Currency and the subterranean economy

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Currency holdings have always fascinated the public. The fascination is only heightened by the lack of hard data that confines investigators to conjecture in explaining currency holdings. Growth in the number of checking accounts and the expanding use of such currency-saving instruments as credit cards have often led to predictions of a "cashless society." Yet along with the growth in credit cards and checking accounts there has come a large increase in currency holdings.

Currency in circulation has increased nearly 13 times in the past 40 years, boosting per capita holdings to $510. Even casual observation indicates that $2,000 in currency is more than a family of four needs for ordinary transactions.

Aside from the increased use of checking accounts and credit cards, there are other reasons for expecting the use of currency to decline. Holding wealth in the form of currency is risky as it can be lost or stolen. On the other hand, experience with widespread deposit insurance shows that holding wealth as deposits is relatively risk free. Also, currency holdings sacrifice interest returns, which, with the rise in interest rates, have become considerable.

One possible explanation for the rapid growth has long been recognized. That is currency held for illegal purposes. Higher tax rates would seem to increase the use of currency to avoid taxes. There is also some feeling that certain inherently illegal activities have expanded greatly, particularly dealings in illegal drugs. Transactions of this sort would necessarily be made in currency.

Subterranean economy estimate

Reliable data on currency usage in illegal activities are, of course, hard to obtain. This explains the widespread attention given to a recent estimate of currency usage in what is called the "subterranean economy." In this underground economy, activities are either inherently illegal or not reported to avoid taxes. In an article in the Financial Analysts Journal (November/December 1977), Peter M. Gutmann used the ratio of currency to demand deposits to estimate the amount of economic activity in the subterranean economy. He estimated that activity in the subterranean economy amounted to at least $176 billion in 1976. That was nearly a tenth of the reported GNP.

Gutmann used the currency stock and demand deposit holdings in a straightforward way to estimate the magnitude of illegal activity. Over the period 1937 to 1941, the ratio of currency to demand deposits was 21.7 percent. By 1976, the same ratio had risen to 34.4 percent.

Assuming (1) that a dollar of currency and a dollar of demand deposits support the same amount of economic activity (legal and illegal) at the same point in time, and (2) that the ratio of currency to demand deposits needed to support legal activities had not changed, he figured that illegal activity had increased substantially. Even if there was no illegal activity in the earlier period, illegal activity in 1976 would amount to $176 billion.

There are some important implications involved in this estimate, however. One is the implication that economic activity (legal and

illegal) associated with currency has grown faster than activity associated with demand deposits. Another is the implication that a dollar in currency or demand deposits supports about twice as much GNP activity in 1976 as it did in the earlier period. This follows because GNP averaged $98 billion in 1937-41 and currency plus demand deposits (M-1) averaged $33.6 billion. Every dollar of M-1, therefore, supported $2.9 of GNP in 1937-41 and $5.6 in 1976. Most important, the estimate depends critically on the use of demand deposits as the "yardstick" magnitude compared with currency. This choice determines not just the estimate of growth in the subterranean economy, but whether there was any growth at all. For example, comparison of the ratio of currency to total bank deposits shows currency declined relative to total bank deposits from 1939 through 1976. Indeed, over the period 1959 through 1978, of the five money measures (all including currency) that the Federal Reserve reports, currency declined as a proportion of all except M-1. This comparision suggests that what was striking about this period was the slowness of growth in demand deposits. Currency did not increase relative to other deposit measures.

Some evidence from stocks . . .

	1937-41	1976
Currency stock (billion dollars)	6.0	77.8
Demand deposit stock (billion dollars)	27.6	226.2
Currency/demand deposits	.217	.344
"Excess" currency/demand deposits	.0	.127
Reported GNP (billion dollars)	98.	1693.
"Excess" currency/((M-1) - "excess" currency)	.0	.104
GNP output of subterranean economy (billion dollars)	0.	176.

Importance of transfers

There are compelling reasons for thinking M-1 is the best money magnitude to relate to GNP. Currency and demand deposits are the only components of any money measure that can be immediately transferred for goods and services. Other deposits must first be transferred into currency or demand deposits before an exchange can be made for goods and services. This implies that currency and demand deposits should be more closely related to GNP. They perform the transfers associated with the production of goods and services.

The analysis that leads to a focus on the behavior of currency relative to demand deposits suggests that transfers of currency and demand deposits would be more indicative of economic activity than the stock of currency and demand deposits. Activity carried out in the visible economy requires payments for labor and materials, probably by check. Once an activity is carried out at least partially in the subterranean economy, even transactions that are in the visible economy, such as purchases of materials, may be paid for with currency.

It might seem that emphasizing currency and demand deposit transfers instead of the stock of currency and demand deposits gives little new insight into illegal activity. Nothing could be further from the truth. Figures are available on the turnover of demand deposits—the average number of times a dollar of demand deposits transfers over time. The average from 1937 through 1941 was 21 times a year. In 1976, it was 117 times. Demand deposits outside New York—a series that reduces the effects of purely financial transactions—turned over an average of 20 times a year from 1937 through 1941. In 1967, they turned over 80 times.

One of the main reasons for the faster demand deposit turnover has been the effect of increasing interest rates, which have encouraged better management of cash balances. Banks are prohibited from paying explicit interest on demand deposits and rising interest rates have increased the foregone income represented by demand deposits. This leads the demand deposit holder to

economize and reduce idle balances, increasing the turnover of demand deposits. The increase observed in turnover further reinforces the earlier observation that demand deposits have behaved vastly different among deposits in growing so slowly.

Impact of transfers

The increase in demand deposit turnover has important implications for estimates of the subterranean economy. Debits to demand deposits increased by more than 30 times over the period from 1939 to 1976. By contrast, the currency stock increased only 12 times. Unless the turnover rate for currency has also increased substantially, growth in currency transfers has actually lagged growth in demand deposit transfers over this period. Demand deposit transfers put an entirely different perspective on the changes in currency relative to demand deposits.

Moreover, what scant evidence is available suggests that currency turnover has actually slowed rather than increased over the past 40 years. Although there is no direct evidence on currency transfers, a rough idea of the velocity of currency transfers can be inferred from observing currency redeemed and destroyed. Currency is redeemed and destroyed when notes show signs of wear. If currency becomes worn as a result of transfers, then the volume of currency redemptions and destructions can be used as an indication of currency transfers.

This interpretation is supported by evidence on destruction of different denominations. Smaller denomination notes are more suitable for most transfers. Larger denomination notes are more suitable for storing wealth. It has long been observed that denomination and currency lifetime decline together, presumably as transfer velocity increases.

From 1937 through 1941, the average life of a dollar of currency was 3.12 years. In 1976, it averaged 5.31 years.[1] With the assumption that the number of transfers in the life of a currency note did not change, the data indicate that currency in 1976 transferred only about 59 percent as fast as in the earlier period.

By use of the changes in transfer rates for currency and demand deposits and with the assumption that currency transfers accounted for the same proportion of transactions as in the earlier period, it is possible to compute what the ratio of currency to demand deposits would have been in 1976. The result is that currency in 1976 would have to be 1.45 times the level of demand deposits. The combination of the speedup in demand deposit turnover and the slowing in currency turnover means that currency would have to be larger than demand deposits in 1976 to perform the same proportion of transfers that it did from 1937 through 1941. In fact, the ratio of currency to demand deposits in 1976 was only 0.34.

. . . and from transfers

	1937-41	1976
Currency stock (billion dollars)	6.0	77.8
Currency turnover (per year)	c*	.59c
Currency transfers (billion dollars/year)	6.0c	45.9c
Demand deposit stock (billion dollars)	27.3	226.2
Demand deposit turnover (per year)	20.3	79.9
Demand deposit transfers (billion dollars/year)	554.2	18073.4
Currency stock/demand deposit stock	.217	.344
Currency transfers/demand deposit transfers	.0108c	.0025c

*Where c represents currency transfers per year in the period 1937-41.

[1]The increase in currency lifetime may be due, in part, to a conscious decision by the Federal Reserve to lengthen the life of a note through changes in its currency redemption policy in the mid-1970s. However, examining data from the early 1970s indicates there was a substantial increase in currency lifetime aside from the effects of any changes in Federal Reserve redemption policy.

Two trends

Adjustment for turnover changes the interpretation of the currency stock numbers completely. Instead of a currency stock that seems too large, the stock now appears far too small to perform even the same proportion of transfers as in 1937-41. Yet the currency stock and the per capita holdings have risen sharply. The explanation appears to lie in two distinct trends. One trend does, indeed, seem to be a move toward a cashless society, with currency performing a smaller and smaller proportion of transfers in the economy. Apparently, the growth in the use of checking accounts and credit cards is substituting for currency transfers.

A second trend has been a growing use of currency as a store of value, with much lower turnover rates. The rapid increase in $100 notes, until there is now more money outstanding in this denomination than any other, could reflect the increased use of currency as a store of value. Even larger denominations might be used if they were still issued. This trend in large denomination notes could easily be connected with illegal activity, but these notes do not have the same relationship to economic activity as in the visible economy.

Why illegal activity might increase the stock of currency while reducing the turnover rate can be seen in a comparison of the problem facing a small tax evader with the problem facing a large tax evader. The small tax evader evades the tax on a relatively small part of his income. As his biggest risk is that the unreported income will be detected, the small evader uses a currency transaction to receive the income in a way that cannot be detected. Having received the currency, the small evader has no problem disposing of it, since it is a small amount relative to his income. The small evader is affected by the same factors that lead the holder of legally obtained currency to economize on his currency holdings—the interest return that must be foregone to hold currency and the depreciating value of the dollar.

The large tax evader may be required to hold much larger amounts of currency that transfer much slower. Notice that with a currency per capita figure of $510, casual observation suggests that currency holdings are sharply skewed with some holders having very large amounts. Large tax evaders have the reverse problem of small evaders. Since a great part or all of their income is hidden from the tax collector, it is likely that the payments are already arranged in currency. However, there is a danger in transferring it into visible assets. Visible assets substantially greater than previously reported income could arouse suspicion. If the income came from an activity that was itself illegal, the currency holder might even purchase a legitimate business and "launder" the illegal income by pumping it through the business and paying taxes on it. This might explain the reputed attraction for large scale organized crime of such currency intensive businesses as legalized gambling, where large amounts of currency could be resurfaced.

One piece of supporting evidence for the difficulty of eliminating currency hoards comes from the period just after the Second World War. Currency increased rapidly during the war. This presumably reflected an increase in illegal activities, hoarding as a store of value, and increased foreign holdings. Currency declined after the war. The decline was slow and protracted, however, as though currency hoards could not be disgorged quickly. Per capita currency holdings actually declined for 15 years—from 1946 to 1961.

The evidence presented here does not deny the possibility that illegal activities have been growing. Indeed, increasing tax rates would seem to increase the incentive for such activities. Nor does the evidence deny that a great part of the increase in currency may be due to illegal activities. The analysis of demand deposit and currency transfers does suggest, however, that the proportion of total economic activity associated with currency has declined substantially over the past 40 years. Thus, it seems unlikely that the subterranean economy could presently account for a tenth of reported GNP.