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Explaining money creation by commercial banks: Five analogies for public education

Ib Ravn[1] [Aarhus University, Denmark]

Abstract
Educators and economists concerned with monetary reform face the extraordinary challenge of explaining to the public and its elected representatives *not only* what a reformed system would look like, but also how the current system works. Centrally, the point that in a modern economy money is largely created by commercial banks, as explained by the Bank of England recently (McLeay, Radia & Thomas, 2014b), is often met with incredulity: "What do you mean, created?" This paper introduces five easy-to-grasp analogies that educators and reformers may use to convey key money-creation concepts to a lay audience. The analogies offered include (1) money as patches in an expandable patchwork quilt that covers a nation's real assets, (2) the money supply as water in a bathtub with a faucet and a drain, (3) money understood as debt in a model economy run by schoolchildren, (4) the misleading concept of a bank "loan" explained by reference to gold that a London goldsmith *could have lent*, and (5) the money-creating capacity of bankers' clearing systems illustrated by the example of neighbors working for each other without money.

Introduction: money creation defies popular comprehension

Where does money come from? Most laypeople likely believe that a nation's money is issued by its central bank, while economics students are taught the credit-multiplier model, or the principles of fractional-reserve banking, which cast banks in the role of intermediators providing loanable funds. Commercial banks are believed to lend savers' deposits to investors, keeping only a fraction in reserves each time the money is re-lent, thus expanding the money supply.

What actually happens in a modern banking system is quite different, as pointed out by academic critics (Huber, 2014; Keen, 2014; Benes & Kumhof, 2012; Werner, 2005, 2014a, b; Bjerg, 2014), central bank governors (King, 2012, p. 3; Jensen, in Danmarks Nationalbank, 2014, p. 1), one top government regulator (Turner, 2013, p. 3), central bank economists (McLeay, Radia & Thomas, 2014a, b; Keister & McAndrews, 2009, pp. 7-8; Deutsche Bundesbank, 2012, p. 76; Bang-Andersen, Risbjerg & Spange, 2014; Sveriges Riksbank, 2013, pp. 74-77), informed members of the press (Wolf, 2014; Häring, 2013), and advocates of monetary reform (Ryan-Collins et al., 2011: Jackson & Dyson, 2012; Huber & Robertson, 2000).

The alternative view advanced by these critics (and recently referred to as "New Currency Theory" in these pages by Huber, 2014) starts from the fact that in modern economies, the central bank issues only cash, while some 95% of the money supply is bank account money. Most of this account money is created by commercial banks when they extend loans to their customers, loans being, in essence, *additions* to the money supply, not a mere reshuffling of extant money, as the intermediation model has it. Likewise, repaying bank loans with account

[1] Associate Professor, Department of Education, Aarhus University, Denmark. Board member of Gode Penge, a Danish monetary reform organization.

money amounts to extinguishing money, since money spent on loan repayments disappears from the borrower's bank account and thus gets subtracted from the national money supply. That ordinary lending by commercial banks constitutes money creation is a key element in the explanation of the bubbles that plague modern economies (Galbraith, 1975; Minsky, 1978; Kindleberger & Aliber, 2011; Werner, 2005), disrupting the lives of millions of wage earners and home owners. As such, money creation-through-bank-lending is an insight that deserves to be widely appreciated, not only by economists and finance and banking professionals, but also by the general public.

It is a commonplace that the technical jargon of economics, finance and banking is a barrier to public understanding. In the case of money creation by commercial banks the challenge, however, is exacerbated, because this process flies in the face of many things we "know" about money, whether we are laypersons or economists. The alternative explanation draws on the dynamics of evanescent account-money, not just tangible cash or commodity money and, thus, is unfamiliar and counterintuitive. How do we explain that commercial banks create account money on their books when a layperson has no clue that money can be created at all, or that there is a finite money supply that expands, contracts and is replenished? Educators and communicators facing student or lay audiences, whether through oral or written presentation, need intellectual tools so simple that they can address the challenge of explanation head on.

Analogies as tools for understanding

This article offers such tools, in the form of five analogies or stories that are easy to grasp, yet preserve the underlying structure of the concepts and processes illuminated. They are presented here in terms congenial to the lay mind (that is, in terms of people with real names doing almost-real things), yet in so compact a manner that when the expert reader of this journal retells them to a lay audience he or she may occasionally need to expand the story and will know how to do so.

In the first analogy, we clarify the nature of money by seeing it as tokens representing real assets. This idea is explained by reference to the neutral veil which, according to orthodox economics, covers the real economy. In the positive reformulation offered here, the veil is a patchwork quilt and each patch or square a money token, the veil covering a country's real assets. When more tokens are produced and inserted into the veil, it inflates into a bubble and eventually explodes, producing a crisis.

The second analogy addresses a common barrier to public understanding: the concept of a money supply; the fact that a nation's money constitutes a finite and countable sum, which can be added to and subtracted from, by creating and retiring money, respectively. The analogy of water in a bathtub (as well as that of a population) serves to illustrate those points. Our third analogy lies in the type of model economy that is enacted by students in a school who play workers and business owners for a week. The "school business week" allows us to distinguish two possible sources of a nation's money: it can be supplied by private banks as loans and thus based on debt which, when repaid, shrinks the money supply and hampers economic activity. Or it can be supplied debt-free by the sovereign (that is, a government agency) and retracted, to prevent inflation, through taxation.

Next, the story of the London goldsmiths in the late 1600s is more history that analogy. It illustrates some fine points about the loan process that may otherwise confound the lay mind.

Wealthy citizens came to the goldsmiths to borrow gold but were persuaded to accept a deposit receipt instead, as receipts were already circulating as money. The borrower's promise to repay this loan illustrates the origin of the loan contract, which banks today enter as an asset, enabling it to create money on its books by simply lengthening the balance sheet, a shrewd sleight of hand when invented and, today, still not well understood.

Over several centuries, merchants and bankers evolved a system that allows them to match payments moving in opposite directions and thus to "clear" them without the use of much money. Our fifth and last analogy is about two neighbors who do jobs for each other and cancel their mutual claims. In like fashion, banks today participate in the largely money-free functioning of the national payment system and claim they lend money to their customers when, in fact, they merely use the payment system to effect payments for the customer. For this process very little money is required, meaning that the money lent is created pretty much *ab nihilo* by commercial banks.

We conclude by highlighting how, together, these five analogies can help us explain to the layperson key concepts underlying money creation by banks and the prospects of monetary reform.

Commercial banks create money on their books

Before we launch the analogies, let us state the alternative explanation they serve to illustrate (see the introductions by Jackson & Dyson, 2013; Ryan-Collins et al., 2011). In doing this, I shall follow Furey (2013) and skip the conventional explanations (credit multiplier, fractional reserve, banks as intermediators) and invite the reader to do likewise when using the analogies for public education, so as to avoid imparting wrong ideas and setting up mental barriers that have to be overcome minutes later. *Sans comparison*, when explaining to a child how the solar system is organized, who would start by offering the geocentric model?

The modern view of money creation is set forth authoritatively in recent publications from the Bank of England (McLeay, Radia & Thomas, 2014a, b). Following the lead established by the previous governor of the Bank of England (King, 2012, p. 3), the authors point out that only currency (cash = coins and notes) is created by the Bank of England (2014a, s. 10). The rest of the money supply, in the UK about 97%, is account money, which originates in banks:

> Commercial banks create money, in the form of bank deposits, by making new loans. When a bank makes a loan, for example to someone taking out a mortgage to buy a house, it does not typically do so by giving them thousands of pounds worth of banknotes. Instead, it credits their bank account with a bank deposit of the size of the mortgage. *At that moment, new money is created* …. This description of money creation contrasts with the notion that banks can only lend out pre-existing money…. Bank deposits are simply a record of how much the bank itself owes its customers. So they are a *liability* of the bank, not an *asset* that could be lent out (emphases in original) (McLeay, Radia & Thomas, 2014b, p. 16).

In simpler terms, from the same authors:

> When a bank makes a loan to one of its customers it simply credits the customer's account with a higher deposit balance. At that instant, new money is created. Banks can create new money because bank deposits are just IOUs of the bank…. When the bank makes a loan, the borrower has also created an IOU of their own to the bank [the loan contract. IR]…. The bank's IOU (the deposit) is widely accepted as a medium of exchange—it is money (McLeay, Radia & Thomas, 2014a, p. 11).
>
> Money today is a form of debt, but a special kind of debt that is accepted as the medium of exchange in the economy (McLeay, Radia & Thomas, 2014a, p. 12).

These are succinct statements of the modern view of money, but they are not easy to understand. Just appreciating that money is a means of payment of no intrinsic value is a challenge to laypeople—and specialists need reminding, too, as Jakab and Kumhoff do in a recent, highly technical paper: "While money is essential to facilitating purchases and sales of real resources outside the banking system, it is not itself a physical resource, and can be created at near zero cost" (2014, p. 5). Money as a medium of exchange, created at near zero cost by banks, as a form of debt? Educators and communicators have their work cut out for them. Below, we shall exemplify the ease with which money can be created by the London goldsmiths' use of fake deposit slips.

These issues are not merely banking technicalities; they are highly relevant to the economy at large. Against the orthodox economist's neglect of money, debt, loans and banking, Huber argues:

> Money governs finance, as finance governs the economy. In a modern, highly financialised economy based on credit, money is not just a 'veil' on economic transactions as neoclassical theory has it, but is constitutive of the entire economy, not only enabling transactions, but also financing, and ever more often forerunningly pre-financing, investment and consumption. Money issuance has a pre-allocative and pre-distributive function (2014, p. 42).

In other words, the question of who creates money and how is of major importance to social and economic equality (Jackson & Dyson, 2012). Helping lay people appreciate this point is of democratic concern, and we attempt to bring it home below, using the example of school children cutting out paper money for a model economy.

Unlike the goldsmiths' deposit slips and school children's paper money, the money created by banks is account money, and understanding its mode of operation is a separate challenge. In particular, banks' newly created account money start circulating in the economy as payments, entering the payment system that banks in modern economies operate. As payments, the loans are cleared or cancelled against matching amounts every night, as the system tallies up the millions of payments made by households and companies during the previous business day. Well under the public's radar, this clearing system enables banks to double and triple a country's money supply in a matter of years, thus contributing to bubbles, their popping and the consequent crises. Crucially, the way that loans are superimposed on the payment system is the key to understanding the freezing of the interbank system that so terrifies politicians that they bail out large banks too big to fail. Additionally, this point allows us to briefly discuss an alternative system in which lending and payments belong in separate

compartments, and money creation is a privilege reserved for the sovereign, the people's democratically elected representatives, rather than the banks.

1. The expandable veil

As is well known, neoclassical economics treats money as a "neutral veil" that conceals or lies over real assets, which may be exchanged for money in largely uninteresting ways (e.g., Schumpeter, 1954, p. 277; see also Patinkin & Steiger, 1989). Money and its dynamics can be largely ignored; hence, the roles played by banks, the financial sector in general and money creation in particular are poorly understood by the orthodox economist and the layperson.

I wish to flip this somewhat negative metaphor and turn it into a useful analogy for money. If the veil represents money, we can see it as a blanket or patchwork quilt resting on top of the real assets of the world, such that one small patch or square of veil covers one asset: one plot of land, one home, one small shop, one person's work year, one pile of consumer goods. We can take the squares to be tokens representing the assets, and they may be traded in their place. They are our monetary units, like $100,000 bills. Crucially, they are worth nothing in themselves: only in their capacity as a claim on a resource do they become valuable. Today, these tokens include coins made of base metals, paper notes/bills, checks, the digits in bank accounts, and some securities (like government bonds).

Assume that we have a country of so many assets (say, a hundred) that a hundred squares are *just* sufficient to keep its economy running. The veil of 100 squares fits snugly over the area of the assets. Adding a bit of credit, in the form of five extra squares, will help the economy, as businesses will be better able to purchase raw materials and pay labor before they sell their goods, this being the quintessential function of credit (which needs to be explained to students or public sector-employees unfamiliar with the fact that credit is required for starting and expanding a business, as well as innovating new products and services).

We can imagine that when the tight veil covering the assets is expanded by five squares it will hover a bit over the country, as if some extra air is let in under the veil. The economy is lifting off, and with 10 or 30 additional squares it may be flying, the veil billowing in the winds of change. The money supply is expanding, from 105 to 115 to 135 squares, but as long as new assets are being produced and engaged – new homes, more consumer goods, unemployed citizens' work years – they keep pace with the growing number of squares. The economy is picking up speed, expanding the area of assets, tightening the veil somewhat again.

If, however, squares are being produced (or credit extended = money created), *in excess of* new assets, inflation ensues. If 150 squares are available, but there are still only 100 assets, each asset will now correspond to (cost) 1.5 squares, which amounts to inflation. This happens particularly when credit is extended for non-productive purposes, like speculation in existing assets (e.g., real estate and stocks) rather than the production of new assets, like goods and services (Werner, 2005).

If the agency that issues the money has the nation's interest at heart (as, supposedly, a central bank does), it will slow money creation to help keep prices more stable and allow asset production to catch up, and it may try to redirect credit towards productive purposes, rather than speculative ends. If, on the other hand, private interests, like commercial banks,

enjoy the privilege of issuing the country's money, e.g., in the form of lending, and do so in pursuit of their own profits, they have no incentive to be prudent. Each bank, in fierce competition with other banks that threaten their market share, will keep adding squares (new money, loans, credit lines) and eventually inflate the veil into a regular bubble (Minsky, 1978). The creation of just the right amount of money, whether by commercial banks or the central bank, has been a major motif in the development of modern economies, as narrated by, e.g., Kindleberger & Aliber (2011).

The financial bubble is now being fuelled by commercial banks slackening their credit standards to lure new (and riskier) borrowers. At some point the loans start defaulting, bank equity is wiped out, liquidity freezes up and the whole nine yards. The veil explodes, spewing money squares into the air, whence they came. The veil deflates, quickly settling on the country, in tatters, insufficiently covering the assets, because banks have called in loans, businesses don't ask for credit since consumer demand is down, etc., etc.

The economy languishes for a number of years, until a seed of optimism takes hold somewhere and the cycle starts again, eventually producing a new bubble. It may happen in a new market that has gone unnoticed by regulators, where banks can create money or money substitutes that authorities only recognize as such too late to prevent the veil of money squares from yet again blowing up (in both senses of the word).

The regulators' aim is to keep the veil extended just right, so it won't suffocate the assets and the economic activity underneath, but hover right above them and facilitate production and trade. Galbraith's terse history of money (1975, chapters 2-4) turns precisely on the challenge facing every nation's monetary authorities to keep the veil suitably expanded, neither overshooting nor suffocating. The judgment required to do so is everywhere clouded by the desire of private parties, usually banks, to make money (in the form of interest) for themselves out of money created for others through lending (the identity of lending and money creation being further explained in analogy 4).

The expandable veil of money-squares covering a nation's assets is a tangible image for the nation's money supply. Traditionally, the immensely difficult task of regulating it to suit production and trade has been assumed to belong to the central bank. As is well known, central banks have largely given up on this task (Huber, 2015) and left it to commercial banks, resulting in the boom-bust roller-coaster.

Reconfigured as indicated, the veil metaphor no longer indicates the supposed irrelevance of money, but its significance in facilitating business transactions when supplied in just the right amount. This proper amount is visualized as the veil hovering over the land in the pleasant breeze of economic dynamism, an image easily held in the mind.

2. The money supply as water in a bathtub

To grasp the idea that money is being created at all, whether by private banks or a central bank, a layperson will find it useful to be conversant with the concept of a finite money stock that is replenished continuously. Few people have any direct experience of limits to the *general* availability of cash or bank account money. If told that her country's money supply currently stands at so many billion currency units, the person in the street will likely wonder: "How do they count that?" Offering the M1 explanation of cash plus deposits usually does the

trick, especially if we remember to mention that the central bank keeps track of how much cash is issued and withdrawn, and that commercial banks tally up everyone's accounts every month and report their total to the central bank, which adds up the totals from all the banks.

The replenishability of the money supply can be illustrated by the bathtub analogy. The water level is the current money supply, the water faucet adds money and the drain subtracts, and the relative velocities of each determine the expansion and the contraction of the money supply. (Notice that in English, the term "money supply" already implies the dynamics of money being supplied, whereas other languages use more static terms. Thus, French: *masse monétaire*, German: *Geldvolumen*, Russian: *denezhnaya massa*, Swedish: *penningmängden*. This may be confusing or illuminating and must be borne in mind by the expositor.)

A simplified, three-step, historical perspective may be added:

When a country's money was silver coins, the Royal Mint created money, and very tangibly so. Minting was the water faucet, and clipping and smelting by the public were drains.

When, in the 16-1800's, banks extended loans by printing their own bank notes (famously the deposit receipts issued by the goldsmith bankers, cf. analogy 4 below), this became the faucet. Repaying the loans required collecting enough of these bank notes and giving them to the bank. Since the banks then did not eliminate the bank notes, that is, pour the money down the drain, as prudence would require, more and more notes came into existence, causing inflation. Finally, governments took away from banks the power to create paper money (in the UK, with the Bank Charter Act 1844).

However, the commercial banks' practice of creating money effortlessly continued by way of lending account money by book entry (as already described). It took a while for economists and governments to recognize this as real money, but in the course of the 1900's bank account money was included in the calculation of the money supply in modern economies. Just as borrowers repaid lent bank notes by returning them, loans by book entry were repaid by reducing the balance on one's account, either through bank transfers or by cash. This, then, constitutes the drain to the money supply (complementing the faucet: the banker's money creation by book entry).

Skipping this historical narrative, one may simply explain that while most of us think the central bank creates a nation's money, the expanded use of bank accounts over the past century, including the modern payment and clearing systems, has meant that commercial banks, where about 95% of the money in a modern economy resides, are in control of a nation's money supply. The faucet is not in the central bank, but is turned on whenever a bank extends a loan, and money is drained away when the loan is repaid.

Continuing the plain talk, we may explain that when times are good, banks like to lend – this is how they earn their money, through the interest paid – and this increases the money supply: the faucet sends more water into the bathtub than is taken out through repayment of the previous years' loans. Vice versa, when times are bad, as in the current post-2008 crisis, more loans are being paid off by households and companies than are being replaced by new loans, which banks are weary of extending anyway, for fear of taking further losses. More money is extinguished (destroyed, retired) from the money supply than is being created, and the water level in the bathtub drops, contracting the money supply and hampering production and trade.

A related analogy is that of a population. A young child has no concept of a population; there are just people in the street everywhere, in seemingly endless supply (just like most people think of money). But adults know that a population is the people in a nation counted at a particular moment in time. The faucet is births and immigration, and the drain is deaths and emigration; one may exceed the other, causing population growth or decline. The details of "people creation" (sex) weren't well-known amongst girls in convent schools a hundred years ago, just as, today, the details of money creation aren't well known to the layperson equally innocent in matters of financial procreation.

3. Money is debt in the school business week

Let's see if we can help a layperson get a feel for the role that money, considered as a system, plays in an entire economy. The model to be presented is especially useful for illustrating the dynamics of two different monetary systems in which money is created either by a central bank or by commercial banks.

Imagine a small country school with a hundred students. Once a year they run a "school business week" to help students understand the world of business and work. Classes are suspended and the children work for wages in five different businesses, such as a cafeteria, a grocery store and a woodshop. They change jobs occasionally and spend their wages buying the products of each business, such as lunch, sweets and wooden swords.

Money is needed for production and trade. A couple of students and a teacher form a money committee and cut out some pieces of paper in the total amount of 5500 money units. They distribute them, 5 units for each student and 1000 for each business.

Monday comes and the students start working, 20 students in each business, at 5 units an hour. Every few hours they take a break and spend some of their money on products from the five businesses. The amount of money in the system proves just about right for production and consumption, and the little economy is humming.

After a few days, the school is visited by 20 students from abroad, and they are invited to join the work week. A metal shop is opened, and it soon attracts 20 workers. But there is a dearth of paper slips to facilitate the new production and labor, so the money committee cuts out some more pieces of paper, 1100 units' worth. The metal shop receives 1000 units and each visiting student 5 units. Soon the expansion in the money supply is absorbed by the new production and consumption, and prices remain stable. A twenty percent increase in the money supply did not lead to inflation because production expanded.

At this point in our storytelling we may join our listeners, the laypersons, in their appreciation of our model economy. "That's so nice," they may say, "isn't this exactly how our monetary system is working?"

Well, no. To see how, let's look at another model economy. In the next small town, the local school is about to start *their* business week, for the first time ever. One of the older students, J.P., tells the teachers he has a very old game of Monopoly with some pretty banknotes. Would the school like to use them? Sure, say the teachers, how can we organize that? Well, since the notes are so fragile, he'll only *lend* them to the businesses and students. He'd really like them back after a few days, just to make sure they don't disappear. Also, to compensate

him for the risk that they get dirty or lost, he'd like to have 1100 Monopoly dollars back for every 1000 he lends a business for ten days, to be paid in installments of 110 dollars a day, starting Monday evening. The teachers are puzzled by his terms and don't quite understand their ramifications, but they go along.

The first Monday passes as nicely as in the former school; the economy is up and running. At the close of business, J.P. collects 110 dollars from each of the five businesses, a total of 550. This is a 10% reduction in the money supply, which started at 5500. Tuesday morning the businesses have the same labor force, but at the end of the day, they are running a little short on dollars to pay their workers. They have to dismiss some of them for the last working hour, and workers worry that maybe they shouldn't spend their money as quickly tomorrow. Tuesday night the money supply contracts again, as new installments are paid to J.P.

The teachers suddenly realize that all the money in their economy came about as debts to J.P., and that repayments reduce the money supply and contract the economy. To lubricate the wheels of commerce, students and/or businesses have to borrow from J.P. anew, as he is their only source of money, the special Monopoly dollars they have now come to think of as money *per se*. Debt is the essence of their money system, and they can never get completely out of debt. Without debt there can be no money – as the system is set up now, with J.P. supplying all the money.

At this point in our story, our layperson realizes that the first economy, with its intuitively sensible and stable money system, is a pipe dream. Real economies are rather like the second model, with money supplied by people like J.P., or multiple agents like him, whom we now recognize as banks, which lend the community money that actually belongs to the banks. The means-of-payment that businesses need to pay wages and which people need to buy goods can only come from one source, the banks. Since modern economies typically rely on banks for some 95% of their money creation, we may say that a modern economy is a mixture of 5% of the first model and 95% of the second.

Here are some additional points that the business school week analogy allows the educator to make:

Being an entrepreneur is tough because the start-up money required has to be borrowed from J.P. at interest and maybe repaid before the company has established itself properly. This may explain why so many new businesses fail. Compare with the metal shop that is given 1000 dollars by the money committee to start production and provide employment for 20 idle workers. This may look like Keynes, but notice that the government does not borrow the money; it creates it.

If the money committee were a government agency under parliamentary control, it might decide to revoke J.P.'s money-lending privilege and instead supply its own paper money for the community on more favorable terms.

Whether the money is pretty or not is of no consequence. It is just a means of payment, to oil the wheels. Cut-out paper will serve as well. Money has no intrinsic value. What does is labor, resources, real estate, goods, etc. This difference may be used to distinguish between the finance sector and the real economy and their relative status today.

J.P. is likely to lend only to creditworthy borrowers (often those who possess collateral, like real estate and stocks), especially during a recession. This impedes recovery but inflates speculative bubbles in those separate markets. In contrast, the money committee may decide to distribute money somewhat evenly in the community to encourage spending, as

recently proposed by Blyth & Lonergan (2014) in Foreign Affairs magazine (hardly a socialist outlet).

We may introduce several more banks to study the effects of their competition for sound borrowers, as well as their collaboration in a payment system (see analogy 5, below). In particular, we may replace the paper money with account money, requiring all workers and business to open bank accounts. Money lent by the banks is no longer physical Monopoly money, but the stuff that bankers' dreams are made of: numbers entered in books or computer software. This money is much more readily created by banks and, when inserted into the payment system, its origin in the banker's creative act is obscured, leaving the uninitiated with the obsolete belief that banks actually collect money from savers and lend it to borrowers.

One school (nation) may feature a central bank (money committee) and several commercial banks, the interactions between which may be simulated. The power of a nation to create sovereign money for itself has already been demonstrated (in the first school, above), and the lay person now recognizes that somehow, that power has been passed on to commercial banks. This prompts the question: When a government's spending exceeds taxation, it issues bonds to raise money, but why should a government allow banks to create money and then borrow it back from them at interest, compounding government indebtedness, when it could create its own money directly, free of debt? (Hixson, 2005).

4. Goldsmiths' deposit slips as money

We are now ready to confront some major barriers to understanding how banks create money through lending. These are the facts involved in the mechanics of bank loans, which include several puzzles: When extending a loan to a customer, how can a bank simply write the amount into the borrower's account? How is it that this money is not transferred from another customer's account or found in a drawer somewhere, like we would expect from a proper money lender? Sure, the borrower signs a loan contract, but how can this promise to repay the bank *in the future* constitute the basis upon which a bank may create new money *now*? And, more technically, how did it come about, historically, that the amount written in the loan contract, essentially just a signed piece of paper, can enter the assets side of the bank's ledger, allowing the bank to create the new money on its liability side, by extending its balance sheet?

These questions may be answered by reference to an important episode in the history of banking, in the middle and end of the 17th century, when London goldsmiths turned into bankers (Davies, 2002; Werner, 2005, p. 167-172; Ravn, 2014). We can reconstruct the reasoning behind their financial innovation and, while not strictly analogy, but plain history, it will serve as our fourth explanatory vehicle.

Goldsmiths lent fake deposit receipts

In the mid-1600's, many wealthy Londoners began storing their gold with goldsmiths, and they were given deposit receipts in return. These 'goldsmith's notes' began to circulate as money, as they were easier to carry and keep than the gold. Meanwhile, other people borrowed gold from the goldsmith's ample supplies. At some point, a goldsmith persuaded a prospective borrower to take a (fake) deposit receipt instead, since it was as good as gold. The goldsmiths wrote them out in increasing numbers, pretending the gold backing the receipts was actually in their vaults.

The goldsmiths grew wealthy from the interest on the loans, and the economy prospered from the infusion of new money (Werner, 2002, p. 170). The fraudulent practice was tolerated, legalized and regulated in the early 1700's, and further circumscribed by the newly founded Bank of England. During the 1800's, the practice continued with account money, which, in like manner, the bankers would provide out of nothing, by book entry, as freely as they had written fake paper receipts. During the 1900's banks were required to keep *some* money on hand (reserves), as they are today (although in some countries expressed as liquidity and solvency requirements).

The story of the London goldsmiths is one spectacular road taken by a nascent financial sector, illustrating how banks came to provide money or credit, or bank account digits, of their own creation. They *do* have some reserves to back up the money created, in the event that some customers want their account balance paid out in cash, just as the prudent goldsmith would not write out deposit receipts in excessive numbers: occasionally, customers actually came to exchange deposit slips for real gold. Such a run on the bank could prove ruinous, as history has shown repeatedly during crises (Kindleberger & Aliber, 2011).

Goldsmiths issuing notes morphed into bank lending

The crucial transition from basic gold lending to shrewd money creation came at the point when, in the above story, the first goldsmith started giving out deposit receipts not backed by gold.

We need to remind our lay listener that *money* is here treated as a token that represents a real asset (here: gold), as in: one deposit receipt per deposited gold piece. Using these 1:1 paper slips as money is the primordial monetary innovation *per se*, but *money creation* proper, in the sense of creating more money than warranted by resources, occurred when a goldsmith started writing out more receipts than he had gold in his vault.

This practice was fraudulent to the extent that the customer believed that he, or the merchant receiving the note in payment, would be able to retrieve the gold from the goldsmith, but would fail because the goldsmith had overextended himself. The more fake slips the goldsmith produced, the fewer borrowers could redeem any gold in the event of a bank run.

Fraudulent or not, the practice turned gold lending into banking. As one observer remarked: "Some ingenious goldsmith conceived the epoch-making notion of giving notes, not only to those who had deposited metal, but to those who came to borrow it, and so founded modern banking" (Withers, 1914, p. 24). This fact captures what makes banking special and different from mere money lending: the capacity of banks to write out new money, paper that purports to represent real resources when it doesn't.

In the act of coming for gold but accepting a deposit slip lies the key to the significance of the signed loan contract without which a loan cannot be made today. Bankers have been entrusted with remarkable powers: Out of my promise to pay a banker £100,000 (plus interest) at a specified time in the future, he is legally allowed to enlarge the nation's money supply and create £100,000 for me now. My neighbor can't do that for me, nor can a money lender in the street. Not even a central bank can do it for me, a private person. But a bank can: create legal tender out of something as evanescent as a promise to pay.

Where did that privilege come from? It came from the goldsmiths' audacious innovation: a prospective borrower comes asking for an ounce of gold, and the goldsmith says, in effect,

> "Well, how about we pretend that you just made a deposit of that much gold? Then I could give you a receipt for that gold, in the amount you want to borrow. I know you have not made such a deposit, but if you promise to do it later, like in a year (plus interest), I'll give you the receipt now. How does that sound to you?"
>
> "Fine," the customer may have replied, "let's just pretend I made a deposit of gold now; I'll be happy to actually only make it next year, with the usual interest accruing, as long as I get the receipt now, because I have payments tomorrow I need to make."

The customer's promise to make that deposit in a year is recorded by his signature on a piece of paper (the loan contract), which the goldsmith keeps for later enforcement. Money, in the form of the freshly written (fake) deposit slip, created *completely* out of nothing, is turned over to the customer against his promise to supply *later* the gold that both parties pretend was deposited *now* (Werner, 2005, pp. 167-171).

This sleight of hand provides the customer with the purchasing power he wanted from the gold he came for, and the goldsmith supplies it happily, securing for himself the later "return" of gold (or the corresponding deposit receipts, now money) *that he never possessed in the first place*. To this day, this is called a loan, even though the banker lends nothing. The goldsmith writes on a blank sheet of paper certain words and digits that turn the paper into money—just as, today, he writes digits into a ledger or an account, whether on paper or a computer screen, whereupon the customer gets to use it as money, on the promise that he will pay the particular amount (plus interest) later. Only by the considerable stretch involved in imagining that gold *could have been* lent can this be called a loan (Werner, 2014b).

Double-entry bookkeeping helps keep the lid on

Using double-entry bookkeeping, banks render lending inconspicuous. Let's see how. Customers' deposit accounts are liabilities from the bank's point of view; the bank only promises to pay out the money when I want to withdraw it. Correspondingly, when the bank grants me a loan of £100,000 and I promise to repay it, this promise, as materialized in a signed loan contract, is my liability to the bank, and hence an asset to the bank. When, applying for a loan, I sign the loan contracts, the bank enters "£100,000" on the other side of the ledger: Operated by the loan officer, the bank's loan management software adds a "1" to the sixth position to the left of the decimal point in the balance in my deposit account. A microsecond later I can use my greatly expanded balance to make payments in the amount of £100,000 by transfer to other bank accounts.

Thus, the bank's *ab nihilo* creation of money is completely rationalized by the matching entries in its books: the bank has extended its balance sheet by £100,000, adding this amount in proper fashion to its assets as well as to its liabilities. Nothing untoward has happened and, crucially, there has been no transfer of money into my account from any other account.
This remarkable process is known as bank lending. We have seen how its origins lie in the deposit receipts issued by goldsmiths and later regulated by the government. Individual goldsmiths/bankers occasionally suffered bank runs, which continued to plague European

and American banks well into the 19th century. Central banks were largely created to rescue the banking system from itself, providing banks with new money in times of crisis, as they do today.

There is another innovation we need to understand to appreciate the immense power of banks to create new money, and that is clearing.

5. Clearing: like neighbors exchanging work without money

We now leave behind the *paper* money of the goldsmiths and the school business week and consider the more intricate world of bank *account* money. How are the opportunities for creating this kind of money under the public's radar? Much better, as we shall see.

Banks in most modern economies operate a system that facilitates payments between account holders in different banks. Its essence is the cancelling out of like-sized payments that move in opposite directions between banks, thus considerably reducing the amount of money needed to settle these transactions.

During the centuries-long emergence of this system, merchants and bankers discovered that the process of *lending* to borrowers could piggy-back on the payment system (Ingham, 1999), in similar fashion reducing the bank's need for money (to extend loans). Due to the power of the payments clearing system, banks only need *very little* money to offer a client a *very large* loan, meaning that new money (the difference) has been created.

To help the layperson appreciate how money is created by being lent by many banks and then cleared between them, we start with the "clearing" that occurs between two neighbors doing a job for each other. Assume I am a web designer. I create a web site for my neighbor, who is a gardener. Normally, I would charge £2000 for this, but it so happens that I need some landscaping done. My neighbor does this, and instead of charging me his fee of £2000, he suggests we cancel or 'clear' the payments.

Due to our proximity, we can settle the two transactions without taking a penny out of our pockets. (We ignore the tax evasion involved here.) If we didn't know each other, it would be harder for us to get the web site and the garden fixed, especially if we had no money. Banks are institutions that facilitate contacts such as ours, helping distant consumers, producers and merchants trade. Take an example.

Banks' payment systems

A person, Mr Urbani, buys a cottage in the countryside from Ms Rurale for £100,000. Mr Urbani asks his bank, Citybank, to transfer the amount from his account to Ms Rurale, who has an account at Countrybank. On the same day, another customer of Countrybank, Mr Greendale, happens to purchase the consulting services of Citybank customer Ms Steeltower, in the amount of £100,000. Mr Greendale instructs Countrybank to pay this amount into Ms Steeltower's account at Citybank. The two transfers of £100,000, about to move in opposite directions in the interbank payment system the following night, cancel each other out; the system "clears" them. The system makes the relevant additions and subtractions to the four customers' accounts, in the amount of £100,000 in each instance: At Citybank, Urbani's balance is taken down and Steeltower's up; in Countrybank, Rurale's is up and Greendale's is

down. The total balance of each bank is unchanged. Absent banking regulations, the two banks could be empty; not a penny is needed to complete the two transactions and the adjustments to the four accounts.

In the real world, there may be thousands of transactions between two banks during any one day. The national payment system add the payments going one way and those going the other way, and subtract one from the other, obtaining the net difference. The result of this 'netting', for example: £60,001, is what Citybank owes Countrybank after that particular business day. To settle their payments, this 'net position' must be transferred from Citybank to Countrybank (if they were the only banks in the system). This is the (small) amount of money needed by these two banks to settle the payments between them, amounting to many millions of pounds.

What happens in the case of three banks? Let's say the bilateral netting shows that Citybank owes £100,000 to Countrybank, and Countrybank owes the same to Regionalbank, and ditto for Regionalbank and Citybank. These identical net positions cancel out and again, no money needed to move between parties to clear their payments. If, on the other hand, the net positions are not similar, as is the case in reality, an overall result is obtained for each bank by adding all the positive bilateral positions (amounts owed to Citybank by all the other banks) and subtracting from this all the negative bilateral positions. This produces each bank's overall net position, whether the system has three banks or five hundred.

Let's say this position is -£402,003 for Citybank, this being the amount it owes all the other banks when totaled. If there were a pool of money for the five hundred banks participating in the payment system, Citybank could pay this amount into that pool, and all the other banks could do the same, depositing or withdrawing their overall net positions, to settle everyone's obligations after a given business day. As it happens, there is such a pool in modern economies. Each bank keeps an account, typically called a settlement account, for this very purpose with the Central Bank (or a similar central monetary authority). The sum of the balances in these five hundred settlement accounts is that pool. The nightly settlement is performed by software that executes millions of payments between participant banks every night and adjusts the balance in each bank's settlement account accordingly, up or down, keeping constant the size of the pool.

However, and crucially, these adjustments are usually tiny, compared with the large sum of payments they settle, maybe in the order of a few percentage points. We may visualize a deep ocean of payments, with billions of pounds being transferred between consumers, tax payers, businesses and government agencies each day, but the clearing is accomplished by pushing around only small ripples on the surface of this sea, the tiny adjustments in the five hundred settlement accounts.

Such is the functioning of the *payment system*, developed over centuries to facilitate trade between people who are not neighbors, relieving banks of the need to cart gold coins through the city every night.

Loans piggyback on the payment system

Now, let's consider loans and money creation. Historically, payment systems and lending practices have co-evolved and in official accounts, little is made of their possible differences

(e.g., in Committee on Payment and Settlement Systems, 2003, p. 6). Nevertheless, they are conceptually separate systems. Their disentanglement is an important pedagogical goal, not least for its implications for monetary reform efforts.

Let's recall the point emerging from the goldsmiths story, that a borrower is not primarily interested in gold (or money *per se*), but in the *purchasing power* afforded by gold or money. Finding real money to lend is a hassle, as every street-corner loan shark knows. If you could only find some way to make it up. "Life is so much easier when one has a license to print money" (Werner, 2005, p. 179). The clearing process enables payments to be made, using very little money. That is, it creates purchasing power, which is, effectively, money.

"Ah, Mr Urbani, you say you want to borrow £100,000 from our bank for a cottage? Well, I can certainly help you pay for that." The typical bank customer will hear that the banker is offering him a loan, which involves the transfer of money from some other account into his account. For this sacrifice, the bank is of course entitled to interest. The bank officer is unlikely to protest this understanding, either because it is her own as well, or because she thinks the customer's misconception immaterial.

But *we* can speak with the banker's tongue, in our attempt to educate the lay reader:

> "Mr Urbani, you say want a loan. But a bank doesn't actually *lend* anything. That's just an old phrase we use. What we do is enable you to make payments. You see, we have access to this amazingly efficient payment and clearing system, and we can use it to obtain the cottage you want from Ms Rurale.
>
> Once we find you creditworthy, I'll open our loan management software and we'll complete your loan application with the amount of £100,000. We'll enter your bank account number and the software will add the digits 1, 0, 0, 0, 0 and 0 to your balance. These digits now count as money, but notice that this money was not transferred from some other account anywhere. The amount adds to the national money supply which, as you know, consists of cash and bank deposits. Enlarging a nation's money supply, of course, is creating money.
>
> At the same time, the software opens a loan account for you and enters the £100,000 outstanding, allowing both you and us to track your repayments.
>
> When you decide to spend the amount in your deposit account by transfer to another person's bank account, we insert this payment of yours into the clearing process. That is, we ready it for processing at night along with the thousands of other payments that our customers make today, and it is added to the others in the netting tonight. There's plenty room for your £100,000 in the sea of payments being processed. Most of them cancel each other out, clearing, like pairwise payments of equal sizes travelling in opposite directions.
>
> Now, if we had given you a very large loan, like £5,000,000, which you might spend all at once, then tonight, extraordinarily, we might be couple of million short. But there are routines in place that allow us to borrow that money from

another bank in the system, so no worry. As one banker put it: 'If we are short, we know the money has to be somewhere. Our only problem is to find it, and pay the price asked for it' (Gardiner, 2004, p. 152). Such an interbank loan will likely cost us a fraction of one percent, but that's OK with us because we charge ten or fifty times that on your loan.

Now that you got me sharing our insider's perspective with you, Mr Urbani, let me add that when times are good, banks really want to increase their lending. Banks can do this pretty much indefinitely, as long as they do it together. If we all step up our lending, we expand payments from maybe one billion to two billion pounds daily. However, this only *deepens* the sea of payments. If all banks do it, there will be hardly any change in the magnitude of the ripples on the surface, the small differences between the net positions that are handled by adjusting the settlement accounts. As the great economist Keynes said, as he was making certain assumptions, 'there is no limit to the amount of bank money which the banks can safely create *provided that they move forward in step*' (Keynes, 1930/2012, p. 23).

You see, banks only face problems in lending when one bank has lent so recklessly that the other banks—to put it colloquially—will no longer cover its behind in the nightly interbank lending market, for fear that it will collapse a few hours later and cannot service the loan just extended. This suspicion spreads quickly among banks; none dare lend, payments cannot clear, the system is stopped and suddenly it is rumored that cash machines may not open in the morning. The prospect that ordinary folks cannot buy groceries and may start food riots in the street is so terrifying to politicians that they rally to bail out these banks with big piles of government-created money.

The Central Bank usually steps in long before we get this far and, less dramatically, provides the loans needed. We say that the Central Bank is the lender of last resort. Well, as a matter of fact, today we joke that it is the lender of *first* resort, that's how keen they are on financial stability. We don't want our little boat to rock, even if some banks overextend themselves. Of course, there are limits to the Central Bank's and the Finance Ministry's patience. Banks are sometimes left to sink, like Lehman Brothers in 2008 in the US.

So, Mr. Urbani, there you have it: we let loans piggy-back on the payment system, or rather, we pretend they are loans, when we don't really part with much money at all, because the cancelling of payments going back and forth is such a money-saver for us. As long as we have the required pittance in the settlement accounts and the cash machines are full, the system works like a beaut. That's why government liquidity requirements are only 10% or 15% in most countries. That is enough; except when it isn't: at the peak of a bubble, or during bank runs, when the whole thing goes belly-up.

You may feel it is unfair that everyone's payments are at the mercy of the bank's lending operations, especially when the lending-and-spending euphoria sets in and the bubble pop is imminent. But what can we do? That's how the system is."

This concludes our bank officer's inside account. The ease with which neighbors work for each other and discharge their obligations has been duplicated by banks and their payment and clearing system. Modelled on the symmetry of neighbors working for each other and the cancellation of their mutual obligations, the clearing system allows banks to grant loans and effect payments without putting up much money themselves. When the amount lent is used by the borrower to purchase a car, it enters the economy as money, new money created by the bank on its books.

Conclusions

Faced with the challenge of explaining money creation by commercial banks to a lay audience, and skipping the phlogiston of fractional reserves and credit multipliers, we availed ourselves of five analogies with accessible imagery and simple building blocks. Needless to say, analogies engage only a few aspects of reality and may easily be extended *ad absurdum*. That said, the school business week analogy may be elaborated gradually to look like a model economy, while the veil and the bathtub are images for beginners best left behind as understanding progresses. Further, the London goldsmiths and the clearing system, being empirical phenomena, are beyond embellishment.

Notice that none of the analogies relies on the T-accounts of double-entry bookkeeping, as forbidding to the layperson as equations in a popular science text. The educator blessed with an audience undaunted by assets and liabilities is referred to the excellent article by Furey (2013), who explains money creation (*sans* fractional reserve banking) to the slightly *more* advanced beginner than was presumed by the five interweaving analogies presented here:

The veil analogy uses a quilt knitted from squares like money tokens representing real assets. When too many squares are created, this quilt or veil is sent flying, expanding into a bubble that bursts and, now in tatters, holds too few squares, or money, for recovery to start. The goal of monetary policy is to keep the veil tight enough to represent the assets (stable prices), yet so supple that the veil hovers and allows for a dynamic economy (which requires sufficient credit, a few extra squares in the quilt). When commercial banks, pursuing their own profits, control the money supply, this national goal is difficult to maintain, making for a boom-and-bust economy.

The bathtub analogy underscores the dynamic and replenishable nature of the money supply, allowing us to see money as being continuously created and extinguished, by the agent turning the faucet: in our system, mostly commercial banks. The similar analogy of a population features sex as a source of people creation which, traditionally, has been kept out of polite conversation much like the procreative monetary powers enjoyed by banks are today.

The school analogy helps us see all the money in an economy as a system. A monetary system may be run by a committee acting in the interests of the whole, like the Money Creation Committee of Huber and Robertson (2000), or it may be controlled by special interests, J.P. and similar banks. A sovereign can create its own money and spend it debt-free into circulation, only withdrawing money (through taxation) to lessen overheating (the veil flying to high, the bathtub overflowing). If private agents, like the banking sector, are in control of the nation's money supply, they can issue money as loans, requiring households and

companies to go into debt for there to be any money in the economy at all. When such debt is repaid, money disappears, shrinking the economy, keeping the veil too tight and the bathtub too low on water for the economy to function and people to prosper and flourish.

The goldsmiths accepted gold for storage and wrote out deposit slips, which soon circulated as money. At some point, someone came to borrow gold and was persuaded to take a newly written deposit slip instead, as if he had deposited gold. Thus we may explain why fresh deposit slips, or newly created money, are still called loans today: because gold *could have been* lent, and the borrower didn't mind either way, nor does she today; all she wants is the purchasing power afforded. This initial fraud produced ample credit, fuelling production and trade, expanding the veil. For that reason it was accepted by governments and regulated to prevent excesses. This accounts for the magic of banking, the power of banks to create money out of nothing, like a goldsmith taking out a pretty piece of paper from his drawer and writing "£100" on it for his borrower waiting in the hall.

The fifth analogy, again more reality that simile, was that of *clearing* as executed by neighbors swapping work efforts. If no neighbor is at hand and I hire a stranger for my landscaping, he needs to be paid, and banks help me pay him through the payment system. When I don't have the money, banks will lend it to me, but they no longer write out deposit slips or print actual bank notes in their basement, like they did in the 1800's. They use account money freely invented, which, when entered as payments into the interbank payment system, more or less cancel each other out, requiring the banks to put up no more than the marginal differences between the millions of payment moving between banks every night. This is the real source of money creation in the modern economy, this decentralized system of banks extending loans for practically for free, lifting the veil and filling the bathtub, but under no other control than the sets of government regulations circumscribing banks' lending practices by the minimal requirements of liquidity and solvency ratios, plus whatever other restrictions apply nationally.

Beyond the scope of this article is an appreciation of alternatives to the present system. A mere glimpse was afforded by the money creation committee in the school business week, a vision of a government agency under democratic control being in charge of the monetary system, especially the money supply. This is a system that does not let banks exploit the payment system for money creation purposes, endangering it when bank lending grows reckless. Ordinary payments would be kept separate from lending activities. The amount of credit available in the economy is regulated by a transparent panel under public oversight and is allocated for banks to dispense, given that they are uniquely suited to assess the creditworthiness of local businesses and investors (see Huber & Robertson, 2000; Ryan-Collins et al., 2011; Jackson & Dyson, 2012).

Whether one leans toward monetary reform or not, a thorough understanding of the present monetary system is a democratic imperative. Orthodox economists have had a field day (or, rather, field century) shrouding their knowledge claims in jargon and mathematics, shielding them from popular understanding and critique. May the heterodoxy not perpetuate this folly.

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Author contact: ravn@edu.au.dk

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