

3 What happened to all the \$100 bills? The mysterious case of the missing cash

We know from consumer surveys that the average consumer holds about 50-100 in cash in their wallet. And yet there is some \$3000 in circulation for every American and €2,450 for every euro zone inhabitant.¹ Japan and Switzerland have even larger amounts per person. Even if we account for cash held by businesses (about half of what consumers are holding) there is a huge gap, with most of the missing currency in the higher denominations: 75% of US currency by value is in \$100 notes and a third of Euro currency is in €500 notes. Where is all this cash?

This question has generated significant research; currency is an important part of monetary policy, so Central Banks would like to understand how and where it is being used in economic activity. The outstanding currency also generates significant seignorage income: the notes and coins in circulation are in effect an interest-free loan from the public to the currency issuer. The \$800 billion in circulation save the US government some \$20 billion per year in interest. If the demand for currency were to suddenly decline, the treasury would have to borrow this money somewhere else and pay interest.

Two places have been suggested for this missing cash: abroad and in the underground economy. There is good reason to suspect that a significant amount of at least some currencies is held abroad. Several Latin American countries, notably Argentina, use US dollars de facto as a domestic currency. In several Eastern European countries, notably former Yugoslavia, the Deutschemark and later the euro were similarly used domestically.

¹ According to BIS, in 2010 there were 2400 Euro in notes and coins per capita in circulation, meaning less than 5% of this was in consumer wallets.

Hard data on this foreign usage are very scarce. For US dollars we can use data on shipments of physical currency to and from foreign countries as an indicator; any shipment of over \$5000 has to be reported to US authorities. Analysis of these data suggests 30-37% of dollars are held abroad, with the main countries being Russia, China and Argentina. By these calculations each Argentinean would hold \$1000.²

For Deutschemark no such shipment data are available but the unification of Germany provided an interesting clue: 10 billion DM were supplied following unification, or about DM 650 per inhabitant of former East-Germany, much lower than the amount in circulation for each West-German at the time. Correcting for standard of living, this suggests that some 30-40% of Deutschemarks were held abroad.³

Even if a third of currency is abroad that still leaves a significant amount of cash unaccounted for. The general assumption is that hoarding plays a role, but much of it is used in drug-trade and unreported economic activity. An IRS report on non- or mis-reported tax income gain, puts income from the grey economy at 17% of total US GDP in 1988. We can extrapolate from there if we assume that the ratio of cash for official use to bank balances is constant, and that any extra growth in currency must be due to growth of the informal sector of the economy.⁴ The ratio of currency to bank deposits grew from 31% in 1988 to 38% in 2008. Assuming the excess growth comes from illicit usage, the underground economy grew from 17% of GDP in 1988 to about 22% in 2008.

So where does this leave us on the mystery of the missing currency? With 15% of currency used for cash transactions, some 20-25% used in the informal economy and 30-40% held

² Feige (2009).

³ Seitz (1997).

⁴ This approach is proposed by Feige (2009) and the figures are taken from his paper.

abroad, we are still short some 15-35%, presumably stuffed in mattresses and various lockboxes.

One consequence of the fact that relatively little currency is used for actual legal cash transactions is that governments need not be overly worried that their seignorage revenues will disappear due to the rise of electronic payment instruments such as debit cards. At the same time the impact on outstanding currency stocks appears to be almost unobservable. This seems logical since most of the outstanding currency is in larger denominations which are not commonly used for transactions.

In fact, several researchers have looked into fluctuations in currency outstanding by size of denomination. They distinguish the amounts of large, medium and small denominations.⁵ Analysis shows that the amount of large denominations is negatively correlated with the interest rate: the higher the interest rate, the lower the amount of large notes in circulation. The amount of small notes and coins follows a quite different dynamic, and is negatively correlated with the use of electronic payment instruments such as debt cards.

Hence large and small denominations fulfil two very different functions of cash. Small denominations are a medium of exchange while large denominations are a store of value.

⁵ Amromin and Chakravorti (2007) and Fisher, Köhler et al. (2004). They define medium as the denominations given out by ATMs, large is anything above that and low is anything smaller than that.