korea	15	45.9	6.1	327	2.3
Latvia	.5	2.4	243.6	208	5.5
Lithuania	.5	3.6	136.5	139	3.6
Mexico	5	97.6	21.2	51	0.6
Panama	2.0	2.7	1.0	648	11.1
Peru	5	25.2	29.9	182	3.8*
Paraguay	.1	5.6	16.9	18	0.6
Philippines	2	76.1	9.6	26	1.0
Poland	1	38.6	39.9	26	0.4
Romania	2	38.6	134.8	52	0.8
Russia	80	147.2	183.1	550	10.0*
Singapore	1	3.4	2.3	294	1.4
South Africa	2	43.6	8.0	46	3.1
Taiwan	1	21.7	3.2	46	0.3
Thailand	.25	59.5	5.0	4	0.1
Turkey	10	63.5	58.2	157	2.6
Vietnam	3	75.1	66.9	40	2.7
Total	248.1	2628.9	...	...	...
Average	...	...	44.59	94	1.28

Notes: The source data for the average annual inflation rate is based on monthly IFS data, and, when possible, ten-year averages of such data from the IMF's *International Financial Statistics*. The remaining data in the table were drawn from the CIA World Factbook website. For the currency holdings, estimates were provided during the teams' visits to each country, and are thus estimates as of the most recent trip to each country. ICAP teams in the Middle East also found that about \$15 billion was in the Persian Gulf in Saudi Arabia, Bahrain, the United Arab Emirates, Kuwait, Iran, and Iraq. A similar amount was thought to be in India and Pakistan.

**Based on purchasing power parity GDP.

...Not applicable

3.5 Changing Conditions in Countries Surveyed

Conditions in some countries have changed significantly since the last report. Argentina experienced a severe crisis from which it has yet to recover and which spread into neighboring Uruguay. Ecuador and El Salvador dollarized. The precise patterns of dollar usage may have changed as a result of these events, but many of the general patterns almost surely remain, so the information from the trips is likely to remain generally valid. In addition, the ongoing relationships and visits from residents of these countries provide periodic updates.

3.5.1 Transaction Technologies

As countries develop and stabilize, noncash transactions and savings mechanisms such as checks, credit cards, debit cards, and bank accounts can displace paper currency. However, discussions during the teams' trips indicate that people who have been driven to dollar usage by crisis are often extremely cautious about moving away from the familiar dollar. At the wholesale level, payment systems that displace dollars are embraced when credit systems and contract enforceability are established; these developments occur more readily within countries than across borders. Since the initial report, several bold experiments in electronic cash were launched, but none proved to be commercially successful.

3.5.2 Euro Banknote Introduction

The introduction of the euro banknotes in January 2002 generated a small short-run increase in demand for dollars, but in the longer run the euro may well displace the dollar in some portfolios. Three groups of people who now use dollars might switch to euros at some point. First, residents of the euro area who currently carry dollars when they travel outside their home countries will no longer need dollars within the euro area and may be able to exchange euros just as easily and cheaply as dollars outside this area to the extent that the euro succeeds as an international currency.²⁵ These users might

²⁵ Among other factors, the cost of exchanging money is a function of the volume exchanged in a particular currency and location. Dollars are relatively cheap to exchange in many places because they are heavily used.

switch to euros fairly quickly, and there are already indications that Europeans and Russians moved toward euros for their vacations in 2002. Second, dollar users in countries close to the euro area may find that euros are just as convenient, and in some cases more convenient, than dollars. However, these users might need somewhat more time to become accustomed to euros, and thus might not generate large movements to euros and away from dollars for several years. Third, although residents of countries experiencing political or economic crisis might in the long run prefer to hold euros, second-currency-holding habits change only very slowly. Thus, this group of dollar users is also unlikely to switch away from dollars very soon, if ever. Overall, current users of dollars as a store of wealth will likely be cautious about switching to euros until the euro becomes somewhat more established.

4 Models of Overseas Currency Demand and Usage

The Federal Reserve has developed several statistical models for estimating stocks and flows of U.S. dollars abroad.²⁶ The models indicate that between 50 percent and 70 percent of U.S. currency is now held outside the United States and that the growth in currency in circulation over much of the 1990s has been driven mostly by overseas demand. These models use confidential data on currency shipments to and from the Federal Reserve Bank of New York, data collected by the U.S. Customs Service through its Currency and Monetary Instrument Report, data on cash processing at Federal Reserve Banks, and less formal information collected during the study trips.

4.1 Data Sources

4.1.1 Major Wholesale Dealers of Banknotes

Currently, monthly reports on the volumes, sources, and destinations of incoming and outgoing international currency shipments are provided to the Federal Reserve Bank of New York by large commercial banks and other banknote brokers. These reports have been provided since 1988, and were also provided for a period between World War I and World War II.

About \$163 billion in U.S. currency on net moved overseas via wholesale banknote brokers in the fourteen years from 1988 through 2001. Before 1992, the bulk of the net value went to Latin America, primarily Argentina, which received a little more than one-third of total net shipments from the United States to the rest of the world in the 1988–91 period. Since then, turbulence in the former Soviet Union has sharply boosted shipments, especially to Russia. Indeed, the shipments have been so large that, for the fourteen years from 1988 to 2001, the broad region of Europe, Russia, and the other countries of the former Soviet Union has come to account for about nearly all net U.S. currency shipments abroad. This growth was spectacular from 1994 to 1996, when

²⁶See Porter and Judson (April and October 1996) for a comprehensive treatment of the various indirect models that have been developed to estimate overseas holdings.

annual net flows to Russia averaged about \$20 billion, or well over half of total net foreign shipments of U.S. currency in that period.

4.1.2 Federal Reserve Cash Processing Data

The most complete source of indirect information on currency flows is data on currency processing at the Federal Reserve System's thirty-six Cash Offices. The Cash Offices record by denomination and, to a limited extent, by series, all currency received, processed, destroyed, and paid out or shipped to other Cash Offices. These data do not differentiate between foreign and domestic flows, but by comparing Cash Office reports on shipments of \$100s and \$50s with information from other sources, we can enhance our knowledge of stocks and flows abroad. These data are particularly useful in light of other data, which indicate that a noteworthy portion of cash activity at certain Cash Offices arises from foreign demand for U.S. currency.

4.1.3 Currency and Monetary Instrument Reports

The most obvious direct source of information on currency flows across U.S. borders is the Currency and Monetary Instrument Reports (CMIRs) required by the U.S. Customs Service. In principle, these reports are a rich source of information because individuals and firms making almost any shipment of more than \$10,000 in cash across a U.S. border are required to file a CMIR. Nonetheless, at least six factors indicate that CMIRs are neither accurate nor thorough measures of large cash shipments outside the banking sector.

First, because arriving travelers must pass through Customs but departing travelers ordinarily do not, the CMIR data are biased toward measuring inflows of currency. Departing travelers are occasionally informed of the filing requirement or are targeted for enforcement purposes, but their responses are not adjusted statistically to account for the large proportion of outgoing travelers who should, but apparently do not, file CMIRs. For example, in 1994 the number of travelers entering the United States from anywhere in the world was about the same as the number of travelers leaving (about

45 million), but in that year, about 170,000 arriving travelers filed CMIRs, whereas only about 34,000 departing travelers did so.²⁷

Second, CMIRs do not capture shipments of \$10,000 or less, activity that could cumulate to a significant total. This feature of the data collection process biases the reported flows particularly for locations near the United States. Thus, according to the CMIR report (as well as wholesale bank shipments data) the net flows between the United States and its neighbors in most periods are relatively small and almost uniformly one way. For example, the flows are reported as going from Mexico to the United States and not the reverse. The explanation for these biased reports is simple: The flows to Mexico tend to be in numerous but small amounts, often via remittances or in the pockets of travelers who individually do not carry that much cash and thus do not need to file or, in any event, do not file CMIRs. In contrast, flows in the opposite direction represent that part of the currency going to Mexico that is unneeded and so is returned via wholesale banking channels to the United States and recorded in both CMIRs and wholesale reports. These one-way flows from Mexico are quite large, perhaps on the order of \$600-\$800 million per month.

Third, many shipments greater than \$10,000 are likely to be misreported or not reported at all. Although banks and other firms are accustomed to filing CMIRs and probably do so fairly diligently, individuals are potentially less aware of these reports, less willing to file them, or even eager to avoid them.

Fourth, the record-keeping system for CMIRs was designed to identify individual transactions, not to develop accurate aggregate statistics on currency flows.

Fifth, the 1996 establishment of the extended custodial inventory (ECI) facilities (see chapter 5) provides data superior to those on the CMIRs in two ways: (1) the CMIRs do not record the ultimate destination or origin of the currency being shipped, whereas

²⁷Most likely as a result of this one-sided recording capability, net shipments of U.S. currency in the CMIR statistics totaled only \$340 million in the period from 1977 to 1996, a period over which all other estimates of such flows increased by several orders of magnitude more.

the data on commercial bank shipments do, at least in principle, and (2) Federal Reserve data capture *all* of the movements in and out of the ECIs, whereas the CMIRs do not.²⁸

In sum, CMIRs are an important source of data, but they probably do not provide accurate aggregate data because of a one-sided system for collecting data, the omission of some potentially large volumes of currency flows, and the inability to cope with intermediate ECI transactions.

4.1.4 ICAP Trips and Other Institutional Information

The Federal Reserve estimates also draw on institutional knowledge of several types, most having to do with patterns in the issuance and usage of the \$100 note, the largest denomination now issued by the Federal Reserve. Two facts about the use of \$100s suggest that the net new demand for them is coming primarily from abroad. First, although \$20s are in more common use than \$100s in the United States, \$100s now make up nearly 70 percent of the dollar value of all U.S. currency outstanding. Second, the Federal Reserve Bank of New York, which is the primary supplier of currency to foreign users, makes shipments of \$100s that are unusually large relative to its region's share of nationwide population and income (table 4.1). The Federal Reserve Bank of New York accounted for over a third of the gross issuance of \$100s in 2001, a figure two to three times larger than its share of population, income, or payments of \$20s, a denomination more commonly used for domestic transactions.²⁹ At the same time, survey data on holdings of the \$100 bill indicate that U.S. residents hold, on average, less than one-third of a single bill per person, while for every U.S. resident, about twelve \$100 notes now circulate somewhere in the world. In sum, the basic information we have from surveys and the Federal Reserve Cash Offices about the circulation of \$100 notes is consistent with relatively low dollar use domestically and high use abroad.

²⁸The CMIRs capture only the initial and final transactions in the circular flow of currency from and to the United States. The Federal Reserve data capture all intermediate cases when the fiat currency returns to the ECI.

²⁹ The figures for the period 1974-2001 overall are quite similar.

4.2 Methods for Measuring Flows and Stocks of U.S. Currency Abroad

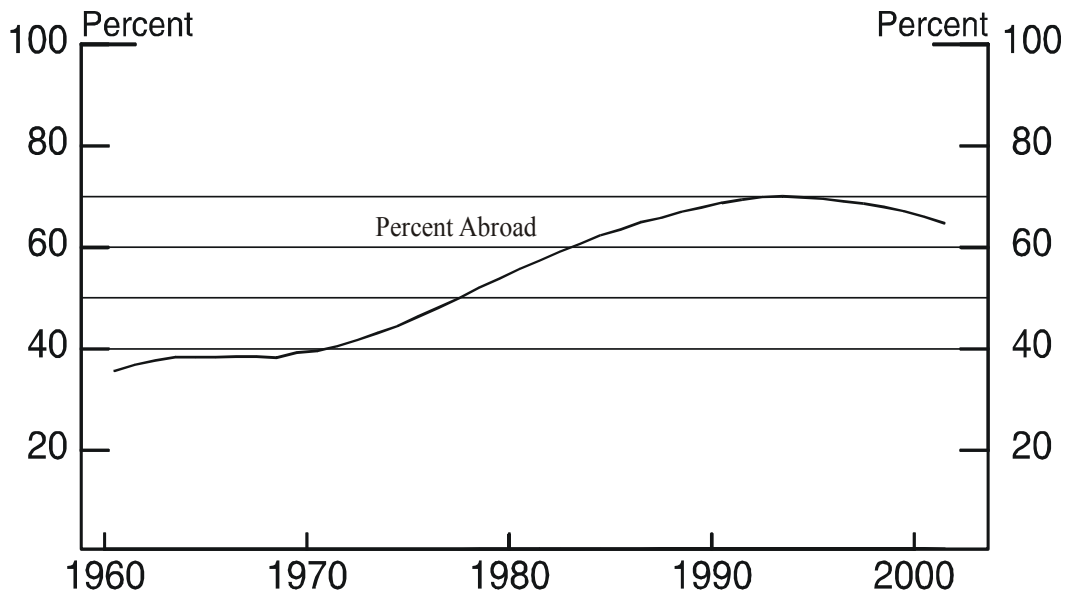
In terms of the geographic split in holdings, it is unwise to rely exclusively on official data sources because they often miss significant currency flows. For example, between two countries, currency often flows in one direction in the hands of travelers and in the other direction through (recorded) wholesale shipments between banks.

4.2.1 The Seasonal Method

The seasonal method, as well as various other indirect methods discussed in Porter and Judson (April and October 1996), is based on the idea that the usage of U.S. currency abroad differs from its usage in the United States in some measurable respect. The method relies on three assumptions: (1) the seasonal pattern of currency demand in the United States is the same as the seasonal pattern observed for demand in Canada, (2) foreign demand for U.S. dollars has no seasonal pattern, and (3) international demand for Canada's currency is so small that the seasonal pattern of demand for Canadian currency is a domestic phenomenon. Appendix 1.1 in the previous report provides evidence of the veracity of these assumptions and details about the model. The seasonal method produces an estimate of the share of currency held abroad that rises steadily from about 35 percent in the early 1960s to around 68 percent in the early 1990s and remains flat at this share before tailing off a bit and reaching around 61 percent by 2002.³⁰

³⁰These estimates are based on the banknote denominations common to the two countries, namely the \$5, \$10, \$20, \$50, \$100, and \$1000 notes. The results reported are a dollar share weighted average of those for the individual denominations, with the highest two denominations combined into one to take account of the continued issue and use of \$1000s in Canada until recently. In September 1998, \$1000s in Canada made up about 12 percent of the value of Canadian notes in circulation. The issuance of \$1000 notes in Canada has been discontinued, and they now comprise less than 6 percent of the value of notes in circulation. To replace many of the \$1000s that were removed from circulation, a disproportionately larger number of \$100s were subsequently issued. To avoid the possible distortions in the seasonal estimates for \$100s, a combined estimate of \$100s and \$1000s was constructed.

Figure 4.1
U.S. Currency Abroad, Estimated by the Seasonal Method,
Denominations from \$5 to \$1000



4.2.2 The Biometric Method

The second estimation method is based on an approach used by biologists to estimate the size of an animal population. Biologists, like bankers, can often only see a small part of the “population” (animals or pieces of currency) at any one time. The approach used by biologists is to capture a sample of the animals, mark them, release them, and capture another sample later.³¹ Assuming that the marks do not affect the animals' ability to survive, the share of marked animals in the (unknown) general population will be the same as the share of marked animals in the recaptured sample. For example, suppose that a biologist wants to estimate the number of fish in a pond. The biologist catches 100 fish and marks them. Later, the biologist returns and catches

³¹This approach draws on studies in the 1890s by a Danish biologist, Carl Petersen. More detail about the model can be found in appendix A.1.2 of the previous report, and in Porter and Judson (1996).

another 100 fish, of which 20 fish have the biologist's mark on them. This would suggest that 20 out of 100 of the total fish population, or 20 percent, are marked. Since the biologist knows that 100 of the fish are marked, the biologist might conclude that 100 is 20 percent of the total population, or that the population is 500.

This approach can be adapted to measuring U.S. currency abroad by combining two kinds of information: (1) data from Federal Reserve Cash Offices on currency shipped to and from local banks, and (2) knowledge that most of the \$100 shipments handled by the Federal Reserve Bank of New York are to and from foreign banks. First, data on currency flows at Federal Reserve Cash Offices provide virtually continuous “samples” of currency. Although currency is not literally marked when it is processed at Federal Reserve Banks, statistics for the pre-1990-series \$100 note are maintained separately from those for the 1990 and NCD series. The 1990-series note contains an embedded security thread; the NCD note has additional security features, including an enlarged offset portrait, a watermark, and color-shifting ink. The 1990-series and NCD notes function as the marked animals. For example, when a pre-NCD note is “sampled,” or returned to a Federal Reserve Cash Office, it is “marked” by being replaced with a NCD note. We know the number of NCD notes issued by each Federal Reserve Cash Office, and we know how many return to the Cash Offices in later samples.

Second, we make use of the institutional fact that the \$100 shipments moving through the Federal Reserve Bank of New York are mostly to and from foreign banks, and the Federal Reserve Bank of New York handles most international shipments between commercial banks and the Federal Reserve. Thus, if we can estimate the population of dollars in the area served by each Federal Reserve Bank, the currency abroad can be estimated as the population in the Federal Reserve Bank of New York area. Using the biometric method, we find that the December 2001 share of \$100s held abroad is just under 70 percent. The comparable estimate for \$50s is about 52 percent. For \$20s, the NCD processing strategy, which was to not immediately destroy all old-design notes processed, makes it difficult or impossible to apply the biometric method.

4.2.3 Wholesale Demand for Currency

The Flow of Funds Section of the Federal Reserve Board and the Commerce Department's Bureau of Economic Analysis (BEA) jointly publish quarterly estimates of international currency holdings that proxy for wholesale shipments of U.S. currency (table 1.1, column 4).³² The published series represents an estimate of wholesale currency shipments that move through the international banking system. Research by Porter and Judson (April 1996) showed that such shipments constitute the vast majority of all international currency shipments, with a relatively minor amount likely being transmitted through the hands of individuals and firms and smaller financial institutions.

The Federal Reserve-BEA estimate can be viewed in several different ways. First, as a benchmark for the amount of \$100s held overseas in the last few years, this estimate closely matches the other estimates of the percentage of \$100s held abroad. The Federal Reserve-BEA estimate of the share of \$100s held outside the United States was 66.4 percent of total \$100s in circulation at the end of 2001, which is very close to the estimates for this period obtained from the two methods discussed above, the seasonal (65.6 percent) and the biometric (68.8 percent).³³ Second, apart from these institutional considerations, the Federal Reserve-BEA estimates can be considered to represent international flows because they also coincide with the outliers from a simple domestic money demand specification. Table 4.1 shows that, in 2001, gross payments of \$100s and \$20s from the Federal Reserve Bank of St. Louis were 3.0 percent and 3.2 percent respectively, roughly in line with the district's 1998 share of personal income of 3.5 percent.³⁴ Thus, the amount of \$100s in this District appears to be in line with what might be expected from domestic money demand considerations within the District—that is, by and large, the \$100s that were issued in this District appear to have been used there.

³²The Federal Reserve began publication in December 1996 and the BEA in July 1997, and in each case both levels and net flows are published. Earlier, the BEA published a similar concept but that series was discontinued in the mid-1950s.

³³ This central tendency, 68.8 percent, for the biometric estimate combines the three methods that appear to be converging at the end of the sample. Based on past experience with this estimator, we believe that the excluded estimate will also eventually converge to the other estimates, so we discard it from consideration here.

³⁴ Figures for the period 1974-2001 as a whole are very similar.

The same alignment with local demand variables does not hold for the New York District, which includes the Federal Reserve Bank of New York: during 2001, the New York District issued 34.4 percent of all \$100s but only 14.3 percent of all \$20s.

Table 4.1
District Shares of Nationwide Characteristics of Economic and Cash Activity
 Percent

District	Population ¹	Personal income ²	\$100s issued ³	\$20s issued ³
Boston	4.5	5.0	2.8	7.2
New York	11.4	13.8	34.4	14.3
Philadelphia	4.4	4.6	3.4	7.2
Cleveland	6.8	6.4	2.4	5.1
Richmond	8.6	8.5	7.3	11.4
Atlanta	13.0	11.8	12.8	12.9
Chicago	10.7	10.9	6.6	11.9
St. Louis	3.5	3.3	3.0	3.2
Minneapolis	2.0	2.0	1.2	2.1
Kansas City	4.9	4.6	2.9	4.0
Dallas	8.7	8.0	6.7	6.3
San Francisco	21.6	21.0	16.5	14.5
Total	100.0	100.0	100.0	100.0

1. As of 1998.

2. Total personal income in 1998.

3. Gross payments in 2001.

If the population served by each Cash Office is used as the benchmark for the normal level of demand in that region, the two significant outliers are the New York and Los Angeles Cash Offices.³⁵ That finding was the deciding reason for selecting these two offices in constructing the Federal Reserve-BEA wholesale estimate. The assumption that all \$100s issued by these two offices are sent abroad or received from abroad requires that the quantity of small-denomination notes sent abroad from these two offices as part of wholesale shipments about matches, on net, the \$100s used domestically in the regions served by these offices.

Unfortunately, this analysis cannot readily be applied to lower denominations. For denominations lower than \$100, notably the \$20, which is the next most widely used

³⁵ The Los Angeles Cash Office is part of the San Francisco District. The Los Angeles office shows atypically large *inflows* of \$100s, which is largely currency returned to the U.S. from Pacific Rim countries.

note, the estimates are far less clear-cut. In part, the variation in the quality of the results for these two denominations represents differences in the way these two notes are used. The \$20 is a popular denomination in some developing countries such as Mexico and other nearby Latin American countries, most likely because its purchasing power is convenient for a wide array of transactions. Various indirect methods for estimating overseas holdings suggest that the proportion of \$20s held overseas is more than half. But because the \$20 seems to be more likely to circulate outside of recorded commercial banking channels, the data on wholesale shipments that allow confirming estimates for the \$100 are much less informative for the \$20, for two reasons. First, for a given dollar value, \$20s are more numerous and hence more expensive to ship than \$100s. Indeed, data indicate that, unlike the \$100, only a tiny fraction of the \$20s that are paid into circulation are shipped overseas. Second, anecdotal information indicates that departing international travelers are far more likely to carry \$20s than \$100s simply because the \$20 is the primary denomination dispensed from ATMs within the United States. In sum, while various indirect methods for estimating overseas currency holdings suggest that more than half of \$20s are overseas, the direct evidence is scanty but perhaps suggestive of a significantly lower figure.

4.2.4 Summary: Reconciling the Estimates from the Various Methods

It is interesting and reassuring to note that these disparate methods yield very similar quantitative results, especially for the key \$100 denomination, which accounted for nearly 70 percent of the total value of U.S. banknotes at the end of 2001. The biometric method produces an estimate of 68.8 percent abroad, a value close to the seasonal method's estimate of 65.6 percent abroad. These two estimates in turn are within a few percentage points of the wholesale demand method's estimate, which is that 66.4 percent of \$100s were abroad at the end of 2001. For \$50s, the seasonal method estimate (64.4 percent held abroad) and the biometric method estimate (52.3 percent held abroad) agree less closely, but are both between half and two-thirds. It is difficult to comment on \$20s as their introduction was handled differently and in a way that was not conducive to applying the biometric model to the available processing data.

5 The International Distribution of U.S. Banknotes

The current program and the earlier JIST efforts were undertaken to further understanding of currency movements both within and outside commercial banking channels, which include local retail banks and banks that function as major wholesale banknote dealers. Currency movements within banking channels include sales and purchases of currency to and from the public and banks, and can be partially measured and observed since the Federal Reserve is the ultimate source or destination for many banknote shipments. A significant volume of currency also moves across borders outside banking channels, in the pockets and suitcases of travelers and traders; these movements are extremely difficult to measure, even in approximate terms.

5.1 International U.S. Banknote Market Structure

Like other financial instruments, U.S. banknotes are traded internationally with small bid-ask spreads. While many financial institutions trade U.S. dollars for other currencies in the international foreign exchange markets, no more than thirty institutions worldwide participate actively in the wholesale buying and selling (including transport and delivery) of *physical* U.S. banknotes.³⁶ Wholesale dealer banks purchase approximately 90 percent of the U.S. dollars that are exported to international markets from the Federal Reserve Bank of New York. Most of the remaining purchases are distributed from the offices of the Federal Reserve Banks of San Francisco and Atlanta. Wholesalers purchase banknotes to fill customer orders and the notes are shipped either directly to the customer overseas or to distribution centers. In value terms, approximately 85 percent of U.S. banknotes that wholesale dealing banks purchase in the markets and return to the United States are deposited for processing at the Federal Reserve Bank of New York; most of the remaining repatriated notes are deposited at the Federal Reserve Banks of San Francisco, Dallas, and Atlanta.

Worldwide, six locations serve as the principal international distribution and consolidation hubs for U.S. banknotes: one in the western Hemisphere (Buenos Aires),

³⁶ This group of wholesalers includes those who are active globally as well as those who trade only in regional markets.

three in western Europe (Frankfurt, London, and Zurich), and two in off-shore Asian centers (Hong Kong and Singapore). Five of these sites have traditionally been extremely active in the U.S. banknote business. Frankfurt became a major U.S. banknote hub as a result of the growth of the Russian markets in the early 1990s. The preeminence of all these locations arises from their accessible transportation networks as well as their historical focus on international commerce.

U.S. banknotes are distributed over international wholesale channels either as new notes (bundled in plastic wrappers from the BEP), which is the preferred form for the majority of international market participants, or as fit notes (recirculated banknotes) in very good condition. The overwhelming preference is for new notes, still in their original BEP packaging, which assures that the notes are free of counterfeits.

In view of the handling costs and the concern of many purchasers about counterfeits, not all of the U.S. banknote distributors are willing to deal with second-hand notes. While a used or “redirect market” does exist, only the highest quality used notes are deemed acceptable. Although not a great deal of information is available about the size or velocity of U.S. banknote transactions in the “redirect” segment of the international market, it appears that the primary economic justification for dealing exclusively with new notes is to avoid the sizable costs incurred in fitness sorting and authentication of used notes. The reluctance of many banknote dealers to participate in the redirect market also stems from concerns relating to the authentication of the banknotes. This apprehension is especially true in markets such as Russia, where a \$100 U.S. note is viewed as a significant amount of money and, therefore, the possession of a counterfeit \$100 U.S. note may represent a major potential loss to an individual.

5.2 The Extended Custodial Inventory Program

To aid in the introduction of the \$100 new currency design (NCD) note in 1996, and in recognition that an assured supply of U.S. currency abroad would help to maintain stability in international financial markets, the Federal Reserve introduced the Extended Custodial Inventory (ECI) program as a pilot. An ECI is an overseas cash depot maintained by a private-sector bank that holds currency for the Federal Reserve Bank of New York on a custodial basis in a segregated area of its vaults. The Federal Reserve

Bank of New York manages the ECI program and bears the costs associated with providing management oversight and monitoring the program. It coordinates the shipment and receipt of currency between Federal Reserve facilities and the ECIs. All banknotes, while in inventory at an ECI and during transit between a Federal Reserve facility and an ECI, are carried on the books of the Federal Reserve Bank of New York. Each wholesale dealer bank that enters into an ECI arrangement maintains an account at a Federal Reserve Bank. That account is debited whenever the bank sells banknotes and the banknotes are paid out of the ECI inventory to its overseas customers. Conversely, that account is credited when the bank purchases currency from its overseas customers and deposits it into the ECI inventory.

Banks that operate ECI sites bear the costs for insurance coverage that is required and for staffing the ECI site, maintaining processing operations, and making the necessary physical renovations to house the ECI. The banks must certify that any savings realized from the Federal Reserve's recording ECI transaction on a same-day settlement basis will be passed along to the market.

The inventories held in ECIs enable overseas banks and banknote dealers to draw on an immediate supply of U.S. currency to meet local demands as well as to mitigate financial crises when unexpected financial or political disturbances occur. Also, by having readily available supplies of U.S. currency at overseas ECIs, market participants are not subject to the vagaries of transoceanic transportation schedules or adverse weather conditions for filling orders.

5.2.1 The ECI Pilot Program

The ECI pilot program had several objectives: to facilitate the introduction of the new-design currency, to expedite the repatriation of the old-design banknotes, to promote the recirculation of fit new-design currency, and to strengthen U.S. information-gathering capabilities on the international use of U.S. currency and sources of U.S. banknote counterfeiting abroad. These objectives were to be accomplished by (1) the strategic stockpiling of new-design notes at ECI sites (two in London and one each in Frankfurt and Zurich), (2) the implementation of sorting requirements for new- versus old-design

notes, (3) the deposit of old-design notes at a Federal Reserve facility, and (4) the redistribution of the resulting fit new currency to the international market.

The pilot program accomplished its primary mission of ensuring “orderly markets” during the introduction of the new-design \$100 banknote, particularly in the European and former Soviet Union markets, by providing ready supplies of new \$100 banknotes. The pilot program also offered an incentive for the major market participants to take an active role in the introduction of the new-design currency and the repatriation of the old-design notes derived from their on-site control of the inventories that were carried on the books of the Federal Reserve Bank of New York. Despite additional expenses incurred by the pilot program participants, competition increased and currency pricing margins substantially narrowed because of the cost savings from bulk currency shipments.

Federal Reserve economists evaluated the implicit costs and benefits of the ECI program to the U.S. Treasury and concluded that the implicit cost of the program is small compared with the benefit of potential additional seigniorage that might occur as a result of increased overseas traffic in U.S. currency. The cost is even less significant when viewed in light of continued confidence in the large stock of U.S. currency held abroad. Even though the exact amount cannot easily be determined, it does appear that the ECI program results in a net gain to the U.S. Treasury. Finally, the pilot provided important new information on the international flows of U.S. currency, both genuine and counterfeit, which is critical to the Treasury, the Federal Reserve, and the Secret Service.

In summary, the Federal Reserve Bank of New York’s ECI pilot represented a successful new approach in the Federal Reserve System’s currency distribution and processing policies. It demonstrated that partnership with the private sector can supplement Reserve Bank capabilities and be a cost-effective and market-sensitive approach.

5.2.2 The Current ECI Program

After the successful introduction of the NCD series notes, the ECI program’s purpose was shifted from introducing new currency designs to enhancing the international banknote distribution system and ensuring the integrity of U.S. currency.

The planned introduction of another new-design note series will once again put the ECI operations in a central role in facilitating the introduction and in conducting the public education campaign.

In January 1998 the ECI program was placed into full operation with the European ECI program extended through 2000. Additionally, ECI operations were established in Hong Kong in 1998, in Buenos Aires in 1999, and in Europe again in 2000.³⁷ The Asian ECI program was renewed in 2002 and expanded to Singapore.

5.2.3 ECI Accomplishments

The ECI program has significantly facilitated the international distribution of U.S. currency by maintaining sufficient stocks of currency in strategically located international distribution centers. In addition, the ECIs were also essential to the Federal Reserve System's efforts to supply currency to the major global financial markets during times of crises. Having the ECI inventories as part of the Federal Reserve's preparations for the century-date change helped assuage currency-related Y2K concerns. In addition, when air transportation was halted after the terrorist attacks on September 11, 2001, the insurance and armored carrier industries faced significant challenges and promptly reassessed their risk exposures. As air traffic resumed, major delays and flight restrictions were nonetheless imposed on freight and valuables cargo. By having U.S. currency already positioned at the ECIs, the Federal Reserve was able to satisfy heightened international demands for U.S. currency in the major financial markets without any interruption of service.

The ECI program has been an effective means of repatriating pre-NCD design \$50 and \$100 banknotes. ECIs are required to sort the currency purchased from market participants by design (pre-NCD or NCD) and into fit and unfit notes. This requirement ensures that old and unfit notes are removed from circulation in a timely fashion and then sent to a Federal Reserve cash-processing center for authentication and destruction. Thus, the ECIs help flush older-design notes out of the international marketplace, further ensuring the integrity of U.S. currency outside the country.

³⁷ The ECI in Buenos Aires was suspended in February 2002 because of unstable economic and political conditions in Argentina.

The ECI program has been a major contributor in the effort to retire old series designs, which has been successful. This success is based upon a combination of factors: a higher penetration rate for the new design in various markets based upon the much more significant changes in the design; the associated improvements in counterfeit deterrence; a more effective public education campaign; the development of an international market for fit notes as well as the requirement for ECIs to repatriate old design notes.

Banknote dealers in the international currency markets voluntarily provide data to the Federal Reserve Bank of New York on country-level flows of payments and receipts. This dataset has been instrumental in the creation of several statistical models for estimating stocks and flows of U.S. currency abroad. These models in turn, have been used to gain a better understanding of the benefits and challenges that result from having about \$365 billion of U.S. currency held abroad. The ECI program has enabled the Federal Reserve Bank of New York to provide the U.S. Treasury Department and Board of Governors with timelier and more detailed reporting of country-specific information on overseas use of U.S. currency.

The sorting and authentication operations conducted by the ECIs and the information provided to the U.S. Secret Service and Federal Reserve Bank of New York are important aspects of anti-counterfeiting efforts, and provide two concrete improvements in reporting. First, the ECI program has become a direct source of information to the U.S. Secret Service on international counterfeiting. All ECIs utilize the Secret Service's web-based Counterfeit Note Search Site. ECIs detect counterfeit notes before they pass from the overseas banking system and information on the geographic sources of these counterfeit deposits is quickly relayed to the Secret Service. The ECIs were among the pilot sites for the Secret Service web-based automated counterfeit note search site. Second, most notes forwarded to Federal Reserve Banks are labeled by country of origin. Thus, the origin of counterfeits detected in ECI shipments to Federal Reserve Banks can be determined and is now reported.

6 Global Counterfeiting

Given that so much genuine U.S. currency is overseas, a reasonable question is how much counterfeit U.S. currency might also be circulating overseas? When the ICAP teams were initially assembled in the mid-1990s, numerous reports suggested that vast quantities of counterfeit dollars were circulating overseas. Some of these reports and anecdotes came from commercial establishments seeking to sell their anti-counterfeiting products as a method for businesses to protect themselves. Other, more credible organizations stated that vast amounts of counterfeit notes went undetected and remained in the marketplace indefinitely. All such reports and anecdotes have been refuted by the findings of the ICAP trips as well as by data from official sources, an indication that the actual incidence of counterfeiting is relatively low. This chapter examines the economics of counterfeiting, the mechanics of counterfeiting enforcement, the amount of counterfeits that have been passed and seized in various international markets, and the efforts by the Secret Service to respond to various counterfeiting threats. Chapter 6 attempts to place an upper bound on the estimated quantity of counterfeit currency in circulation using data collected by the Secret Service and Federal Reserve and an analysis of circulation patterns for genuine and counterfeit currency.

6.1 General Considerations

Counterfeiting of U.S. currency is a lucrative and relatively low-risk criminal enterprise in many parts of the world. Since U.S. dollars are widely held and used in many countries, counterfeiters have many opportunities to pass counterfeit dollars outside of the United States. Moreover, the punishment for production, distribution, and passing of counterfeit U.S. dollars outside the United States varies considerably in severity. The level of concern about counterfeiting also varied across the countries visited by the teams: Officials and business people in some countries viewed counterfeits as a considerable threat while those in other countries were more blasé, viewing counterfeits as an inescapable part of the banknote business. Regardless of the level of concern, the figures for the incidence of counterfeiting were remarkably consistent: Most central

banks report detecting no more than about one counterfeit note for every 10,000 notes they handle.

Detection capabilities for counterfeit U.S. dollars are relatively high overseas and, in line with the idea that counterfeit notes are part of the banknote business, the level of resources expended on their detection is determined in cost-benefit terms. That is, both central and commercial banks displayed varying detection practices depending on local labor costs, local counterfeit activity, and the relative cost of missing a counterfeit. Training tellers to detect counterfeit U.S. dollars is not particularly difficult, and it is possible to find and train fully capable tellers in emerging-market countries. In many countries, tellers have an incentive to detect counterfeit U.S. dollars because the value of undetected counterfeit notes is frequently deducted from their pay. The incentives for shopkeepers are similar: Accepting a counterfeit is likely to result in a direct loss to the business. In countries where dollars are a new asset, small commercial banks might suffer a loss from counterfeiting and then arrange for training to avoid further episodes. Similarly, banks often sort lower-denomination notes only by machine or not at all, reserving the costly but more accurate method of hand counting and verification for the \$50 and \$100 denominations. On balance, counterfeit U.S. dollars were typically viewed as an occasional but not serious problem within the foreign banking community.

In the United States, U.S. dollars sent to Federal Reserve Banks are checked for counterfeits, and any counterfeits detected are forwarded to the Secret Service for further investigation. The counterfeits detected by the Federal Reserve constitute about 20 percent of all counterfeit passed upon the public and received by the Secret Service. The remaining 80 percent of counterfeit U.S. dollars detected are reported to the Secret Service directly by commercial establishments, financial institutions, and law enforcement authorities.

The Secret Service has recently developed two new systems to improve statistical reporting: The Counterfeit Contraband System and the new Counterfeit Note Search Site on the Internet. The Counterfeit Contraband System automates the collection of statistical and investigative data regarding counterfeit currency. Information entered into the system is readily available for analysis and is reconciled fifteen days after the end of each month. The system allows each Secret Service office to monitor the data of all other

offices to determine if and when counterfeiting activity moves from one investigative district to another. Monthly records are closed on the fifteenth of the following month, allowing for timely access to current statistics.

In March 1999 the Secret Service established a Counterfeit Note Search Site on the Internet (www.usdollars.treas.gov) that allows authorized users to access a database containing descriptions of all counterfeit notes known to the Secret Service. This web site, which is in continuous operation, allows domestic and foreign financial institutions and law enforcement agencies to input the identifiers on a questioned note to determine if it is a known counterfeit. If the note is a known counterfeit, the Secret Service classification number is given, and further instructions are provided. If the note is not a known counterfeit, the user is instructed to carefully examine the note for defects and to call the Secret Service office listed on the screen for additional assistance. This site allows the Secret Service to obtain information on counterfeit distribution and passing activity more quickly than in the past.

The Secret Service Counterfeit Division, which is the headquarters unit with oversight of all Secret Service anti-counterfeiting operations, controls access to the web site and maintains the counterfeit note database. The Counterfeit Division has used the web site on several occasions to post limited defect information on certain high-quality and large-quantity counterfeit notes to foreign law enforcement and financial institutions and the Federal Reserve system, thereby heightening awareness internationally of the appearance of these notes. The Secret Service has received a strongly positive response from the international community regarding the U.S. government's willingness and ability to share this information in such a timely manner.

In addition to providing for the routine processing of counterfeit U.S. dollar notes, the web site has been effectively used as a proactive enforcement tool. Certain high-priority notes, such as notes targeted in a specific investigation, can be carefully monitored by Counterfeit Division. When a user anywhere in the world enters the identifiers on these notes, this information can be rapidly disseminated to the responsible Secret Service Field Office and other authorities for immediate investigative action.

Over time, the Secret Service expects additional foreign banks and law enforcement agencies to use the system, thus incorporating more timely and complete

information from a wider array of countries. The web site currently has over 6,000 subscribers in 68 countries, including a variety of law enforcement agencies, financial institutions, and approved commercial entities.³⁸

Table 6.1
Registered Users of the Secret Service Counterfeit Note
Search Site

Type of user	Domestic	International
Financial	5,665	138
Law enforcement	743	279
Commercial	87	4
Federal Reserve	174	...
Total		7,090
...Not applicable		

In August 2002, the U.S. Secret Service and Colombian National Police sponsored an International Counterfeit Money Seminar “A Latin American Perspective on the U.S. Dollar” in Bogotá, Colombia, and a Spanish version of the counterfeit note search website was introduced to the conference participants, who represented seventeen Central and South American countries. A total of forty-seven individuals registered for access to the web site at the seminar. Both this strong reception for the website, which represented nearly 10 percent of international registration on the website as a whole, and the plaudits for the Spanish version of the web site garnered at the seminar suggest that the site may prove to be a valuable law enforcement tool in this vital region that has been the source of so many well-produced counterfeits for a long period of time.

6.2 Counterfeit Production Methods

A variety of methods, generating a wide range of quality in output, are currently used for producing counterfeit U.S. dollars. Once produced, the counterfeit U.S. dollars must either be passed by the manufacturer or transferred to others for distribution; either method is a complicated undertaking when large volumes of notes are produced. A bank or an individual might be fooled into accepting a batch of counterfeit U.S. dollars, but this seldom happens more than once. Thus, the counterfeiter must distribute the bogus notes ever more widely.

³⁸ The figure for number of subscribers was as of August 2002.

In the past, producing highly deceptive or easily passed counterfeit U.S. dollars required substantial technical ability and access to presses, inks, and, critically, high-grade paper. With the current revolution in personal computing and other digital technology, printing technology is improving at a dramatic rate, thus reducing the costs and printing skills or special training needed for counterfeiting. As a result, increasingly deceptive counterfeit U.S. dollars can be produced on color copiers or on inexpensive personal computer equipment.

Counterfeit U.S. dollar manufacturing operations are of three basic types: traditional offset-printed counterfeit notes, digitally printed notes, and more highly deceptive notes produced by intaglio and typographic printing methods.

Traditional offset lithography requires specialized printing equipment and materials as well as considerable skill. The counterfeit U.S. dollars produced by this method can be quite deceptive to the public but are generally easy to detect by trained cash handling personnel. The high volume of counterfeit U.S. dollars that can be easily produced by this method presents an investigative challenge to foreign and domestic law enforcement.

Digital printing techniques employ copying machines, scanners, and computers, which reproduce currency images using multicolor plastic toners or liquid inks. These notes vary greatly in quality. A layperson with only rudimentary computer skills can use digital technology to produce a reasonably “passable” counterfeit note. Digital technology is also poised to revolutionize traditional printing operations. Fully automated and computer controlled offset presses and other specialized printing equipment being introduced in today’s market are allowing high-quality and high-volume printing with little training or expertise.

The Secret Service suspects that the counterfeiting of U.S. currency may become progressively easier as the generally available technology improves and the cost of computer equipment (including printers and scanners) decreases. Counterfeiting with laser color printers is likely to increase with the affordability of the printers. Similarly, the growing use of the Internet is expected to aid counterfeiting. Once a currency note is scanned and the resulting electronic image is enhanced, the image can be transmitted

electronically, including over the Internet, and printed in batches of any size by individuals who would be unable to make the image themselves.

Finally, certain highly deceptive notes, termed “supernotes” or “super dollars” by the media, have received worldwide attention. These notes are printed with intaglio and typographic methods similar to those used by the U.S. Bureau of Engraving and Printing (BEP) and use specially manufactured paper. Despite the high quality of this type of counterfeit, defects and other features allow it to be consistently detected in currency processing at Federal Reserve Banks and other financial institutions worldwide. In addition, in terms of volume and overall impact, the current threat from this type of counterfeit is greatly overshadowed by the threat from offset and digital counterfeiting. Nonetheless, the Secret Service continues to aggressively investigate all cases of “highly deceptive” counterfeit U.S. dollars to prevent direct economic loss and a loss in confidence in U.S. currency worldwide.

Of the 651 counterfeit-currency printing operations suppressed in the United States during fiscal year 2001, 608, or 93.4 percent, used digital processes, a phenomenal increase from the 29 digital operations (or 18.9 percent of the total) suppressed in FY 1995. Even though the quality of digital counterfeits varies widely, and even though they are not at present being produced outside of the United States in nearly the same volume as they are domestically, the increasing use of computers in the production of counterfeit notes remains a key concern for the U.S. Secret Service.

6.3 Recent Experience with Counterfeiting

Out of the approximately \$600 billion in U.S. dollars in circulation during FY 2001, the Secret Service reported that about \$49 million in counterfeit currency was passed on to the public worldwide, or about \$1 for every \$12,400 in circulation.³⁹ Of that \$49 million, almost all (\$47.5 million) was passed in the United States, with the remainder passed overseas. In terms of enforcement, the Secret Service counterfeit

³⁹ The Secret Service reported that additional quantities were “seized,” or confiscated before they entered circulation. While seized notes pose some threat before they are seized, passed notes clearly cause losses to the public.

program in FY 2001 resulted in the arrest of 5,241 suspects and the suppression of 651 counterfeiting plants in the United States.

6.3.1 Overall Figures on Passing and Seizures of Counterfeit U.S. Currency

Within the United States, all detected counterfeit currency must be turned over to the Secret Service. As mentioned earlier, the laws of other countries vary considerably. Thus, the Secret Service's data for the United States are much more complete than the equivalent data for other countries. Table 6.2 displays figures on counterfeit currency passed or seized from 1999 to 2002.

Table 6.2
Data on Counterfeit Currency, Fiscal Years 1999-2002
Millions of dollars

Year	Passed			Seized		
	Domestic	Foreign	Total	Domestic	Foreign	Total
1999	39.2	1.4	40.6	13.7	126.6	140.3
2000	39.7	1.4	41.1	20.9	190.8	211.7
2001	47.5	1.5	49.0	12.6	54.0	66.6
2002	42.9	1.4	44.3	9.7	120.4	130.1

Note. "Seized" refers to counterfeit currency that was detected before being circulated, while "passed" indicates currency that was determined to be counterfeit after entering circulation. Only passed currency represents a loss to the public; seized counterfeits represent only a potential threat.

Table 6.3
Counterfeiting Rates in Deposits at Federal Reserve Banks, 2002

Denomination	Total notes processed (millions)	Value of counterfeits detected (millions of dollars)	Counterfeits detected per million notes processed
\$1	11,931.0	0.01	0.7
\$2	18.1	0.00	1.1
\$5	2,421.5	0.05	4.2
\$10	2,196.7	0.25	11.6
\$20	14,804.5	1.39	4.7
\$50	1,209.3	0.31	5.1
\$100	1,627.0	5.00	30.7
Total	34,208.1	7.01	5.0

6.3.2 Rates of Counterfeiting in Federal Reserve Statistics

Tables 6.3 and 6.4 provide some evidence on the frequency with which counterfeit notes are found in domestic and foreign deposits at Federal Reserve Banks. Table 6.3 shows the overall results by denomination for 2002; the denomination with the largest amount of counterfeits, both in dollar terms (about \$7½ million) and as a proportion of notes processed (about 50 per million notes), was the \$100 note.

Table 6.4
Counterfeit \$100s Detected In Deposits Processed at Federal Reserve Banks
1996-2002

Period	Counterfeits detected (millions of dollars)			Notes processed (billions of dollars)			Counterfeits detected per million notes of same source and series processed		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
All Series									
1996	6.83	5.69	1.14	112.9	79.8	33.1	60.5	71.3	34.5
1997	7.22	5.63	1.59	108.3	76.1	32.2	66.7	74.0	49.4
1998	6.33	5.21	1.11	107.5	76.8	30.7	58.8	67.8	36.3
1999	5.82	5.00	0.82	111.7	84.3	27.5	52.1	59.3	29.8
2000	6.44	5.56	0.89	162.1	124.4	37.7	39.8	44.7	23.5
2001	7.40	6.63	0.77	154.0	126.7	27.3	48.1	52.4	28.1
2002	5.00	4.27	0.73	162.7	127.1	35.6	30.7	33.6	20.4
Total, 1996-2002	45.04	37.99	7.05	919.2	695.2	224.1	44.6	50.4	27.8
1996-Series (NCD)									
1996	0.02	0.02	0.00	23.9			0.8		
1997	0.50	0.47	0.03	65.8			7.6		
1998	1.58	1.48	0.10	83.2			19.0		
1999	2.59	2.40	0.19	95.5			27.1		
2000	3.89	3.49	0.41	143.8		n.a.	27.1		n.a.
2001	4.92	4.50	0.42	141.6			34.8		
2002	3.59	3.14	0.45	155.0			23.2		
Total, 1996-2002	17.09	15.50	1.60	708.8			17.5		
Pre-NCD Series									
1996	6.81	5.67	1.14	88.9			76.6		
1997	6.72	5.16	1.56	42.6			158.0		
1998	4.75	3.73	1.01	24.3			195.2		
1999	3.23	2.60	0.63	16.2			199.5		
2000	2.55	2.07	0.48	18.2		n.a.	139.8		n.a.
2001	2.48	2.13	0.35	12.4			200.3		
2002	1.41	1.13	0.28	7.7			183.3		
Total, 1996-2002	27.95	22.49	5.45	210.3			144.1		

6.3.3 Counterfeiting Inside and Outside the United States

Table 6.4 breaks down the data for \$100s detected at Federal Reserve Banks over the last six years by note design and by origin of deposit. For both types of notes over the whole period shown, the foreign share of detected counterfeits is rather small, less than 10 percent for 1996-series (new currency design, or NCD) counterfeits and around 20 percent for older-series counterfeits. However, the incidence of counterfeit detection in foreign deposits is closer to domestic levels at about one-half to two-thirds of the domestic incidence. The lower figures for foreign deposits likely reflect two factors. First, foreign deposits are smaller because the cost of transporting U.S. currency is generally higher from a foreign location than from a domestic location, and thus dollars held outside the United States tend to return to Federal Reserve Banks less frequently. Second, dollars that do get shipped back to Federal Reserve Banks have likely been scrutinized more, because of both their longer lifespan away from Federal Reserve Banks and the generally lower labor costs of currency authentication outside the United States.

Table 6.5 provides data on the very highest grade of counterfeits, the “supernotes.” As noted above, supernotes are printed by the intaglio method, the same method used by the BEP to print genuine notes. Nearly all high-grade counterfeits are \$100s as the labor involved in producing and circulating them apparently does not make counterfeiting of lower denominations worthwhile. The value of the passed notes of this variety is a small share of overall passing activity, especially for the NCD notes and especially for the United States, for which data are more complete. In 2001, only \$1.2 million of the \$47.5 million worth, or about 2.5 percent, of counterfeit notes passed fell into the “highly deceptive” category.

6.3.4 Secret Service Cooperation Outside the United States

The statistics in the previous section make it clear that counterfeiting of U.S. currency is not just a domestic problem. In addition to the fact that counterfeit dollars circulate overseas, evidence indicates that many of the counterfeit dollars passed in the United States originate overseas.⁴⁰ Before 1996, contact with the Secret Service by

⁴⁰ In FY 2001, 41 percent of the \$47.5 million in counterfeit currency passed in the United States was determined to be from Colombia.

foreign law enforcement officials (including INTERPOL) and financial institutions can best be described as inconsistent. Generally speaking, counterfeiting of U.S. banknotes has not been and still is not considered a significant offense in most countries.⁴¹ In addition, there was neither a central repository for counterfeit notes nor a coherent policy for reporting counterfeit activity.

Since the beginning of the ICAP program, many improvements have been achieved in the Secret Service's investigative techniques and data gathering and, above all, in its relationships with the law enforcement and financial institutions. Field presence has increased, and new offices have been established in key strategic locations. The Secret Service now has permanent offices in seventeen cities: Bangkok, Berlin, Bogotá, Bucharest, Frankfurt, Hong Kong, Lagos, London, Mexico City, Milan, Moscow, Ottawa, Paris, Pretoria, Rome, Toronto, and Vancouver. Through these offices, the Secret Service can more readily respond to counterfeit inquiries, establish contacts with police agencies, offer expert testimony, conduct interviews, and assist in overall investigations. The new offices have already resulted in the seizing of substantial blocks of counterfeits and arrests that would not have been possible without an immediate presence.

The Secret Service continues to develop important new relationships with key law enforcement agencies worldwide. On June 27, 2002, the Director of the U.S. Secret Service signed a cooperative agreement with the newly formed European Police Office (EUROPOL), the central law enforcement agency of the European Union. This marks the historic first official agreement signed between EUROPOL and a U.S. Government law enforcement agency. The Secret Service continues to encourage, facilitate, and monitor public education in counterfeit detection. Overseas initiatives include training and education for the banking and law enforcement community through relationships developed through its foreign offices, foreign task forces, ICAP, and the International Law Enforcement Academies (ILEAs). Additionally, the Secret Service gave presentations in November 2001 at Interpol's Latin American Regional Conference in

⁴¹ A significant exception is the European Union, which has reportedly become stricter about counterfeiting of all currencies since the introduction of the cash euro in 2002.

Mexico City and in April 2002 at the Interpol conference on counterfeiting in Amsterdam.

Table 6.5			
Highly Deceptive Intaglio Counterfeit \$100s Passed			
Million of dollars			
Fiscal year	Total	Domestic	Foreign
All Series			
1996	2.5	1.4	1.1
1997	3.1	1.5	1.5
1998	3.2	1.4	1.7
1999	2.0	1.4	0.5
2000	1.6	1.0	0.6
2001	1.2	0.7	0.5
2002	1.0	0.5	0.5
Total 1996-2002	14.6	7.9	6.4
1996-Series (NCD)			
1996	0.0	0.0	0.0
1997	0.0	0.0	0.0
1998	0.0	0.0	0.0
1999	0.0	0.0	0.0
2000	0.4	0.2	0.2
2001	0.4	0.2	0.2
2002	0.4	0.2	0.2
Total 1996-2002	1.2	0.6	0.6
Pre-NCD			
1996	2.5	1.4	1.1
1997	3.1	1.5	1.5
1998	3.2	1.4	1.7
1999	1.9	1.4	0.5
2000	1.2	0.8	0.4
2001	0.8	0.6	0.3
2002	0.7	0.4	0.3
Total 1996-2002	13.4	7.5	5.8

With the introduction of the additional offices and the new data collection systems described in section 6.1, more comprehensive information can be obtained on the true state of counterfeiting in terms of production, longevity, and movement within a given geographic region. The newer contacts, principally in Latin America and eastern Europe, coupled with the establishment of Extended Custodial Inventories (ECIs), provide more

definitive information relating to criminal activity. As a result, seizures of counterfeit U.S. dollars, detection of international distribution networks, and counterfeit plant suppressions have increased.

Table 6.6
Top Ten Countries for U.S. Dollar Counterfeiting, Fiscal Years 2000-2002
 Value in U.S. dollars

Ranked by passing activity			Ranked by seizures		
Economy	Passed	Seized	Economy	Passed	Seized
FY 2002					
Hong Kong	279,360	15,000	Colombia	0	85,962,640
Mexico	149,410	200	Chile	0	12,092,400
Kenya	123,160	0	Bulgaria	9,700	4,108,450
England	116,630	3,552,630	England	116,630	3,552,630
Singapore	111,750	1,600	Poland	3,800	1,771,300
Germany	81,815	293,055	Guinea	0	1,525,900
Dominican Republic	59,540	38,030	Peru	100	1,415,180
Israel	29,870	100	Italy	3,695	1,060,100
Switzerland	23,946	20,500	Portugal	4,350	848,100
Australia	20,440	1,900	Russia	3,400	760,400
FY 2001					
Hong Kong	228,590	0	Spain	48,510	25,312,800
Mexico	184,177	600	Colombia	2,370	9,493,270
England	122,660	0	Pakistan	500	2,903,400
South Africa	86,750	1,554,120	Israel	24,840	2,215,450
Dominican Republic	82,350	149,000	Germany	35,255	1,896,390
Switzerland	79,690	298,100	South Africa	86,750	1,554,120
Austria	76,320	6,300	Poland	28,430	1,463,600
Jamaica	63,280	7,400	Turkey	6,070	1,375,950
Spain	48,510	25,312,800	Bulgaria	860	1,010,100
Germany	35,255	1,896,390	Belgium	3,330	917,840
FY 2000					
Hong Kong	356,975	0	Netherlands	2,070	100,005,250
Mexico	151,715	3,780	Italy	3,510	49,782,820
England	133,410	141,370	Colombia	3,540	6,730,330
Kenya	54,950	0	Turkey	9,300	5,801,400
Dominican Republic	47,681	47,300	Russia	10,006	4,146,100
Germany	36,931	2,169,176	Nigeria	0	2,776,950
South Africa	36,150	1,419,990	Brazil	500	2,741,700
Switzerland	35,400	1,680	Philippines	13,670	2,710,240
Malaysia	31,600	57,500	France	23,340	2,658,000
Austria	28,620	17,040	Germany	36,931	2,169,176

As indicated in table 6.2, in fiscal 2001 the Secret Service reported the seizure of \$54.0 million in counterfeit currency and the passing of \$1.5 million in counterfeit currency outside the United States. While the total of both seized and passed currency is comparable to those for the United States (see table 6.2), many more counterfeits are seized than are passed, according to statistics compiled from foreign sources. Thus, this

discrepancy in the Secret Service data is illusory since it reflects in part the fact that information received on counterfeit U.S. notes passed overseas is much less comprehensive than that received for notes passed within the United States. The Secret Service believes that the true quantity of counterfeit notes passed abroad may be more comparable to that passed inside the United States.

Table 6.6 presents data on the ten most active countries over the last three fiscal years, ranked by the total value of counterfeit currency that was reported to the Secret Service as seized or passed. As can be seen, in several countries there were very large seizures totaling in the millions of dollars reported, but passing activity reported to the Secret Service was extremely limited.

6.4 Counterfeiting in Key Countries and Regions

One region (Latin America) and three countries (China, Colombia, and Bulgaria) deserve special mention in enumerating the responses that the Secret Service has developed to deal with the counterfeiting threats posed abroad. Colombia registers first on the counterfeiting threat list for one reason: It is the chief supplier of counterfeit notes to the U.S. market. Relatively high quality Colombian counterfeit U.S. dollars have been successfully imported into the United States for several decades. The Bulgarian threat arose more recently with the growth of organized crime in southeastern Europe. Together, counterfeit U.S. dollars produced in Colombia and Bulgaria account for almost half (48 percent) of all counterfeits successfully passed in the United States. China is of interest because it seems to be a distribution point for, but not a producer of, high-quality counterfeit dollars.

In the past few years, official and unofficial dollarization of the economies in several Central and South American countries has made this region a prime target for counterfeiters. Furthermore, the countries in this region appear to lack the necessary resources and enforcement infrastructure required for effective anti-counterfeiting operations.

With regard to counterfeiting, the Secret Service allocates its resources overseas based on the overall incidence of counterfeit U.S. dollar activity in a particular geographical area. The Secret Service has found that the strategic placement of its

personnel overseas promotes successful foreign police anti-counterfeiting operations. Secret Service agents assigned overseas are able to respond more promptly and consistently in support of joint international counterfeit currency investigations. In time, the long-standing relationships that develop from day-to-day interactions, liaison activities, and training, and the ability to focus consistently on ongoing problems encourage foreign law enforcement counterparts to increase the priority given to this type of investigation. In locations where a permanent presence is not feasible, the Secret Service employs task forces to target regions with large amounts of counterfeit currency (Sofia, Bulgaria, for example).

6.4.1 Latin America

Full or partial dollarization in Latin America, along with a relatively low threat of prosecution, is making this region an attractive target for the distribution of counterfeit U.S. dollars. Perhaps more significantly, the organizational structures developed to manufacture and distribute narcotics in and through this region are ideally suited to the secondary task of supporting U.S. dollar counterfeiting operations. Moreover, given the respective penalties involved, these counterfeiting activities entail considerably less risk than the drug trade.

In the past several years, the Secret Service has seen a significant increase in the number of packages of counterfeit U.S. currency seized in transit to or through Central and South American countries. Most of these intercepted packages originated in Colombia, and were being sent to the United States, Europe, or elsewhere outside of the region.

In June 2002, the Secret Service seized an operation in Colombia that was manufacturing a counterfeit U.S. dollar coin (the Sacagawea “Golden Dollar”). The counterfeit coins appeared to be intended for export to Ecuador’s dollarized economy, which had recently begun using the coins. The seized facility was the first clear example of the intent by Colombian counterfeiters to target a specific country in Central or South America.

The Secret Service has long recognized the need to expand its enforcement efforts and to foster greater cooperation with law enforcement authorities and financial

institutions throughout this region. In August 2002, the U.S. Secret Service, in cooperation with the Colombian National Police, hosted the “International Seminar on Counterfeit Money: A Latin American Perspective on the U.S. Dollar” in Bogotá, Colombia. This conference brought together senior representatives of law enforcement agencies from eighteen countries to learn about characteristics of genuine and counterfeit U.S. currency and to discuss investigative strategies for counterfeiting enforcement and prosecution.

Law enforcement officials and prosecutors from Colombia, Argentina, Ecuador, Brazil, Chile, Peru, Uruguay, Paraguay, Panama, Costa Rica, El Salvador, Guatemala, Nicaragua, Mexico, Honduras, and the Dominican Republic, as well as representatives from Spain, EUROPOL, and the Southern European Cooperative Initiative (SECI), representing Turkey and Romania attended the conference. This conference was a major initiative on the part of the Secret Service and the authorities in each of these countries to address the current and potential threat of U.S. currency counterfeiting. In addition to a mutual pledge to take a proactive stance against counterfeiting in this region, essential relationships were established which will have a great impact on future enforcement efforts.

6.4.2 Colombia: Primary Producer of Counterfeit Dollars Passed in the United States

Colombia is important because it is consistently ranked in the top five of counterfeit source nations by value of seized counterfeits. It has been an important source of counterfeit U.S. dollars flowing into the United States for nearly two decades. During FY 2001, approximately 41 percent (\$19.6 million out of a total of \$47.5 million) of all counterfeit currency passed within the United States, including 70 percent of all offset counterfeit notes, originated in Colombia. Because large volumes of Colombian counterfeits have been entering the United States for many years, in 1997 the Secret Service established the South American Task Force (SATF) in Bogotá, Colombia.⁴² The

⁴²The SATF consists of representatives from five law enforcement organizations: Departamento de Investigaciones Judiciales de Inteligencia (DIJIN), the Colombian National Police, the Cuerpo Técnico de Investigaciones (CTI), the Departamento Administrativo de Seguridad (DAS), and the Secret Service, in cooperation with the

SATF and the Secret Service’s Miami Field Office, Bogotá Resident Office, and Counterfeit Division have been instrumental in training South American law enforcement agencies in the detection, interdiction, and suppression of counterfeit U.S. currency. During the course of several investigations, the SATF has identified organized distribution networks, methods of concealment and transshipment, and contraband exchange and payment procedures, and it has developed informants and identified U.S. cities targeted for the sale of counterfeit U.S. dollars.

In May 2001, two U.S. agencies signed an agreement to support a project to combat organized financial crime. The agencies are the U.S. Department of State’s Bureau of International Narcotics and Law Enforcement Affairs and the U.S. Department of the Treasury’s Office of Enforcement, and they agreed to work under the coordination of the Department of the Treasury’s Office of Enforcement. Funding for this project came from the Colombian Justice Sector Reform Program within the “Assistance for Counternarcotics Activities” account of the Plan Colombia Supplemental Appropriation.

Within this program, the U.S. Secret Service established its anti-counterfeiting force in Colombia. The specific goal of this project is to assist specialized Colombian law enforcement units with training, strategy development, and infrastructure improvements. These efforts were all designed to reduce the production, sale, distribution, processing, transportation and trafficking of counterfeit U.S. dollars within Colombia. Funding for this Secret Service program was \$1.5 million.

Arrests	122
Plant suppressions	23
Counterfeit currency seized	\$84.3 million
Other seizures	\$2 million (fraud) 2 kilograms cocaine

Colombian National Prosecutor’s Office. Authority and funding for Plan Colombia was provided under the Colombia Justice Sector Reform Program under the authority of Chapter 8 of Part I of the Foreign Assistance Act of 1961, as amended (22 U.S.C. § 2392 (b))

These vetted units, working in conjunction with agents primarily from the U.S. Secret Service Miami Field Office and the Bogotá Resident Office, have experienced great success in the early stages of Plan Colombia.

Counterfeiting in Colombia involves organized criminal groups that employ skilled individuals familiar with offset lithography and processes to modify various substrates (that is, papers) and inks to create good quality counterfeit U.S. dollars. These counterfeit distribution networks frequently employ the same individuals involved in the trafficking of narcotics to the United States, and they utilize many of the same smuggling methods. Because of the relatively low penalties for counterfeiting U.S. currency in Latin American countries compared with those for narcotics trafficking, counterfeiting may be seen as an attractive alternate or parallel activity.

Suppression of counterfeiting operations in Colombia is complicated by the same problems faced in the suppression of narcotics. Government resources are limited, and the country's sociopolitical issues are complex. Nevertheless, the Secret Service's Plan Colombia project can claim some major successes. Secret Service statistics, shown in table 6.7, reveal the cumulative impact of major seizures of counterfeit U.S. dollars, plant (counterfeit manufacturing operation) suppressions, and dismantling of distribution networks. The increase in foreign arrests has been accompanied by a measurable decrease in Colombian counterfeit passing since the inception of Plan Colombia. Plan Colombia continues to grow and develop, with additional law enforcement training, special programs, and legislative efforts within Colombia to enhance penalties for counterfeiting.

The Secret Service employs a special canine trained in the detection of Colombian-produced counterfeit U.S. dollars through detection of the unique aroma present in these notes and supporting materials. This canine and its handler travel to Colombia on a regular basis to participate in proactive anti-counterfeiting activities under the Plan Colombia project. Currently, Secret Service personnel are implementing a permanent counterfeit detection canine program in Colombia. The program includes the construction of kennels and canine training areas, canine procurement, the training of canines and handlers in counterfeit detection, equipment and supplies, veterinary care, operational procedures, and cost analysis. The success of this program will depend on

the commitment to training and to the strategic use of these canines as a deterrent to the smuggling of counterfeit U.S. dollars out of Colombia.

Historically, Colombian counterfeiters arrested in Colombia have been able to avoid significant jail time by having their sentences converted to an administrative fine. The fact that many of those arrested are repeat offenders indicates that arrests are not much of a deterrent in Colombia. This issue has been repeatedly addressed in various meetings with Colombian officials, including the currency audit delegation from the Treasury and Federal Reserve to Colombia in October 1998.

Since 1998 the Secret Service has been working with the government of Colombia to reform its penal code with regard to the trafficking in counterfeit currency (to include U.S. currency). These reforms seek to abolish administrative fines and to impose a mandatory term of imprisonment for any person convicted of importing, exporting, acquiring, receiving, or negotiating foreign or domestic counterfeit currency in Colombia. As of September 2002, a penal code enhancement for counterfeiting was being supported and was proceeding within the Colombian Congress.

6.4.3 Bulgaria: Another offset counterfeit producer

In March 2002, the U.S. Secret Service formally joined forces with the Bulgarian National Service for Combating Organized Crime (NSCOC) to form the Bulgarian Counterfeit Task Force (BCTF). The production of offset counterfeit dollars in Bulgaria is second only to that in Colombia. Since 1996, over \$6.7 million in counterfeit U.S. currency manufactured in Bulgaria has been passed or seized worldwide, and over seventy-five related arrests have been made.

The BCTF is staffed with a Secret Service agent temporarily assigned to Sofia, Bulgaria, and is supported by additional temporary duty agents. The BCTF has concentrated on two major families of counterfeit U.S. dollar notes, and has seized over \$3.3 million, suppressed several manufacturing operations, and made a number of arrests in several highly successful operations. The Secret Service continues to work with the Bulgarian authorities and confidential informants in a number of active investigations.

6.4.4 China

Unlike Colombia and Bulgaria, which are prime sources of offset counterfeit notes, mainland China is of interest because it appears to be a country in which a large amount of counterfeit can be found, quite possibly considerably more than would be suggested by the information on counterfeits received in Hong Kong, see Table 6.6. Prior to the ICAP team's October 2002 visit to China, statistical data on the incidence of counterfeit U.S. dollars in China came from two sources: processing statistics compiled by the two Hong Kong ECI facilities and other information (mostly involving law enforcement counterfeit seizures) collected and verified by the Secret Service's Hong Kong Resident Office (HKRO). The total from these two sources rarely exceeded \$500,000 in any given year. However, information gathered from the trip raised the possibility that these reported figures represented the tip of the iceberg.

During its visit to China, the ICAP team learned that People's Bank of China (PBOC) statistics indicate that mainland Chinese banks have been receiving between \$4 to \$6 million in counterfeit U.S. dollars annually.⁴³ While the ICAP team was not able to substantiate these figures by the usual means of directly inspecting the suspect notes, they could determine that the PBOC had a well-developed process for handling, archiving, and maintaining statistics on counterfeit U.S. currency. Furthermore, Secret Service representatives on the team examined a small sample of counterfeit notes provided by the PBOC in Shanghai and determined that the majority were of high quality.

While the resolution of the uncertainty on the true size of counterfeit U.S. currency inside China awaits further cooperative efforts on the part of the Secret Service and the Chinese, the Chinese expressed considerable willingness to improve their ability to detect counterfeit notes and to share information about them with the Secret Service. In particular, both the banking and law enforcement authorities the team met with understood that training and suppression efforts regarding counterfeit U.S. dollars were in

⁴³ This finding is not that surprising given that Hong Kong was the leading country for reported foreign counterfeit passing in each of the last three fiscal years, see Table 6.6. Hong Kong serves as a consolidation point for the Asian banknote markets, and is a major point for both the distribution and collection of banknote activity with China. Thus, it is highly likely that a significant number of the counterfeit notes detected in Hong Kong banks arrived in shipments from mainland China.

the mutual interest of both countries. Some of the suggestions for a strengthened relationship included: Providing recurring training to bank and law enforcement personnel on counterfeit note detection, encouraging reporting of statistics on a regular and ongoing basis on all counterfeit U.S. currency detected, providing samples of counterfeit notes, encouraging the use of the USSS counterfeit note website, sharing information of criminal intelligence value, and establishing procedures for regular meetings and continuing liaison.

The ICAP team recommended arranging for additional training and coordinated programs with the Chinese authorities soon after introduction of the new U.S. currency design, which is due to be issued in late 2003. The Chinese agreed with the Secret Service's suggestion that it would be important for officials on the mainland to improve their infrastructure for currency authentication and the handling of counterfeits prior to the arrival of millions of foreign visitors, who would undoubtedly be bringing large amounts of dollars and other banknotes when they went to China for the summer Olympics in 2008 and for other sightseeing activities.

6.5 The Changing Nature of the Counterfeiting Threat

The mission of the Secret Service has always been to keep counterfeit production in check in the United States, but it now faces a constant battle in keeping abreast of improvements in technology that make digital counterfeiting easier and cheaper. Less than ten years ago, computer-generated notes were generally of poor quality. The computer printers and the software available could not generate images of sufficiently high resolution to be deceptive. It is estimated that over 50 percent of the households in the United States now have computers. The prospective digital counterfeiter can obtain the necessary computer hardware and software to produce a reasonably deceptive counterfeit note for less than \$2,000.

The value of counterfeit currency passed in the United States over the three fiscal years 1995–1997 was fairly stable; however, in FY 1998 it jumped by about a third, from around \$30 million to around \$40 million. Technological advancements in the printing field contributed to this increase. Since the emergence of newer methods of producing counterfeit banknotes, the percentage of inkjet counterfeit notes has dramatically

increased, as seen in table 6.8. Many inkjet-produced counterfeit notes are of lesser quality than notes produced on offset presses, but their quality is high enough to deceive many commercial establishments. In addition, as shown in the middle columns of table 6.6, the dramatic increase in the supply of inkjet counterfeits has led to a concomitant sharp increase in plant suppressions and related arrests. However, this phenomenon is not exclusively or even mainly a juvenile problem: in fiscal year 2001, only 20 percent of inkjet counterfeiting cases involved juveniles.

Table 6.8
Digital Counterfeiting Activity within the United States

Fiscal year	Digital notes passed		Plant suppressions			Arrests		
	Value, thousands of dollars	Share of total counterfeit notes passed (percent)	Total	Inkjet	Inkjet share (percent)	Total	Inkjet-related	Inkjet-related share, percent
1995	175	0.5	153	29	19	1,856	37	2
1996	760	3	198	101	51	1,737	176	10
1997	6,121	19	435	321	74	2,436	1,100	45
1998	17,050	43	616	547	88	3,569	2,618	73
1999	15,783	40	677	651	96	3,466	2,846	82
2000	18,460	47	551	527	96	3,467	2,998	86
2001	18,403	39	651	608	93	5,241	4,536	87
2002	15,639	36	555	528	95	4,366	3,734	86

Thus far, the problem of digitally printed notes is largely a domestic one, reflecting the fact that the United States has a knowledgeable and widely dispersed group of personal computer users. However, as the personal computer revolution moves worldwide, it is reasonable to predict that digital counterfeit usage will follow. In the wake of the terrorist attacks of September 11, 2001, the U.S. Congress, recognizing the threat to our nation's critical economic infrastructure posed by financial crimes, included the counterfeiting of U.S. currency in the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT) Act of 2001.⁴⁴ On October 26, 2001, the President signed the act into law.

⁴⁴H.R. 3162

This legislation, among other things, modified existing counterfeit statutes to accommodate emerging and future technologies, such as digital technology, as well as to strengthen maximum statutory penalties for counterfeiting violations. This new law amends the U.S. criminal code to make counterfeiting statutes apply to all counterfeiting activity regardless of the technology employed.⁴⁵

On November 1, 2001, the Federal Sentencing Commission issued new, amended sentencing guidelines that included penalty enhancements for counterfeit currency violations. The new guidelines provide enhanced minimum penalties, regardless of the volume of counterfeit involved in the offense; enhancements for manufacturing; and enhancements for possessing or controlling “distinctive counterfeit deterrents.” The latter enhancement applies when counterfeiters attempt to simulate security features present in genuine currency, particularly in the new design U.S. currency from 1996 and later.

Both the USA PATRIOT Act and recent federal sentencing enhancements demonstrate recognition on the part of lawmakers of the sharp growth in digital counterfeiting and related computer crimes. Recent events have heightened awareness of the threat posed by organized criminal groups, including those counterfeiting the U.S. dollar. Continued cooperation in worldwide enforcement, legislative, and educational efforts will enhance the security of our nation’s financial infrastructure, to include the strength and security of the U.S. dollar.

In sum, the fight against counterfeiting is dominated by three current factors. First, the 1996 and 1999 series notes will continue to displace older notes, and future design changes in U.S. currency will render it even more resistant to counterfeiting. Second, digital technology used to produce counterfeit U.S. currency is becoming easier and cheaper to use and acquire, making the use and awareness of counterfeit-resistant features by the public, businesses, and financial institutions more important if we are to stop counterfeiting at its initial or first pass. Third, partly as a result of the earlier phase of this project, communication among dollarized and dollar-sensitive economies about

⁴⁵18 U.S.C. sections 470, 471, 472, 473, 474, 476, 477, 478, 479, 480, 481, 482, 483, 484, and 493. Prior to the enactment of the Patriot Act, U.S. Criminal Code penalties

counterfeiting must continue to improve, thus making enforcement and suppression more effective and efficient.

for counterfeiting distinguished between traditionally-printed counterfeits and photocopier- or computer-produced notes.

7 Estimates of Counterfeiting

This chapter presents the calculations that form the basis of a point estimate and estimated upper bound on the quantity of counterfeits in circulation. The estimates are based on counterfeit data collected by the Secret Service and Federal Reserve, together with current understanding of circulation patterns for genuine and counterfeit currency. The value of counterfeits in circulation is most likely around \$70 million, or fewer than one in 10,000 notes, with about 60 percent of these held overseas. The upper bound is estimated to be about \$170 million, or about 2.8 in 10,000 notes.

Very good sample data on counterfeits are available from two sources that can be considered independent in various dimensions. Both sources suggest that the incidence of counterfeits in the population is quite small, on the order of one to two notes in 10,000 for \$100 notes.⁴⁶ To develop appropriate confidence bounds for extrapolation, we compare the data from these two sources. In addition, using currency-processing data, we are able to estimate the degree to which the currency received by the Federal Reserve is likely to be representative of the total population of currency outstanding. We also consider the impact on the estimates of the currency that circulates only infrequently through Federal Reserve processing centers. We conclude that it is unlikely that pockets containing large numbers of counterfeits exist for very long outside the banking system.

In sum, counterfeiting is not currently a serious problem for the U.S. economy as a whole. However, evidence indicates that the level of counterfeiting remains low precisely because counterfeiting is diligently investigated and prosecuted.⁴⁷ As mentioned previously, technological advances aid both the Secret Service, which is in charge of enforcing counterfeiting laws, and the counterfeiters, who use all available tools to attempt to perpetrate a very lucrative type of crime. Thus, counterfeiting will remain in check only as the Secret Service is able to act vigorously to prevent it.

⁴⁶We focus on \$100 notes here because they account for about 70 percent of the value of currency in circulation and about 80 percent of the value of counterfeits passed.

⁴⁷This conclusion is also supported by the analytical model of counterfeiting that we consider in section 7.1.

The first section describes a general economic model that explains the level of counterfeiting. The second section reviews the data sources available, and presents comparisons of the two major datasets. The third section presents our estimates. The fourth section presents estimates of how representative the notes that pass through the banking system are and presents a model of currency circulation that demonstrates that it is quite unlikely that a large pool of counterfeits can circulate undetected. The fifth section concludes.

7.1 Theoretical Work

The few theoretical papers on the economics of currency counterfeiting conclude that there are only two possibilities for long-run equilibrium, either very low or very high levels of counterfeiting. There is no middle level of counterfeiting. More specifically, given the actual level of enforcement against counterfeiting and the level of counterfeit deterrence in the genuine notes, the economy can reach two alternative equilibria: Either counterfeit currency takes over, as in a situation in which Gresham's law holds (that is, bad money drives out good) or counterfeit notes hardly get any foothold whatsoever (Lengwiler, 1997). In Lengwiler's model, the equilibrium that actually occurs is a function of the note's production cost (that is, the difficulty of counterfeiting it) and its face value. The higher the cost of counterfeiting and the higher the value of the note, the more likely the monetary authority is to invest more in higher-cost notes and thus insure a near-zero-counterfeiting equilibrium. U.S. banknotes, especially the pre-NCD series, had significantly fewer counterfeit protection devices than the banknotes of many other industrialized countries and were low in value relative to other countries' currency issues.⁴⁸ However, as Green and Weber (1996) point out, the technology now embedded in the 1996-series NCD \$100 approached that of other countries' currency, and the new series of notes are expected to once again bring the technological level of U.S. currency close to that of other currencies.

Clearly, if the high-counterfeiting equilibrium had some real-world relevance, one would not observe the large demand for dollars that exists in most parts of the world.

⁴⁸The highest denomination now issued is \$100. In contrast, many other countries issue denominations with values between \$500 and \$1000.

Rather, the other, low-counterfeiting equilibrium in Lengwiler's model appears to be consistent with the actual data on counterfeiting in which the frequency of counterfeits is on the order of only one in 10,000. In terms of the economic model described above, these outcomes suggest that the level of counterfeiting deterrents embedded in U.S. notes, combined with the level of law enforcement provided by the Secret Service and its foreign counterparts, has been adequate to keep the economy operating at the low counterfeiting state, given the two possible equilibria that could occur.

7.2 Data Sources

The two primary sources of data on counterfeiting are the Secret Service and the Federal Reserve. In addition, this project has obtained some institutional knowledge from banks, currency dealers, banknote shippers, and other officials responsible for currency distribution and counterfeit detection around the world.

7.2.1 Secret Service Data

The Secret Service collects data on all counterfeits found in the United States as well as all counterfeits it receives abroad. For every counterfeit obtained, the Secret Service records its characteristics and the location of its discovery. Their statistics for notes that are seized before being put into circulation are kept separately from those for counterfeits detected while in circulation. This distinction is important for the estimates of counterfeits in circulation, in which we focus on the notes that were passed (actually used in at least one transaction). While the number of notes seized is important from a law-enforcement perspective, only the notes that were actually placed into circulation generate an economic loss to the general public.⁴⁹

Although the Secret Service data are the most comprehensive available, the data on the passing of counterfeit dollars outside the United States are incomplete for two major reasons: First, counterfeit U.S. dollars found abroad may be retained by banks, returned to customers, or held by local law enforcement authorities without being

⁴⁹ We consider the Secret Service data on counterfeit passing *within* the United States to be complete or nearly so. While banks or individuals who detect counterfeit dollars could in principle retain them, by law they must be turned over to the Secret Service, and it would be highly unusual for banks to make a practice of retaining them.

reported to the Secret Service; second, the capacity of the Secret Service itself to detect and seize counterfeit U.S. currency overseas is directly related to its ability to develop working relationships with the appropriate agencies and officials overseas--detection of counterfeits is highest in countries in which the Secret Service has the best ties with local law enforcement agencies. As shown in the top panel of table 7.1, the amount of counterfeit currency passed (and detected) in the United States in 2001, \$47.5 million, was much greater than the amount the Secret Service seized (that is, intercepted before it was circulated) in the United States, \$12.6 million. Outside the United States, however, the amount of counterfeit U.S. currency reported as seized is much higher than the amount reported as passed (\$54 million and \$1.5 million respectively). Because some counterfeits found outside the United States are not reported to U.S. authorities, the Secret Service believes that the true amount of U.S. notes passed abroad is considerably larger than the reported amount.

Table 7.1
Latest Data on Counterfeits
 Millions of dollars except as noted

		Domestic	Foreign*	Total
Secret Service, Fiscal Year 2002	Counterfeit \$100s passed	33.9	1.3	35.2
	Counterfeit \$100s seized	8.1	117.0	125.1
	All counterfeits passed	42.9	1.4	44.3
	All counterfeits seized	9.7	120.4	130.1
Federal Reserve System, 2002	Counterfeit \$100s detected	4.27	0.73	5.00
	All counterfeits detected	n.a.	n.a.	7.01
	Detection rate for counterfeit \$100s, notes per million	33.6	20.4	30.7
	Detection rate for all counterfeits, notes per million	n.a.	n.a.	5.0

Note: "Seized" refers to counterfeit currency that was detected before being circulated, while "passed" denotes currency that was determined to be counterfeit after entering circulation. Only passed currency represents a loss to the public; seized counterfeits represent only a potential threat.

*Includes foreign data for New York, Miami, El Paso, Houston, San Antonio, San Francisco, and Los Angeles.

n.a. Not available.

7.2.2 Federal Reserve Data

Each Federal Reserve Cash Office collects data on its cash processing activities, including counterfeit detection. These data are useful in three ways. First, the Federal Reserve Bank of New York, which is the major port of entry and exit for international

shipments of U.S. dollars, is able to identify the country of origin for many of the counterfeits it receives. These data, which cover notes that by definition have been returned to the United States, complement the Secret Service data, which cover notes detected abroad or, in the taxonomy mentioned in the introduction, are circulating but remain outside the Federal Reserve. Thus, the correlation between these two sources can be used to calculate confidence bounds for the population of notes in circulation as a whole. Because these data have been developed only recently, however, we present only some preliminary results to demonstrate that the samples reveal broadly similar distributions of counterfeits by country. Overall, the Federal Reserve detects about 20 percent of all counterfeits reported to the Secret Service.

The second use of Federal Reserve processing data comes from the fact that separate statistics are recorded for three classes of notes: All pre-1990 series, the 1990 series, and the NCD series.⁵⁰ About 30 percent of all \$100 notes outstanding passed through Federal Reserve Cash Offices at least once in the twelve months after the introduction of the NCD \$100 note, but the notes processed are almost surely not a random sample of all notes outstanding. Notes circulating within the United States are likely to return to Federal Reserve Cash Offices more quickly than overseas notes in remote areas and areas where dollars are often used more as a store of value than as a medium of exchange. The information on the series date of notes, however, can be exploited to obtain estimates of how much of the total currency population is in “active” circulation and how much might be hoarded.

The third use of Federal Reserve processing data is the most direct: From counterfeit detection rates and total processing figures, we can estimate the incidence of counterfeits among the stock of dollars circulating actively.

⁵⁰The first 1990-series notes were issued in 1991 and include a security thread and microprinting. The 1996-series notes were first issued in 1996, in the \$100 denomination. Among the security features of the latest series are a larger portrait, a reflective security thread, a watermark, additional microprinting, and optically variable (color-shifting) ink.

7.3 Estimating the Total Quantity of Counterfeits in Circulation Worldwide

The worldwide estimates of counterfeiting rely on a variety of data sources with differing characteristics. Specifically, we have made three sets of calculations to estimate the total amount of counterfeit currency now in circulation. First, we generate a lower bound for the total number of \$100 counterfeits based on Federal Reserve cash processing data. Second, we generated an upper bound for \$100 counterfeits by extrapolating from Federal Reserve data to cover counterfeits found outside the Federal Reserve. Third, we generated a range of plausible estimates for all denominations based on the relative incidence of \$100 counterfeits and lower-denomination counterfeits. We conclude that the total value of counterfeits in circulation at any moment is on the order of \$70 million, or fewer than 1.2 notes in 10,000, and is highly unlikely to exceed \$170 million, or fewer than 3 in 10,000. Further, we conclude that the incidence of counterfeits is roughly the same inside and outside the United States, and thus the distribution of counterfeits follows the estimated distribution of genuine currency, which is estimated to be about 55 to 60 percent abroad with the remainder located within the United States.

7.3.1 Estimating the Minimum Stock of \$100 Counterfeits in Circulation

The Federal Reserve keeps records on the origin of counterfeit U.S. notes it detects. However, as a basis for comparison, the exact amount of U.S. currency held abroad is unknown. To take account of the range of possibilities, we use a broad range of assumptions on the share of total U.S. currency held abroad. For shares of currency held abroad ranging from 40 percent to 70 percent, table 7.2 presents the counterfeit detection rate per million notes and the implied value of counterfeit notes.⁵¹

The Federal Reserve processing data suggest that the total stock of \$100 counterfeits outstanding is in the range of about \$15 million to \$18 million, a figure we

⁵¹Although the estimates in Porter and Judson (October 1996) put the share of currency abroad between 55 and 70 percent, Feige (1996) presents estimates as low as 40 percent.

consider to be a lower bound for several reasons. First, the notes sent to Federal Reserve Cash Offices are a relatively “clean” sample of the population of all notes in circulation

Table 7.2
Counterfeit \$100 Stocks Implied by 2002 Federal Reserve Processing Data
Assuming Varying Shares of Currency Held Abroad

Location	Detection rate (notes per million)	Value of genuine notes held in location based on assumption (billions of dollars)	Implied counterfeits (millions of dollars)
Assuming 40 percent of U.S. currency is held abroad			
Domestic	33.6	372	12.5
Foreign	20.4	248	5.1
Total	...	...	17.6
Assuming 70 percent of U.S. currency is held abroad			
Domestic	33.6	186	6.2
Foreign	20.4	434	8.9
Total	...	...	15.1

Note: Stock of \$620 billion assumed.

... Not applicable.

in that the notes have already passed through several detection “screens” before reaching the Federal Reserve. If a counterfeit is deposited at a commercial bank, the probability that it will remain in the stock of notes sent on to the Federal Reserve is less than 1, and most likely substantially less than 1. Four possibilities for disposal await a counterfeit that arrives at a commercial bank. First, if undetected it could be recirculated or sent to the Federal Reserve. In the latter case, it would appear in the Federal Reserve processing data.⁵²

Second, it could be detected as a counterfeit, and reported to the police and Secret Service. In this case, the note would appear in the Secret Service's statistics but not in the Federal Reserve's statistics.

Third, it could be detected and returned to the depositor (although virtually no U.S. banks return suspected counterfeits to depositors).⁵³

⁵²We assume that the Federal Reserve detects all counterfeits in shipments it receives. For a discussion of this assumption, see Allison and Pianalto (1997).

⁵³Nearly every central bank in the world, including the Federal Reserve, forbids this behavior on the part of local banks and currency exchanges, but some evidence and the ICAP teams’ interviews suggest that it occurs with some regularity outside the United States.

Fourth, it could be detected and confiscated but either not reported to the police and Secret Service or not released. Banks are often eager to retain a few counterfeits for the purpose of training their own tellers. In some countries, banks are permitted to report counterfeits and then retain the notes. This set of notes thus does not appear in the Federal Reserve statistics but may or may not appear in the Secret Service statistics. Counterfeit detection at commercial banks is generally quite good, so we believe that the majority of counterfeits that arrive at banks do not get shipped to the Federal Reserve. The fact that the Secret Service receives five times as many passed counterfeits as the Federal Reserve would seem to bear this out.

We believe that a counterfeit arriving at a foreign bank is less likely than a counterfeit arriving at a U.S. bank to be delivered to the Secret Service or to make it into a Federal Reserve deposit for two reasons. First, U.S. banks are more likely than their foreign counterparts to contact the Secret Service directly. Second, on average, overseas banks appear to check their dollar shipments more carefully for counterfeits than do U.S. banks, partly because labor costs are so much lower in many foreign countries with heavy dollar traffic. As a result of the higher level of screening abroad, the incidence of counterfeits from foreign deposits is just over half of that for domestic deposits in recent years (see table 7.2).

7.3.2 Using Federal Reserve and Secret Service Data to Estimate the Total Stock of \$100 Counterfeits in Circulation

We now return to the estimate of the total stock of counterfeits. As noted above, a lower bound for the estimate of \$100 counterfeits in circulation is \$15 million to \$18 million. Within the United States, about six or seven counterfeit \$100 notes are detected outside the Federal Reserve for each note found by the Federal Reserve. An estimate of counterfeit \$100s in circulation based on this ratio would be about \$105 million to \$125 million. This estimate, however, should be viewed as an upper bound, for reasons similar to those discussed above. The counterfeits found outside the Federal Reserve are, in general, of lower quality and more easily detected (hence their detection outside the Federal Reserve). Thus, they probably do not circulate for as long as the counterfeits that

survive until reaching the Federal Reserve.⁵⁴ A middle-range value of about \$70 million, or less than 1 counterfeit \$100 in every 7,000 \$100 notes in circulation, is the most likely estimate.

7.3.3 Extrapolating from \$100 Counterfeits to All Counterfeits

Table 7.1 indicates that \$100 counterfeits are between 75 and 80 percent of all counterfeits recorded by the Secret Service and 71.3 percent of all counterfeits found by the Federal Reserve. Extrapolation from the estimates for the \$100 note suggest that the \$70 million baseline should thus be inflated by a factor of 1.25 to 1.40, for a total of about \$88 million to \$98 million, or about \$1.50 in counterfeits for every \$10,000 of currency in circulation. If we extrapolate from the upper and lower bounds discussed above, the lower bound estimate for counterfeits of all denominations is about \$15 million, or 25 cents per \$10,000 in circulation, and the upper bound is about \$175 million, or \$2.8 per \$10,000 in circulation.

7.4 The Next Step: How Unrepresentative Are Our Data?

The estimates constructed above rely heavily on the assumption that the samples are representative. However, the samples could be unrepresentative along several dimensions. First and most crucially, suspected counterfeit notes could perhaps find their way into an isolated pool of currency that never reaches the banking system. Second, notes from some countries could be returned for processing more readily than others. Third, counterfeit detection capability could vary widely across countries.

In appendix B of the first report to the U.S. Congress on this subject, we developed two models that highlighted the reasons that notes are unlikely to remain outside the banking system indefinitely. Both of these models suggest that large quantities of counterfeits cannot hide anywhere for too long. With regard to the third concern, the varying counterfeit detection rates in different regions, the relatively close match between Secret Service data and Federal Reserve data suggests that the country distribution of counterfeits is unlikely to be radically different from what is observed in the available counterfeit data.

⁵⁴Appendix B in the previous report takes up the issue of the lifespan of a counterfeit.

7.4.1 Hoarding: Some Empirical Evidence from the Team's Travels

One cannot rule out the possibility that a large batch of counterfeits has been inadvertently hoarded along with genuine notes, but an episode in Korea in 1998 suggests that fears about this problem may be overdrawn.

After the sharp depreciation of the Korean won in the fall of 1997, a media-led campaign encouraged Koreans to deposit their dollar holdings with the government to help resolve the financial crisis that had arisen. At the time of the call for dollars, counterfeiting in Korea could have been a large problem. Korea was one of the very few countries in Asia that had traditionally been willing to accept fit (previously circulated) notes in its wholesale shipments of notes; wholesale shipments are likely to contain counterfeits, whereas shipments of new notes are necessarily free of them.

As a result of this campaign, the government collected \$1.5 billion in U.S. currency from Korean residents during a grace period in January and February 1998. During the grace period, the government agreed to not question the source of any funds turned in. The dollars were all carefully inspected for counterfeits. In this repatriation of stockpiled currency, which must be one of the largest ever conducted, Korean officials found only 0.018 percent to be counterfeit, or \$264,000. That is, they found counterfeits at the rate of 1.8 counterfeits per 10,000 notes, a result in line with counterfeit incidence elsewhere in the world.

Thus, this natural experiment reinforces the notion that significant stockpiles of currency do not necessarily entail significant quantities of counterfeits. More generally, since unexpected events continually lead individuals to draw upon their precautionary holdings of currency to meet unforeseen demands, there is a sense in which the stockpiled currency is always being sampled.

7.4.2 Scant Evidence for Pools of Undetected Counterfeits

Perhaps some counterfeits circulating abroad escape detection by circulating as part of a pool of U.S. currency that (1) never enters the banking system or enters banks that don't detect the counterfeits and (2) in any case never returns to the United States, where the counterfeits would almost certainly be discovered.

On the basis of the teams' visits, these two possibilities seem highly unlikely. During their visits, the teams found that counterfeit detection capabilities are very good at central banks, commercial banks, and authorities charged with stopping counterfeiting and that the overall condition of the circulating currency is reasonably good in most places most of the time. These observations are consistent with the idea that counterfeits do not endlessly circulate outside the banking system. Currency is used for a wide range of transactions; but even in gray or black market economies, it will eventually find its way into a commercial banking institution, most likely after being used in relatively few transactions.⁵⁵ Appendix B.2 of the first report puts these ideas together in an analytical model.

7.4.3 Comparing the Country Distributions of Counterfeit Notes

Below we present two comparisons of three data sets that have been assembled largely independently of one another. The comparisons point to similar estimates for the distribution of counterfeits, which in turn suggest that, despite the shortcomings of the data sets, they are representative of currency and counterfeiting activity worldwide. First, we compare the counterfeiting data from the Federal Reserve with that from the Secret Service. Second, we compare the counterfeiting data from the Secret Service with the Federal Reserve estimates of the amount of genuine currency circulating overseas.

7.4.3.1 Country-by-Country Comparisons

In principle, the country-by-country data on counterfeits detected at the Federal Reserve Cash Offices should be a subset of the Secret Service data. Under certain

⁵⁵One application of the isolated pools theory has been in stories that one or more governments hostile to the United States had obtained genuine plates for printing U.S. currency and were producing a flood of counterfeits to destabilize the dollar. Part of the scenario was the assertion that these counterfeits could circulate endlessly and freely within the bounds of such countries. We have no way of confirming or denying such stories. If closed countries do indeed have many counterfeits in circulation, it is impossible to know so long as the system remains closed. The evidence and model we present here apply to open markets. Moreover, in a closed system in which everyone is aware of the counterfeits, the loss to consumers and potential for destabilization is not clear. A more formal model of these ideas can be found in appendix B.2 of the previous report.

conditions, moreover, the proportions of counterfeits detected by country and region should be similar in both data sets. However, neither of these conditions holds exactly in the data we present here, and as a result, the ratios do not exactly coincide, though most observations do fall within two standard deviations of the mean absolute deviation.

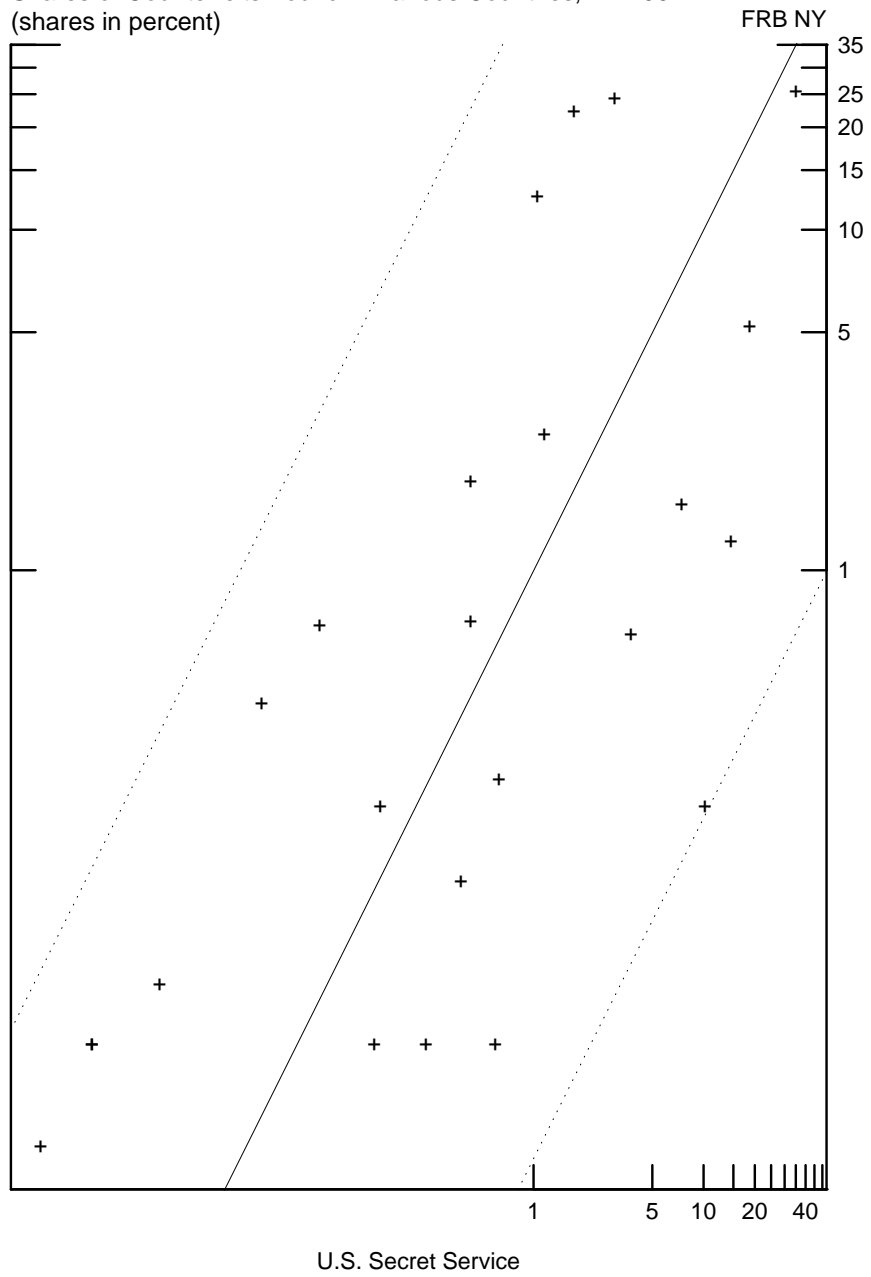
Two conditions are necessary for the country-specific counterfeiting data sets to exactly match both each other and the true country distribution of counterfeits. First, the Secret Service's ability to detect counterfeits would have to be exactly uniform across countries, which is surely not the case given variation in staff size, relations with local law enforcement, and other local factors. Second, the notes processed by the Federal Reserve would have to be a random sample of the notes in circulation in a given country. This condition is somewhat more likely to hold. Although some currency is held for long periods, and some currency is selected for return to the United States because it is unfit, estimates on hoarding presented in the first report suggest that notes circulate fairly randomly.

The Secret Service data used here cover only notes passed to the public; they do not include notes seized, since these notes by definition were never in circulation. The figures used here are for fiscal year 2002. Since the Secret Service dataset includes counterfeits found by the Federal Reserve, the Secret Service's figure for each country should be greater than the Federal Reserve's figure. Countries are dropped if the Secret Service's records show fewer counterfeits than the Federal Reserve's records.

Each point in figure 7.1 represents one country's share of the counterfeits detected in each data set. Thus, a point at (5,10) would indicate that 5 percent of the counterfeits detected at the New York Federal Reserve Cash Office came from that country while 10 percent of the counterfeits detected by the Secret Service did. These points would all lie on the 45-degree line if the relative detection rates between the two data sets agreed and if the samples of notes processed were exactly representative of the notes in circulation. The dashed lines represent a 95 percent confidence interval around the 45-degree line.

Since most of the points associated with the individual country pairs lie within the confidence band, we cannot reject the hypothesis that the relative detection rates in the two datasets are not significantly different from one another.

Figure 7.1
 Shares of Counterfeits Found in Various Countries, FY 2002
 (shares in percent)



7.4.3.2 Testing the Location of Counterfeits with Dollar Estimates in Various Parts of the World

Are the data on counterfeit dollars found in various locations outside the United States in basic agreement with our understanding of the distribution of all dollars in broadly defined regions? Presumably, counterfeits cannot easily “hide” among genuine notes when the number of counterfeits is relatively large. If the proportion of counterfeit currency supply is growing in a region, holders of the currency will eventually learn about the counterfeiting problem and become more wary of acquiring a counterfeit in their day-to-day transactions. Thus, if counterfeit dollars are dispersed throughout the world up to the point at which residents of any country would become suspicious of their dollar holdings, the distribution of counterfeits across the world might match that of the currency as a whole. The proposition ignores the costs of distributing counterfeits, which are not necessarily likely to be evenly distributed across parts of the world.

Table 7.3
Expected and Actual Distribution of Counterfeits
 Percent except as noted

Region (1)	Expected counterfeits (dollars) (2)	Actual counterfeits* (dollars) (3)	Currency distribution (4)	Counterfeit distribution (5)
Africa and the Middle East	\$247,958	\$209,640	20	16.9%
Americas	\$309,948	\$242,626	25	19.6%
Asia	\$185,969	\$457,530	15	36.9%
Europe and the former USSR	\$495,917	\$329,996	40	26.6%

*Actual data are for fiscal year 2002

Table 7.3 compares the percentage distribution of currency holdings in four regions: Africa and the Middle East, the Americas, Asia, and Europe and the countries in the former Soviet Union. This distribution combines the best judgmental information at the Federal Reserve about the distribution of currency (column 4) with the Secret Service’s data on the distribution of counterfeits that were passed into circulation

(column 5).⁵⁶ Columns 2 and 3 list the expected and actual distribution of counterfeits under the assumption that it is proportional to currency holdings in these four broadly defined regions. A standard statistical test of these data suggests that the counterfeit and currency distributions match each other in terms of the relative amounts found in each of these four regions.⁵⁷

7.5 Conclusion

In sum, we estimate that about \$70 million, or fewer than 1.2 counterfeits per 10,000 notes, might be in circulation at any one time. In addition, we consider a range of \$15 million to \$175 million, or between 25 cents and \$2.80 per \$10,000 in circulation, to be an exhaustive confidence interval. It is indeed possible that a large number of counterfeits could be injected into the financial system, but they would likely be detected and removed fairly quickly given what we know about cash transactions and the banking system. We believe that the close correlation between the country distribution of currency holdings and the counterfeits detected by the Federal Reserve and the Secret Service is strong evidence that both counterfeit detection and incidence fall within a small range throughout the world.

⁵⁶The counterfeits that could not be assigned to any region by the Secret Service were assigned according to the distribution of those that could be assigned. Information on seized (never circulated) notes is not used because they are irrelevant to the question of interest, which is how easy or difficult it would be to pass counterfeits.

⁵⁷The test statistic of the null hypothesis that the points lie on the 45-degree line has a value of 5.98 and is distributed as a chi-square with 3 degrees of freedom.

8 Summary and Conclusions

This study reports the results of a joint Treasury and Federal Reserve investigation of currency usage and counterfeiting activities abroad; it updates the first report to the U.S. Congress in January 2000. Activities consisted of study trips to areas of the world where dollars circulate and, subsequently, the establishment of facilities to encourage both recirculation of fit currency and repatriation of old-series currency. The audit plan that we have used in this study takes account of all of the available information and understanding that the Treasury and Federal Reserve possess concerning overseas counterfeiting and currency holdings. Following the congressional mandate, it is based on three components: Models of U.S. currency usage overseas, models of counterfeiting abroad, and information obtained from country surveys with cash handlers and others knowledgeable about the extent of currency usage and counterfeiting issues abroad.

8.1 Overseas U.S. Dollar Holdings

For some time, U.S. dollars have been the currency of choice internationally. In countries with underdeveloped banking sectors and unstable currencies, U.S. dollars are held in cash as a store of value, are used for transactions, and act as the unit of account, especially for larger transactions. Although dollars flow into countries when the domestic currency becomes very unstable or political crisis looms, they do not necessarily flow out when the crisis passes. Even in some countries with developed banking sectors and stable currencies, dollars are the preferred currency for travelers, for cross-border trade, for settlement of large cash transactions, and for transactions in the informal or gray sector.

The Federal Reserve supplies currency on demand and implicitly accommodates new demands that originate anywhere in the world. Various procedures developed by Federal Reserve staff suggest that about \$370 billion of the \$620 billion in banknotes in circulation are held overseas. Although the circumstances in each country are unique, demand for U.S. dollars (or indeed any other currency that circulates widely outside its home country) during a crisis does follow certain patterns. In a simple model of this process, the demand for the foreign currency (dollars) depends on the volatility of

inflation and the differential between the inflation rate in the United States and the developing country. The degree to which a country becomes dollarized and the degree to which residents desire cash dollars rather than dollar-denominated bank accounts depends on confidence in the domestic banking system. The quantity of cash dollars demanded also depends on a country's experience with dollars in the past and its economic circumstances.

Although estimates about overseas currency holding are necessarily imprecise, a confidence interval estimate in the neighborhood of \$300 billion to \$400 billion brackets most of the direct and indirect information we have on such holdings. To take the next step of making estimates for individual countries or regions is considerably more difficult. For one thing, most currency held outside the United States is used for transactions so it is in constant circulation and as a consequence repeatedly moves across borders. While the Federal Reserve data and Currency and Monetary Instrument Reports provide information on shipments to and from various countries and the United States, there is no information about currency movements between other countries, nor is there reliable information about smaller quantities of currency leaving the United States or moving outside of wholesale channels. Our best guess is that about 25 percent of overseas holdings are in the western Hemisphere, 15 percent in the Far East, and 20 percent in the Middle East and Africa. The remaining 40 percent is in Europe, including the former Soviet Union and some of its trading partners such as Turkey.

8.2 Overseas Counterfeiting

Given that so much genuine U.S. currency is held overseas, how much counterfeit U.S. currency is also located abroad? Before the rollout of the NCD \$100 note in 1996, a number of news stories suggested that there might be a significant international counterfeiting of U.S. banknotes. While there was considerable skepticism about the accuracy of such stories, it was recognized that the Secret Service's limited authority outside the country might create vulnerabilities, at least in some regions. Inside the fifty states and territories, the Secret Service has jurisdiction over counterfeiting cases, and information about counterfeiting is routinely channeled to the Secret Service. Outside the United States, however, the Secret Service has limited jurisdiction over counterfeiting

cases involving U.S. currency.⁵⁸ Further, procedures invoked when counterfeit notes are found overseas vary widely.

During the teams' visits to abroad, the level of concern about counterfeiting varied among countries, but banks and other financial institutions detected one or at most only a few counterfeit notes of every 10,000 notes they processed. In FY 2001 the Secret Service reported the seizure of \$54.0 million outside the United States and the passing of \$1.5 million in counterfeit U.S. currency abroad. This discrepancy between the passed and seized figures overseas reflects in part the fact that data on counterfeit U.S. notes passed overseas are inherently partial: The Secret Service's knowledge about counterfeiting of U.S. dollars is more complete in countries in which it has better ties with local law enforcement agencies.

While counterfeiting rates are currently relatively low, it does not follow that one should necessarily be sanguine about the future. Only a decade ago or so, most counterfeits were produced by offset printing presses, which inherently limited the supply because of the limited number of presses and skilled printers. But now the nature of counterfeiting appears to be moving from offset printing technology to computer technology--PCs, software, and relatively inexpensive printers--for which prices are falling and accessibility is rising. For example, of the counterfeit currency printing operations suppressed inside the United States during FY 2001, 93 percent used inkjet printers, a phenomenal increase from the FY 1995 figure of 19 percent. While inkjet technology is only beginning to spread internationally, there is every reason to believe that it will continue to do so.⁵⁹ Given these technology changes, concomitant improvements in both banknotes and Secret Service procedures are needed to stay ahead of the advancing counterfeiting threats. In addition, improvements in Secret Service capabilities are necessary, including more field offices and improvements in the traditional methods of record keeping. The Secret Service has increased foreign offices

⁵⁸ The Secret Service must rely on the cooperation of host-country law enforcement officials.

⁵⁹ For one reason estimates suggest that the growth of inkjet printers over the next 5 years will grow by over 60 percent faster abroad than domestically.

and task forces significantly since the ICAP trips began in 1994. Regarding record keeping, the Secret Service has recently developed two new systems to improve statistical reporting: The Counterfeit Contraband System and the Counterfeit Note Search Site on the Internet.

8.3 Currency Distribution and Education Campaign

Historically, new U.S. banknotes have been attractive to the international market for one reason: Their newness guarantees that they are counterfeit-free. The 1996 NCD Currency Introduction Plan provided for the establishment of an Extended Custodial Inventory pilot program to facilitate the introduction of NCD notes, expedite the repatriation of the old-design banknotes, and promote the recirculation of fit NCD notes. In addition, a key objective of the ECI program was to facilitate information flows about the circulation of both genuine and counterfeit currency. Both of these goals have been realized: Currency circulation and redistribution have become more efficient, and the European and Asian ECIs have become important direct sources of information on external counterfeiting, as the Secret Service receives information directly from ECI operators regarding counterfeit notes detected during their verification process.

In addition, the ECIs provide a natural safety valve for increases in currency demand related to events such as the century date change or the September 11 terrorist attacks. By stockpiling U.S. currency inventories in strategic international distribution centers, banks and currency dealers overseas have an assured, immediate supply of U.S. currency to meet unforeseen demand for banknotes resulting from financial or political disturbances and to mitigate financial panics.

The Department of the Treasury and the Federal Reserve have a duty to inform and educate all users of U.S. currency about prospective changes to the currency and policies with regard to the treatment of older-series notes. In general, the worldwide education program has been successful in disseminating information about currency changes and must be continued.

8.4 Conclusions and Recommendations

There are five main conclusions. **First**, the audit program of the Treasury and the Federal Reserve has continued to open new lines of communication and data collection on the use and circulation of genuine and counterfeit U.S. banknotes abroad. In addition, relationships have been developed with the banknote trading communities and law enforcement agencies that allow the Federal Reserve and the Secret Service to work more effectively in the international arena. The Federal Reserve and the Treasury expect that these benefits will grow as the program continues.

Second, the Federal Reserve Bank of New York's management of the Extended Custodial Inventory (ECI) program has improved the efficiency and stability of the international dollar banknote markets, has contributed enhanced data and qualitative information on international U.S. currency flows, and has resulted in the more timely detection and reporting of counterfeit U.S. banknotes.

Third, given the NCD and upcoming new series notes' greater resistance to counterfeiting, strategies to accelerate the repatriation of old-design notes should be considered.

Fourth, the Secret Service has obtained valuable information through the audit program, and will continue to draw upon information arising from the audits to evaluate its international strategy.

Fifth, the public education campaign contributed to the smooth reception of the new-design 1996-series (NCD) \$100 notes but had some major shortcomings for the introduction of the smaller denominations, particularly in overseas markets. In the future, dissemination of information on any new currency design—especially training and educational material for both cash handlers and the general public—should reach the international markets well ahead of the actual notes in an appropriate range of foreign languages and should be readily available well after the initial issuance of the notes.

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