Chapter 3 from "The Undercover Economist Strikes Back" by Tim Harford.
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Money, money, money

Currency: None. Actually there are three freely convertible currencies in the Galaxy, but none of them count. The Altairian dollar has recently collapsed, the Flainian Pobble Bead is only exchangeable for other Flainian Pobble Beads, and the Triganic Pu has its own very special problems. The exchange rate of eight Ningis to one Pu is very easy to understand, but as a Ningi is a triangular rubber coin six thousand eight hundred miles on one side, nobody has ever collected enough Ningis to own one Pu. Ningis are not convertible currency as the Galactibanks refuse to deal in fiddling small change. From this it may be deduced that the Galactibanks are also the product of a deranged imagination.

—Douglas Adams, The Restaurant at the End of the Universe

You wanted to talk to me about money.

I did indeed. Let me test your reaction to the following story: On 22 August 22, 1994, two retired musicians, Bill Drummond and Jimmy Cauty, flew to Jura, in the Inner Hebrides off the west coast of Scotland. They brought with them a cameraman, a journalist (Jim Reid of The Observer) and twenty thousand £50 notes, bundled and tightly wrapped in plastic bags. A million pounds. (It's worth about £1.5 million or $2.5 million in today's money.) Drummond and Cauty had, it is said, emptied their bank accounts to put the money together.

In the early hours of the next morning, the four men travelled to a remote boathouse, and with the rain hammering down outside, Cauty and Drummond made a small pile of these bundles of notes while the others acted as witnesses. Drummond and Cauty stripped out a £50 note each, lit them with a cigarette lighter, and set the rest of the money ablaze. When the dense blocks of cash would not catch, they pulled out the notes three or four at a time, crumpled them and threw them on the fire. The whole job took a couple of hours.

What a waste!

You think so? Plenty of others thought so, too. Drummond and Cauty, formerly of the hugely successful band The KLF, caused outrage. They saw their action as an artistic statement. The art world didn't seem to agree. What most people did agree on was that whether motivated by art, a desire for attention, or some rock-and-roll sense of excess, Cauty and Drummond had committed a dreadful waste of resources. The Observer article in which Jim Reid described what he witnessed finished with a list of what £1 million could have bought, including "RWANDA—2,702 kits which will feed a total of 810,810 people" and "HOMELESS—B&B accommodation for 68 families for one year in London or 106 families outside London."

When Drummond and Cauty appeared as guests on a television chat show, Ireland's The Late Late Show, hosted by Gay Byrne, they got a hostile reception as they discussed their "art." There were sharp questions from Byrne, and the studio audience were was furious at the senseless destruction. Couldn't the men have given the money to a good cause instead?

Drummond protested: “If we’d gone and spent the money on swimming pools, Rolls Royces, I don’t think people would be upset. It’s because we’ve burned it that people are upset. And I know that this is a kind of corny thing to say and it doesn’t really stand up but seeing as you’re talking about the charity angle . . . us burning that money doesn’t mean there’s any less loaves of bread in the world, any less apples, any less anything. The only thing that’s less, is a pile of paper.”

At that point, Byrne challenged Drummond and said that there could have been more apples or bread in the world if they’d used the money wisely. The audience applauded Byrne and jeered Drummond as he tried to continue.

You’re going to tell me Byrne was wrong and Drummond was correct. Am I right?

You are indeed. The simplest way to see that is to ask how much it would have cost the Bank of England to print £1 million to replace what Drummond and Cauty incinerated. Based on what I can glean from the Bank of England (who are slightly coy but say it’s “a few pence” per banknote) and from information published by the USUS U.S. Federal Reserve, the cost of printing twenty thousand £50 notes would have been no more than £2,000, about $3,000. When Drummond said that his own argument “doesn’t really stand up,” he was mistaken; it stands up perfectly. And when he said that he hadn’t destroyed bread or apples, only paper, he was absolutely right. All he and Cauty had destroyed was $3,000 worth of paper.

In fact, far from committing a senseless waste of resources that could have gone to the needy, Drummond and Cauty had made a little gift to every one of their fellow countrymen. Instead of being outraged, people should have been thanking them.

Thanking them? For what?

Think about what happens every time the Bank of England prints extra banknotes. If there’s not enough demand for goods and services to match the potential supply (and if sticky prices prevent adjustment) then the extra money should mean more demand for existing resources at the same price—this is the “babysitting co-op” scenario we explored in the last chapter. But if people are already demanding everything that’s being supplied in the economy, then prices will have to rise instead.

Flip the scenario around. If Drummond and Cauty were burning money in an economy already suffering from deficient demand—say, burning scrip in the babysitting economy—then they were making a bad situation worse. (Even then, the Bank of England could push a button at any time and reverse the damage, at a printing cost of a couple of thousand pounds.) But if, as is more likely, Drummond and Cauty were burning money in an economy where supply and demand balanced out, the resulting effect is simple to describe: average prices in the economy would drop.

They wouldn’t drop much, it must be admitted. Drummond and Cauty burned £1 million at a time when there were £18 billion ,000 million trillion of notes and coins in the hands of private individuals and companies, or 18,000 times more than Drummond and Cauty incinerated. That number fluctuated by hundreds of millions of pounds from month to month. So the effect of Drummond and Cauty’s “art” was probably undetectable. Still, it was there in principle: something that cost £180 would, on average, have its price lowered by one penny as a result of the money burning. By shrinking the money supply by £1 million, Drummond and Cauty had effectively given £1

million away, in the form of slightly lower prices, to everybody in the world who owned some British pounds.

What a shame Drummond didn't call you for some media training.

I doubt that would have helped—it's a counterintuitive case to make. The fundamental problem is that when we think about money, we instinctively think about individual purchasing power—about all the things that we could buy if we had that money. But from the point of view of society as a whole, things don't work like that. Drummond and Cauty destroyed £1 million worth of their purchasing power. But they didn't destroy £1 million worth of society's resources. Logically speaking, if you destroy your own purchasing power, but not society's purchasing power as a whole, then you must have given your purchasing power away—which is exactly what Drummond and Cauty did.

If you're going to be in charge of an economy, you need to get out of this instinctive habit of thinking about "money" as being equivalent to "things you could buy with the money." For an individual, it is; for a society, it's not. As P. J. O'Rourke once said, microeconomics is about the money you don't have, while macroeconomics is about the money that the government is out of. And that's a different kind of money altogether.

Now, I hope you're not one of those readers who skip the nice italicized quotes I've carefully chosen to put at the top of each chapter?

Er . . . no. Honest.

Glad to hear it. Oddly enough, there is a near real-world equivalent to the Ningi, the triangular rubber coin larger than Mars that was dreamed up by the humorist Douglas Adams. It can be found on the island of Yap, in Micronesia in the West Pacific. Thiseir coins, the rai, are is a stone wheels with a hole in the middle. Some rai are fairly portable—a handspan or less across, and the weight of a couple of bags of sugar. But the most valued stones are far bigger—one British sailor wrote in the late nineteenth century of a stone wheel that was four and a half tons in weight and over more than nine feet in diameter. In other words, it was almost completely immovable.

Yap's stone money used to be a serious business. The stones were quarried and carved on the island of Palau, 250 miles away. One Victorian naturalist witnessed four hundred men from Yap, a tenth of the adult male population, at work in the quarries of Palau. Getting the stones from Palau to Yap on a little bamboo boat was a difficult and sometimes lethal affair—some of the stonesm weighed as much as two cars. (And rai were especially valuable if someone had died on the expedition to fetch them.) The biggest stones might have been used for major transactions such as buying land or wives; more modest-ly sized stones—a couple of feet across—were exchangeable for a pig. Even then, it would have been a lot easier to move the pig than to move the stone.

All this meant that for purely practical reasons, the Yap islanders had to develop an important monetary innovation: they divorced ownership of the stone from physical control of the object. If you wanted to buy my pig, that transaction would be publicly witnessed: I'd give you the pig and in exchange, you'd transfer ownership of one of your stones—the one leaning against the tree, second on the left behind your hut. Now everybody would know that that particular stone was Tim's stone. You and I wouldn't have to go to the trouble of actually moving the thing.

One day, a crew from the quarries were was bringing a new large stone from Palau when they ran into a storm not far from the coast of Yap. The stone sank, and while the men swam to shore to tell the tale of their lucky escape and their loss. But of course, if the stone propped up outside your hut doesn't need to move around to change ownership, why should the stone at the bottom of the sea be any different? This giant stone on the sea-bed had an owner—the chief who had sponsored the expedition to get it. And now his ownership could be transferred to another rich islander, and then to another, just as with any other stone. It was perfectly good money, even though it was out of sight and out of reach.

Yap's monetary system sounds pretty close to insane, if you ask me.

Ah, but is it? For many years the monetary systems of the developed world were based on gold. The gold itself—heavy stuff, although the ingots were not usually as heavy as a giant stone doughnut—would be left in bank vaults, after having been mined at great cost and risk from far-off lands. Naturally, in an anonymous urban society such as London or Venice, nobody could use the Yap island honor system of "everyone knows that's Tim's gold lying there." But the idea was much the same. The gold, like the stone rai, rarely moved. It stayed in the bank vaults. People would instead carry around pieces of paper recording the fact that they owned the gold.

At first this was a purely private arrangement: a merchant with some gold would rent space in a secure vault from a goldsmith. The goldsmith would give him a note acknowledging that the gold belonged to the merchant. If the merchant wanted to buy something from a second merchant, he'd take the note to the goldsmith, collect his gold, use the gold in the trade, and then the second merchant would take the gold back to the goldsmith and collect his credit note. After a while, it became obvious that it was easier to pass around the credit notes than to go back and forth to the goldsmith all the time.

Banknotes such as the U.S. dollar and the pound sterling were descendants of this system. (Paper money has a much longer history, however. Kublai Khan, Chinese emperor in the thirteenth century, introduced a system of purely paper money that astounded the visiting Italian merchant Marco Polo.) Modern British and old American notes promise to pay "the bearer on demand," a promise that once referred to redeeming the banknote in gold, just as with the private goldsmiths' banknotes. But modern currency is no longer linked to gold at all—it once was but most countries broke that link, the "gold standard," in the early 1930s.

So why do English banknotes still say "I promise to pay the bearer on demand"?

It's a quaint relic of the old system. That promise no longer refers to gold—it merely means that you can go to the Bank of England and exchange a £10 note for two fivers. The Bank of England comments, "Public trust in the pound is now maintained by the operation of monetary policy," apparently with a totally straight face.

And that sums up the real difference between the Yap islanders and the monetary system of modern economies. On Yap, they have this crazy system where the precious stone can be perfectly good money even when it is at the bottom of the sea. In the modern world, we have a far crazier system: the precious metal can be perfectly good money even though it isn't there at all. We just circulate the bits of paper, with their nods and winks toward the old days when they were claims on gold in a

vault. Now they are claims on nothing in particular, and somehow also claims on anything at all. Douglas Adams himself couldn't have made it up.

So if we want to think clearly about what function money serves in an economy, we should start by realizing that money doesn't have to be pieces of paper or metal coins—it can be gigantic stones. Nor does it have to be intrinsically valuable. True, gold and rai were valued for much the same reason: they were beautiful and rare. Another early commodity money, salt, was valued for very practical reasons—it's both tasty and essential for life. Yet there are lots of intrinsically valuable items that don't make good money; a Ferrari is valuable, but not easily divisible—you can't offer one of its wheels in exchange for a vacation. Moreover, something can function perfectly well as money without having much intrinsic value at all—as we have seen, anyone who conducts business in British pounds would be quite happy to hand over £1 million worth of goods in return for printed paper worth only a couple of thousand. Money systems such as the goldsmith's notes were initially anchored to an intrinsically valuable commodity, but against all intuition that valuable commodity turned out to be unnecessary. All that is necessary for money to have value is for everyone to believe that it has value.

Right. How do you achieve that?

The textbook view of money is that it has three roles: as a medium of exchange, a store of value, and a unit of account. As we'll see, each of these functions can in some circumstances be peeled away from the others, but the best money will have all three together.

Let's take each role in turn. A medium of exchange is a way of keeping track of transactions. In modern societies, paper money is a medium of exchange. If I can supply laundry services and I want a new computer, I don't have to find a computer retailer who needs his clothes washed and ironed. I can simply do some laundry for anyone in exchange for cash, before spending the cash to buy the computer. The money facilitates that chain of transactions.

We can think of the circulation of paper money as a way of keeping track of contributions to society that somebody, somewhere has found valuable. When I did the laundry I made a valuable contribution, and the cash I received was a formal record of that. When I bought the computer, I redeemed my contribution and surrendered the cash. In principle, such transactions could all be recorded on a gigantic centralized database. That's what happens on Yap—the population is small enough that the giant database, keeping track of who owns which stones, can be in their heads. Paper money made that database unnecessary in societies that were too big to use the Yap system, but is increasingly giving way to a giant database as we use debit cards and internet banking more than notes and coins—a computerized version of the Yap islanders' collective memory.

The second function of money is to store value. A dairy farmer hoping to save for retirement cannot just put churns of milk in his basement: the milk is unlikely to retain its value long enough to be of much use. But if the farmer sells the milk for cash, he can certainly put the cash under his mattress—or in a bank account—and store value in that way.

There's a connection between money's function as a medium of exchange and as a store of value. The medium of exchange allows us to move purchasing power through space—from one situation (doing the laundry) to another (buying a computer). The store of value moves purchasing power

through time. Still, good stores of value are not necessarily good media of exchange, and vice versa. A house can be an excellent store of value, but anyone who has ever tried to buy and sell property can attest that it's a lousy medium of exchange. The rai of Yap were a very good store of value, but the medium of exchange wasn't the stones themselves, it was the Yap society's mental book-keeping.

The final function of money is in some ways the most important, and the strangest. Money is a unit of account. An alternative way to phrase that is to say that money is a kind of reference point, a standard of value. Let's reach for another analogy with mass. I could tell you that I weigh 88 kilograms, or 194 pounds, or 176 bags of sugar. You might think it doesn't matter which way I choose to express it, right?

Of course. Whichever way you say it, you still weigh just the same.

I used to think that, too. But I've come to realize that the unit of account does sometimes matter; my undergraduate tutor, Anthony Courakis, took great pains to persuade me of this. Imagine you did have a million dollars' worth of financial assets—a pile of bonds, shares and various currencies with a total value of a million bucks.

Lucky me.

Indeed. Now you could call that £641,500, at the time or writing, or €795,800. Or you could call it 10,893 barrels of oil. Or 1,730 shares in Apple. Of course, none of those descriptions are literally true: you don't literally have 1,730 shares in Apple, and you don't literally have a heap of a million dollars, you have a whole load of different assets with that total value. The question is, what would be the most helpful way to think about your net worth?

The answer is that the most valuable way of tracking your net worth is to find out what unit of account is stable relative to the kind of things you want to buy. If you plan to retire to Florida then it's probably helpful to think of yourself as a dollar millionaire. If you want to buy a house in Edinburgh, it would be more helpful to think of yourself as a sterling six-hundred-and-forty-one-thousandaire. If your plans involve digging a giant hole and pouring Brent Crude into it, then it might be helpful to think of yourself as an oil ten-thousand-barrel-aire; but otherwise, barrels of oil would be unlikely to be a helpful way to think of your net worth. The same goes for Apple shares: over the past year, at the time of writing, your million dollars would have fluctuated between almost 3,200 Apple shares and a little over 1,500 Apple shares—at all points still being worth a million dollars. Unless your local shops accept payment only in Apple shares, it's probably more helpful to use dollars as your unit of account.

That's what I mean by a standard of value: if you want to keep track of how you are doing, it helps to choose a unit of measurement that is stable relative to the problem at hand. This will often mean thinking of your salary or your net worth in terms of a currency, because good currencies typically are quite stable relative to all the things you might want to buy. It is confusing to think of your salary in terms of Apple shares; for that matter it is confusing to think of your salary in terms of apples.

Over the years, when commodities have been used as money, the fact that they've been stable units of account has been hugely important.

For example, salt was used in early contracts—it's the basis of the word "salary," and it seems likely that Roman soldiers were originally paid in salt. This makes sense, because salt had a very stable value. The demand for salt is stable, because everybody needs a bit, but nobody wants a lot; the supply of salt, meanwhile, was also stable because it was produced by age-old techniques. If both supply and demand are stable, so is the price—and price stability is just what you need in your unit of account.

But this all seems mind-bogglingly obvious—why on earth wouldn't a U.S. citizen think of her salary as dollars rather than jelly beans, or apples, or salt? Or a German citizen think of his salary as euros, not bratwurst?

If it seems completely obvious, it's because the unit-of-account role of money is so basic, so absolutely fundamental, it's hard to think yourself into a scenario where it comes into conscious play. One recent example that made me chuckle was a tweet from James Rickards, an enthusiast for gold and for a return to the gold standard. In April 2013, as the price of gold was collapsing, Mr. Rickards commented "Last week I had x ounces of #Gold. Today I have x ounces. So value is unchanged. Constant at x ounces. Dollar is volatile though. #ThinkOz." Now, I don't have a view either way on where the price of gold is going next, but it's pretty clear that this tweet is absurd, and thinking about how money needs to be a good unit of account tells us why. If Mr. Rickards wants to buy a hamburger, or a suit, or a car, he'll find that the dollar hasn't been volatile at all: the prices of these things have changed slowly when measured in dollars. They have gyrated wildly when measured in ounces of gold—which is why gold is not money, at least not at the moment. It may be a good investment or a bad investment, but that's a different question.

One could tell a similar story about Bitcoin, a decentralized electronic "currency." Bitcoin was developed in 2008 by a mysterious person or group of people with the pseudonym Satoshi Nakamoto. He, she or they developed a way by which Bitcoins could be produced, or mined, slowly—a bit like gold. Some people love Bitcoin for the same reason that some people love gold— – it's independent from any government, and there's a hard limit on how many Bitcoins can ever exist. But just like gold, Bitcoin is not money for a very simple reason: it's far too volatile. On April 10, 2013, for instance, the price of Bitcoins dropped by 61 percent. Again, Bitcoins may prove to be a smart long- term investment. But they aren't money. Maybe that's obvious to you, but there are a lot of gold -and -Bitcoin enthusiasts out there who don't seem to have realized this.

This does suggest, though, that a dollar isn't automatically money either—it's only money if it keeps a reasonably stable value.

Absolutely. When my tutor, Tony Courakis, was a young boy in post-war Greece, he played Monopoly with real money—German marks and Greek drachma—that had become worthless. When the Greeks wished to agree some long-term contract, they often used the British gold sovereign to denominate the transaction, even though no sovereigns would actually change hands.

Another example is when the dollar wasn't good enough money to use in contracts to pay the soldiers fighting for Massachusetts in the U.S. Revolutionary War. The Continental Congress, the body which that issued the Declaration of Independence, was printing money but nobody knew how much it might be worth when the war was over—and indeed it turned out to be worth very little. So Massachusetts promised its soldiers the value of 68 4/7 poundslb of beef, 16 poundslb of leather, 5

bushels of corn, and 10 poundslb of wood, at the end of the war. Note that Massachusetts wasn't actually proposing to hand sacks of produce to each soldier—they would be paid in cash. The point was that promises of any specific amount of cash were hard to weigh up. By offering cash to the value of this portfolio of commodities, Massachusetts discovered a way of making that promise comprehensible in a chaotic environment.

In a more recent example, Nico Colchester, a journalist at the Financial Times, pointed out that the Mars Bar was a fantastically stable unit of account—a veritable ingot of milk, sugar and cocoa. Colchester showed that all sorts of prices had stayed stable over the decades, provided that the Mars Bar was used as the unit of account.

That's all very interesting, but I'm not planning to have a revolutionary war in my economy any time soon. And I am not aware of any proposals to adopt the Mars Bar as a unit of currency.

The fact that the Mars Bar hasn't caught on is, I think, a great vote of confidence in the stability of modern paper currencies such as the dollar, the pound and the euro. Despite financial chaos, the Mars Bar remains nothing more than a sugary snack, which is surely reassuring.

Now, by the end of the last chapter we'd seen why it can sometimes be a good idea to tackle a recession by firing up the printing presses. I promised you that this discussion of money would help us to understand why it isn't always a good idea to try to solve your economic problems by printing more banknotes.

Let me guess: you're about to use the word "Zimbabwe."

That's as good an example as any. The issue here is inflation, which is what we call a broad-based rise in the price of stuff. Unsurprisingly, if you print lots of money, it starts to buy less and less – in other words, prices rise. And printing lots of money is something Zimbabwe was very good at. The country recently It wasn't long ago that Zimbabwe had so much inflation that they had to knock three zeroes off the end of their currency, so the billions became millions and the millions became thousands. You might think that would do the trick, but no: they had to knock off another ten zeroes shortly afterward. Cumulatively, that revaluation would turn a ten trillion dollar bill into a one dollar bill. Even then after that, the highest denomination bill had a face value of , they still had to print notes for a hundred trillion Zimbabwean dollars. If they hadn't revalued, that would have been a sextillion dollar note bill.

Come on, I want to see that written down. Can I crook my little finger to my mouth like Dr. Evil?

If you must. A sextillion Zimbabwean dollars is written Z$1,000,000,000,000,000,000,000, which is a number more than ten million times larger than the world's annual economic output, expressed in USUS U.S. dollars. We economists call this kind of thing hyperinflation, and it makes modern economic life near impossible. Hyperinflation is typically defined as an inflation rate of over 50 percent a month. Imagine, for instance, borrowing $1 million to buy a house in a country that then starts to experience 50 percent monthly inflation rates. Before three years are out, a cup of coffee will cost you more than $1 million. Your salary will be measured in billions. The mortgage on your million-dollar home will be laughable, and the person who lent you the money will be cursing the day that she did. Indeed, when hyperinflation takes hold, anybody who had a debt will find that the debt is trifling; anybody who had money in the bank, under a mattress, or loaned (perhaps to the

government) will find that their savings are worthless. Pensions, too, will be worthless unless properly linked to keep up with inflation—and when prices are rising so quickly, the slightest slippage with the inflation-linking will doom the pension.

Inflation of 50 percent a month is spectacular enough, then. But in October 1923 in Germany, monthly inflation was nearly 30,000 percent, as prices more than doubled every four days. All the clichés were true: people used wheelbarrows to cart the cash around, and they used cigarettes instead of currency, while they used currency instead of firewood. Erich Maria Remarque's novel, The Black Obelisk, describes life in this era. After lighting a cigar with a 10 mark bill, the narrator, Ludwig, turns to his friend Georg. "How are we doing really? Are we ruined or in clover?" Georg replies: "I don't believe anyone in Germany knows that about himself." That's hyperinflation: no one knows where they stand.

Although Germany's experience has become infamous, it is dwarfed by more recent episodes: by Yugoslavia in 1994, where monthly inflation topped 300 million percent; by Zimbabwe in 2008; and in particular by Hungary in 1946. Hungary holds the unenviable world record for the highest ever monthly rate of inflation at 41,900,000,000,000,000 percent—a rate at which prices more than tripeble every day, and your monthly salary wouldn't buy a cup of coffee if you waited a week to spend it. (The equivalent annual inflation rate is, if my arithmetic serves, a number with 178 digits.) Not that anyone would receive a monthly salary under such circumstances, for obvious reasons: prices are rising by 5 percent an hour. If you were thinking of going out for a restaurant meal you'd be smart to eat quickly, or pay in advance.

This all sounds obviously very bad, and it is. But now that we understand something about money, we can specify precisely why it's so bad. Hyperinflation destroys the three things that make for good money. Banknotes cease to be a handy medium of exchange when you have to carry them around in a wheelbarrow. Hyperinflation makes money useless as a store of value, meaning that saving and borrowing become all but impossible. And, as Ludwig and Georg discovered, money becomes useless as a unit of account: it becomes impossible to work out what anyone or anything is worth, without referring to some alternative currency. A few weeks of hyperinflation and you'd find your citizens adopting the Mars Bar as a currency before you could say Fintlewoodlewix.

In the next chapter, we'll put these concepts—medium of exchange, store of value, unit of account—to further use. But to close this chapter, how about another inspiring success story?

I could do with some cheering up.

I thought so. We're going to see how the humble, ethereal "unit- of- account" function of money solved a huge problem for one of the world's great emerging markets—Brazil. When the radio show This American Life covered the story I'm about to tell, they called it "the lie that saved Brazil." I wouldn't put it quite like that.

And how would you put it?

It wasn't a lie. It was more like a ghost currency.

A ghost currency? I rather like that.

The story starts in the 1990s. Brazil had been suffering from bouts of inflation for decades, and prices in the country were increasing by 80 percent a month—comfortably clearing the hurdle of 50 percent a month which that defines hyperinflation. A loaf of bread costing one cruzeiro in January would cost more than three cruzeiros in March, more than a hundred by September, and well over a thousand the following January. We saw in the last chapter that it costs money to change prices; in Brazil in the early 1990s, every supermarket employed somebody whose job it was to walk around the store sticking new labels on all the products—with prices rising by about 2 percent a day, it was pretty much a full-time job. Supermarket customers, meanwhile, had to run around trying to get ahead of him. Life became inconvenient in all kinds of other ways, too. Just received your week's wages? Get it spent, quickly. Agreed on a price to sell a house? Fine—but make sure you also agreed on when the price would be paid. Every day of foot dragging without the price increasing, and the buyer is getting a better deal.

Since Brazilian money was a poor medium of exchange and a worse store of value, it wasn't a terribly impressive kind of money at all. Small wonder that Brazil's politicians tried everything to sit on the inflation problem. President Sarney, in the mid-1980s, made it illegal to raise prices. This is a common response to inflation, and the response result was the same in Brazil that as it always is: since prices were being kept artificially low, sellers took their products off the shelves until prices increased again. (Beef farmers even hid their cows; as This American Life was told: Brazil's a big country. You can hide cows if you need to.) The few sales that did occur were at black-market prices.

Another attempt at a solution was to replace the currency with a new, improved, non-inflationary currency. Brazil's politicians tried this a lot. First the cruzeiro was replaced with the cruzado, in 1986. The next year, the cruzado itself was re-valued. The year after, the cruzado had to be replaced with the new cruzado. Two years after that, the cruzeiro was back; and two years later, in 1992, the cruzeiro was replaced again, this time with the cruzero. Introducing new currencies has sometimes halted inflation, but not this time, and it is hardly surprising that after five new currencies in seven years, people started to doubt that inflation could ever be defeated.

Four academic economists now enter our story: people who had spent their careers studying Brazilian inflation and slapping their foreheads over the idiocy of each new government. These friends, former college drinking pals, were reluctant to get involved in politics. But pretty soon, the politicians were begging. Edmar Bacha, one of the four, was summoned by the President himself, Itamar Franco. When Bacha asked for an autograph for his children, Franco wrote, "Please tell your father to work fast for the benefit of the country." He couldn't really refuse.

The new plan relied on separating out the three functions of money. Previous attempts to introduce new currencies had attempted to replace the medium of exchange, store of value and unit of account functions simultaneously, and had all failed in a flurry of cruzeros and cruzados. The new plan was different. Brazil wouldn't introduce a new currency. It would stick with the cruzeiro, however spelt. The medium of exchange would remain the cruzeiro. The store of value, such as it was, would remain the cruzeiro. But the unit of account would change.

How could that work?

It was absurdly simple. Every price in every shop would no longer be listed in cruzeiros but in URV, or unidade real de valor ("units of real value"). Your salary would be listed in URV. Everything would be

listed in URV. But the URV did not exist; it was a ghost currency. Transactions were settled in cruzeiros. Wallets were stuffed with cruzeiros and so were cash registers. And if you wanted to know how much that loaf of bread was in cruzeiros, simple: the daily exchange rate would be calculated by the central bank each day, published in the newspapers, and might well be listed for convenience on the wall of most shops. This official exchange rate between URVs and cruzeiros was changing every day, because the cruzeiro was worth less and less every day. But the URV? The URV kept its value. (For a while, it was pegged to the USUS U.S. dollar.)

A strange thing started to happen at that point. You'd see that every month you were paid 500 URVs' worth of cruzeiros—that would be more and more cruzeiros each month, of course. And every day you'd go to the store and buy bread. And it would be—for instance—one URV. It was always one URV. No need for the price-label man to run around the supermarket. That one URV would be more cruzeiros each time, naturally, and you'd be paying for the loaf with cruzeiros. But why would you think about the loaf in terms of cruzeiros? It is much more natural to think of the loaf in terms of its price in URVs.

This is the remarkable achievement of the ghost currency: without ever taking any kind of physical form, it became the way in which Brazilians instinctively thought about what things were worth. It became Brazil's unit of account without assuming the other roles of money. It seems like a bizarre psychological conjuring trick, but perhaps the trick was not so hard to pull off. It's not easy to go through life in a modern economy without a unit of account, and a currency that's going through 80 percent inflation a month isn't much of a unit of account. People's minds were scrabbling about for a foothold in an ever-shifting economic landscape. The URV was that foothold.

This wasn't the only change in policy, of course. The Brazilian government was turning off the printing presses, balancing its budget, clamping down on wage inflation, and so on. The cruzeiro inflation rate was falling. But the key was the psychological fixed point of the URV, which helped everybody figure out what everything was really worth.

One day, 1 July 1, 1994, the Brazilian government simply abolished the cruzeiro and replaced it with the long-stable URV, now called the real. The gang of four economists had promised that inflation would end overnight. And it did.

It's encouraging to know that there's a cure for hyperinflation. But I suppose prevention is better than cure.

You suppose right.

Let me recap, then. In Chapter 2, you told me it's sometimes a good idea to print money. In Chapter 3, you've told me it's never a good idea to print too much money. I'm sure you can guess my next question: how much money should I print?

We'll answer that in Chapter 4. But I'll spoil the surprise now, if you like: the amount of money you should print is just enough.