

Money \neq wealth

- Suppose the European Central Bank gives you €1 million. Your wealth has apparently increased.
- But what if you had received this money 50 years ago? Would your euros be wealth then?
- Money is not wealth, but, at most and except for currency collectors, a claim on wealth: money is an instrument to acquire wealth (goods) but not wealth itself (what if you were on a desert island?).
- The purchasing power of an amount of money is the amount of goods that can be obtained from it.

Can too much money be harmful?

- For wealth, it appears that the more, the better. Does the same apply to money?
- Intuition: if the amount of wealth grows at a rate smaller than the amount of money, in proportion, more money corresponds to each unit of goods.
- This means that the money price of goods rise. By how much? There can be no limit, as hyperinflation testify: in a hyperinflation, the inflation rate is out of control (prices may change every minute).

100 trillion ZWD = 5 USD



<http://stephenlaughlin.posterous.com/buy-an-100-trillion-zimbabwe-dollar-bank-note>

http://en.wikipedia.org/wiki/Zimbabwean_dollar

<http://online.wsj.com/news/articles/SB10001424052748703730804576314953091790360>

Largest denomination banknote



Hungary 1946 · 100 quintillion (= 10^{20}) pengő

<http://en.wikipedia.org/wiki/Hyperinflation>

http://www.zimbabwesituation.com/nov14_2008.html#Z2

Money as a sign of poverty

- Large denomination banknotes (the fuel that feeds the flames of hyperinflations) are actually a sign of poverty not wealth. In Hungary, 1946, prices doubled every 15.6 hours (monthly inflation reached 12,950,000,000,000,000 per cent).
- The 100 trillion ZWD banknote at some point in 2009 could just buy a bus ticket. It circulated a few months, until the ZWD was abandoned as legal currency in April 2009. In May 2011, the note was worth some 5 USD: it had become a commodity (wealth) for currency collectors and tourists.

Monetary aggregates

- Monetary aggregates are technical ways of defining (measuring the amount of) money.
- **M0** = monetary base = high-powered money = $E + R$
 - ▶ E = currency held by the public (cash)
 - ▶ R = bank reserves = currency in bank vaults + the banks' deposits at the central bank
- **M1** = $E + D$ (money stock/supply, monetary mass)
 - ▶ D = deposits = non-interest-bearing accounts at banks
- **M2** = **M1** + savings deposits
- **M3** = **M2** + time deposits + others

Technical definitions of money (ECB)

Liabilities (1)	M1	M2	M3
Currency in circulation	X	X	X
Overnight deposits	X	X	X
Deposits with an agreed maturity up to 2 years		X	X
Deposits redeemable at a period of notice up to 3 months		X	X
Repurchase agreements			X
Money market fund (MMF) shares/units			X
Debt securities up to 2 years			X

(1) Liabilities of the money-issuing sector and central government liabilities with a monetary character held by the money-holding sector.

overnight deposits = balances which can immediately be converted into currency or used for cashless payment

<http://www.ecb.europa.eu/stats/money/aggregates/aggr/html/hist.en.html>

The textbook model of money creation

- The cash reserve ratio $r = R/D$ is the amount of reserves banks must hold per euro of deposit. It is the percent of deposits banks cannot lend.
- The liquidity ratio $l = E/D$ is the amount of currency that people hold per euro of deposits.
- The money multiplier is $mm = \frac{1 + l}{r + l}$.
- It then follows that $\mathbf{M1} = mm \cdot \mathbf{M0}$, so $mm = \frac{\mathbf{M1}}{\mathbf{M0}}$.
Hence, if mm remains constant, $\Delta\mathbf{M1} = mm \cdot \Delta\mathbf{M0}$.

The money multiplier

- Calling the money stock $M1$, the money multiplier mm indicates how many units of money stock is generated by one unit of monetary base.
- In fact, $M1 = E + D$ and $l = E/D$ imply $M1 = l \cdot D + D = D(1 + l)$. In addition, $M0 = E + R$, $l = E/D$, and $r = R/D$ yield $M0 = l \cdot D + r \cdot D = D(r + l)$. In sum,

$$\frac{M1}{M0} = \frac{D(1 + l)}{D(r + l)} = \frac{1 + l}{r + l} = mm .$$

- Therefore, $M1$ (the money stock) is a fixed multiple (mm) of $M0$ (the monetary base).

Direction of causality

- If it is taken true by definition that

$$\frac{\mathbf{M1}}{\mathbf{M0}} = \frac{1 + E/D}{R/D + E/D}$$

then one can equally postulate that the direction of causality goes from **M1** to **M0**, so $\mathbf{M0} = \frac{R/D + E/D}{1 + E/D} \cdot \mathbf{M1}$.

- Banking practices give support to the view that **M1** is first determined endogenously by the economy and subsequently the central bank provides the necessary **M0** in the form of reserves.

Orthodox money creation process /1

- Suppose **M0** is increased by €600 million. For instance, the central bank buys financial assets from the banks and pays by increasing €600 million the reserves of banks on the central bank.
- Since the deposits **D** on banks have not changed, banks have an excess of reserves equal to 600. They can then lend the 600 million to consumers and firms. Let consumers and firms be always willing to borrow any amount offered by banks.
- The people that borrow the €600 million will spend them buying goods or financial assets.

Orthodox money creation process /2

- The sellers of the goods or the financial assets get €600 million. Let $l = \frac{1}{5} = 0.2$, so people hold 0.2 cents in cash for each euro deposited on banks.
- People must then allocate the €600 million in cash and deposits to make the increase in cash ΔE divided by the increase in deposits ΔD equal to 0.2. The equations giving the solution are
 - $\Delta E + \Delta D = 600$ and
 - $\Delta E / \Delta D = 1/5$ or, equivalently, $\Delta D = 5 \cdot \Delta E$.

As a result, $\Delta D = 500$ and $\Delta E = 100$.

Orthodox money creation process /3

- This means that people deposit €500 million in banks and hold €100 million in cash. Suppose $r = 0.1$. Hence, banks only need to keep as reserves the 10% of new deposits and can lend the rest. The following table summarizes the process so far.

<i>round</i>	$\Delta M0$	ΔD	ΔE	ΔR	$\Delta \text{loans} = \Delta D - \Delta R$	$\Delta M1 = \Delta E + \Delta D$
1	600			600	600	
2		500	100	50	450	600

- Now the process recommences: people borrow and spend 450, and those receiving the 450 keep a part in cash (75) and deposit the rest (375) on banks.

Orthodox money creation process /4

- The following table represents the process.

<i>round</i>	$\Delta M0$	ΔD	ΔE	ΔR	$\Delta \text{loans} = \Delta D - \Delta R$	$\Delta M1 = \Delta E + \Delta D$
1	600			600	600	
2		500	100	50	450	600
3		375	75	37.5	337.5	450
4		281.25	56.25	28.125	253.125	337.5
5		210.9..	42.1...	210.9...	189.84...	253.125
...	
TOTAL	600	2,000	400	200	1,800	2,400

- Deposits grow continuously: $500 + 375 + 281.25 + 210.9 + \dots$. In the limit, the sum converges to 2,000.

Orthodox money creation process /5

- **M0** was initially increased by 600. What fraction is finally held in cash? The sum $100 + 75 + 56.25 + 42.18 + \dots$, which converges to 400.
- Since $\mathbf{M0} = E + R$, $\Delta\mathbf{M0} = \Delta E + \Delta R$. That is, $600 = 400 + \Delta R$. Thus, $\Delta R = 200$. This is also the value to which the sum $50 + 37.5 + 28.125 + 21.09 + \dots$ converges (the 600 at round 1 should not be counted because banks lend this amount: they represented voluntary, not legal reserves).
- $\mathbf{M1} = E + D$ yields $\Delta\mathbf{M1} = \Delta E + \Delta D$. As $\Delta E = 400$ and $\Delta D = 2,000$, $\Delta\mathbf{M1} = 2,400$: an increase of 600 in **M0** is transformed into an increase of 2,400 in **M1**.

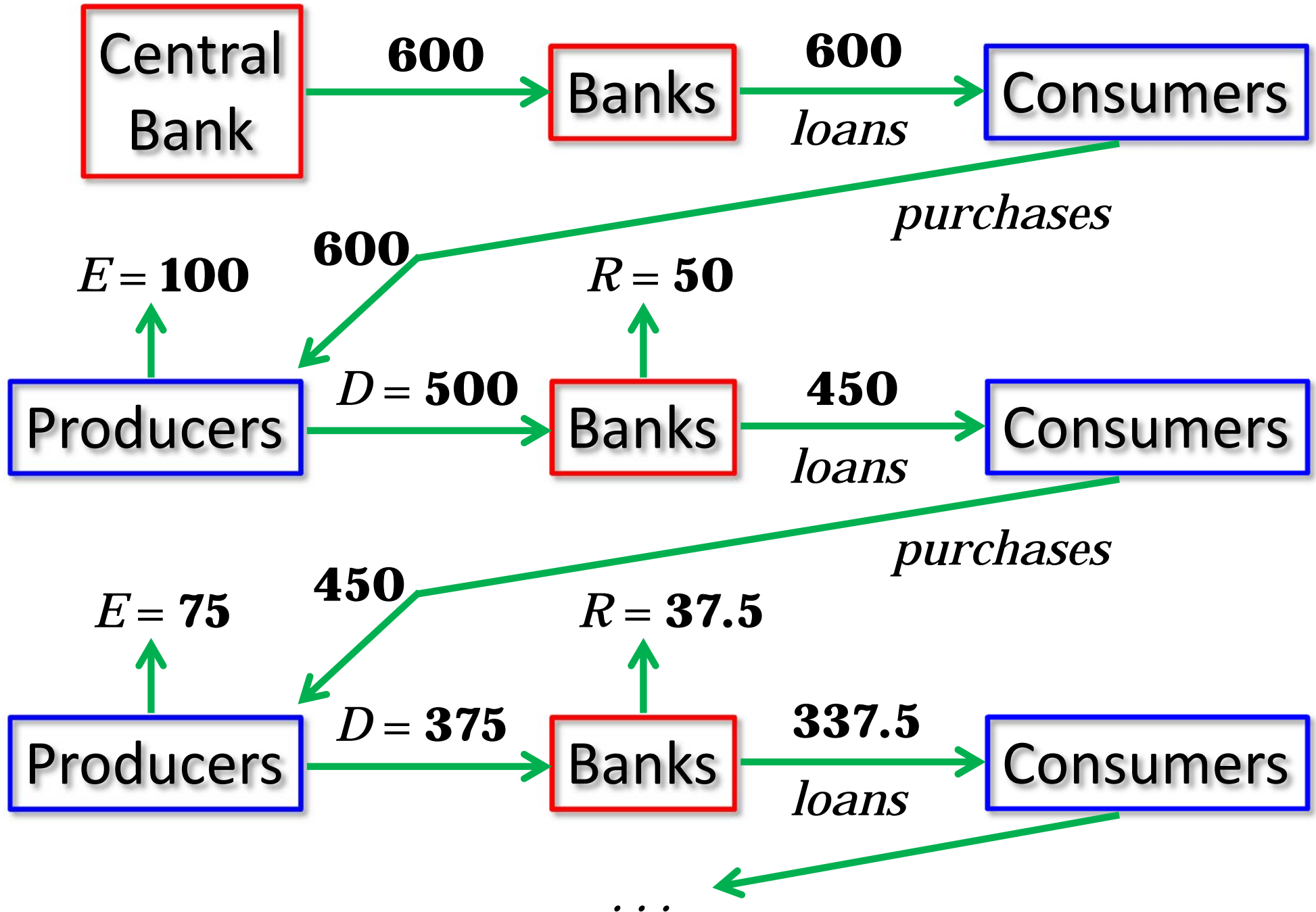
Orthodox money creation process /6

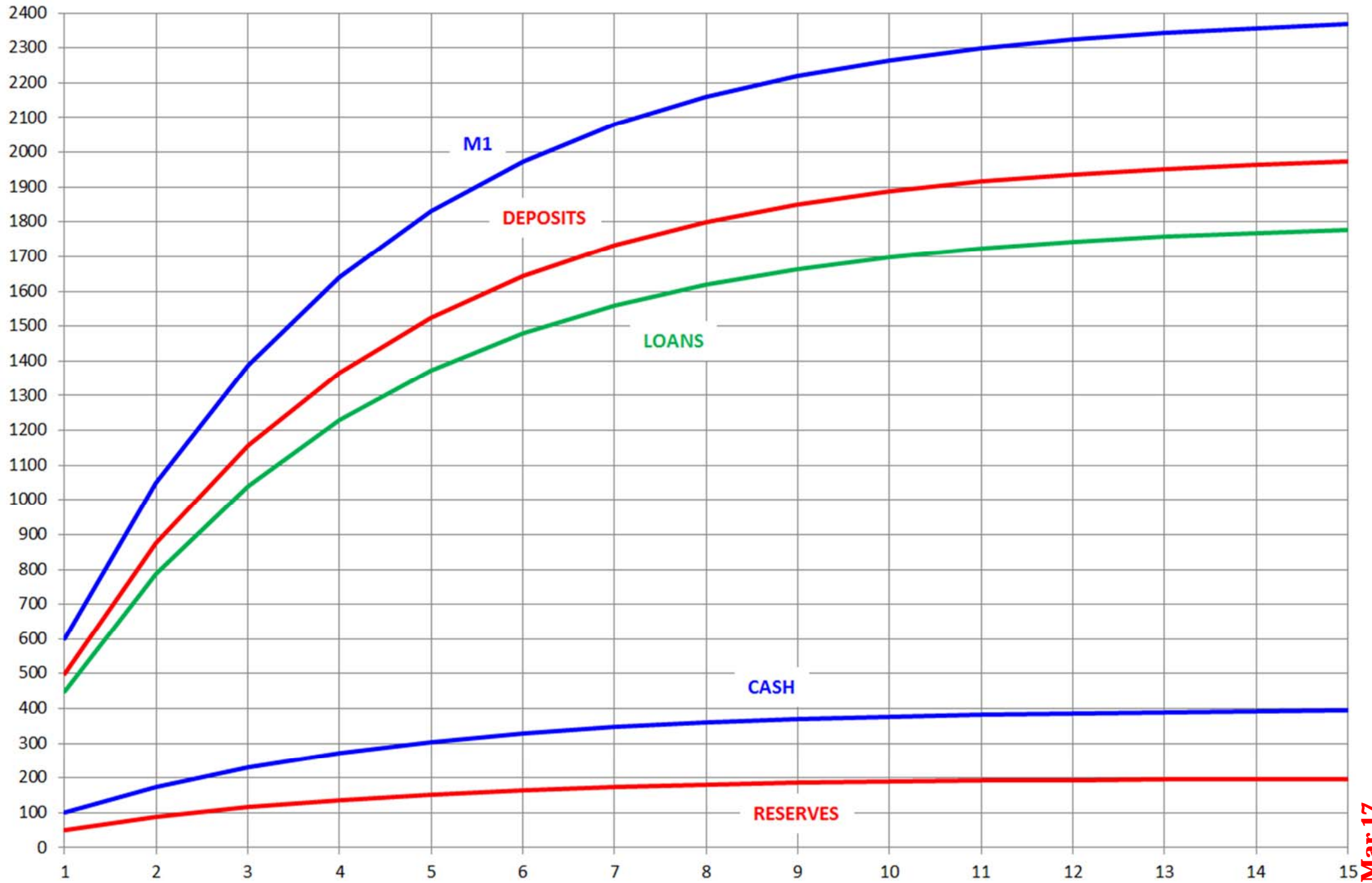
- This suggests that the money multiplier mm must be 4 : $\Delta\mathbf{M0} = 600$ generates $\Delta\mathbf{M1} = 2,400$. In fact,

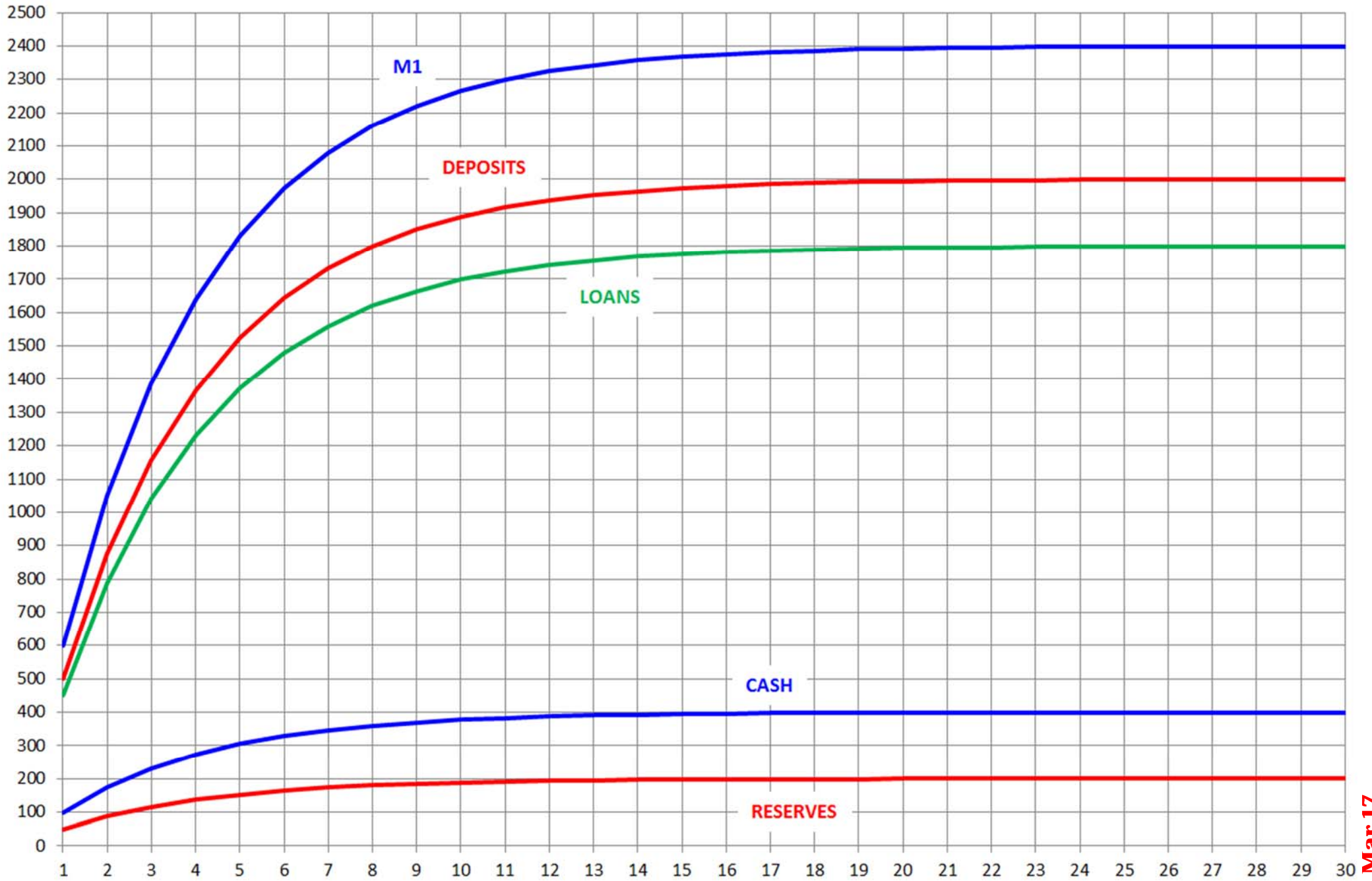
$$mm = \frac{1+l}{r+l} = \frac{1+0.2}{0.1+0.2} = \frac{1.2}{0.3} = \frac{12}{3} = 4.$$

- mm captures the total effect on the cash held by the people and the deposits generated by the process
... $\Rightarrow \uparrow$ deposits $\Rightarrow \uparrow$ loans $\Rightarrow \uparrow$ expenditures \Rightarrow
 $\Rightarrow \uparrow$ revenues $\Rightarrow \uparrow$ deposits $\Rightarrow \uparrow$ loans \Rightarrow ...
- This sequence illustrates the interaction between the financial side (deposits and loans) and the real side (purchases of goods).

Summary of the orthodox (textbook) money creation process







The reality of bank lending

- In the model, banks need to receive a deposit to lend. In reality, when a bank makes a loan, the money lent is not taken from anyone's account nor from the bank's funds: it is created out of thin air.
- As deposits are accounting entries in a computer, the bank creates the money by crediting its customer's account with the amount of the loan and balancing this liability by registering the amount of the loan as an asset. The bank is not actually providing cash but the promise to provide cash. But that promise, the account at the bank, counts as cash.

Banking system's shaky foundations

- Problem: the banks promise to deliver something that they cannot deliver, as there is not enough cash in an economy to cash all bank deposits. In a bank run a large number of customers decide to withdraw their deposits simultaneously.
- In slide 14, deposits worth 2,000 are created, but they are backed by only the additional 600 in cash.
- In Spain, the Deposit Guarantee Fund of Credit Institutions guarantees up to €100,000 per deposit in case of bankruptcy. The fund ended 2012 with a shortfall of €1.263 billion. <http://www.fgd.es/en/index.html>

Banking business: fraud & catastrophe

- **1/** Banking works as long as everyone believes it does. If confidence is lost, the system collapses because it relies on the fiction of unexisting money.
- **2/** The creation of bank money (loans) rests only on the bank's belief that the borrowers can repay.
- **3/** Nothing controls the scale/timing of bank lending. Banks lend freely until they fear a default on repayments. New loans are refused and economic activity declines: ↓ lending, ↓ expenditure, ↓ production, ↓ employment, ↓ lending.

<http://www.opendemocracy.net/ourkingdom/oliver-huitson/uneconomics-guide-to-money-creation>