How banks are able to create additional credit money

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January 17, 2017

1 Introduction

This brief note will try to explain, via a an imagined example, how a bank is able to create extra "credit money" when lending. When a bank extends a loan, a corresponding increase occurs in the borrowing depositor's account. This means that the bank creates money wh en lending, "out of thin air". In principle, if a bank was unconstrained by regulation, it could create as much extra money via this process as it wanted to, as long as there were willing borrowers.

Banks are, however, constrained in their lending by the BIS rules on minimum captal-asset requirements. But it will be seen that in spite of this, licensed banks can net create money as long as the required minimum capital/asset ratio is below 1, which it is by a wide margin.
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2 The model

All monetary entities are in nominal terms. We define the following variables and parameters:

D, M = assets, liabilities [\$]. D = bank loans, M = deposit money.

R = reserves = the Bank's deposit with the CB = high-powered money (HPM) [\$]. We assume that $R > 0$. The Bank's total financial assets are $D + R$ [\$].

$k_{\min}$ = the by BIS required minimum capital/asset ratio [ ].

r = loan repayment rate over a short given period on assets (= loans = debt) [ ].

i_D = interest rate over a short given period on assets [ ].

i_M = interest rate over a short given period on liabilities (= deposits = money) [ ]; $i_M < i_D$.

σ = share of interest income that is left for banks after they have paid their expenses including wages, plus dividends to owners [ ]; $0 < \sigma < 1$.

$F_P = \sigma(i_D D - i_M M)$ = profit flow to the bank during the period [\$].

x = the amount of new loan extended after the period [\$].

We assume that our bank goes through the following three stage process which occurs at the end of the assumed period:

1. The bank is about to receive interest and repayment on its loans, and is at the $k_{\min}$ limit

2. The bank gets these, and because of that it ends up above the $k_{\min}$ limit. The bank uses part of net interest income to pay expenses, wages, dividends. What remains are profits = F_P.

3. The bank then extends a new loan x, exploiting the $k_{\min}$ limit by targeting it again. We will see that the bank creates net credit money while doing this, without breaching the $k_{\min}$ rule.

2.1 Stage 1

The bank awaits payments and is at the $k_{\min}$ limit. Note that risk weights shall only apply in the denominator. The capital-asset ratio is

$$k_{\min} = \frac{D + R - M}{D + 0 \cdot R} = \frac{D + R - M}{D}, \quad \text{or} \quad D = \frac{D + R - M}{k_{\min}} \tag{1}$$

2.2 Stage 2

After receipt of interest and repayments for the period on D, and payment of expenses, wages, dividends, the situation is

$$\frac{D - rD + R - (M - rD - F_P)}{D - rD} \tag{2}$$

Note that the bank profits emerge in the form of reduced liabilities, not increased assets. The amount of deposits has decreased to

$$M - rD - F_P \tag{3}$$

Thus credit money is destroyed through the retained interest flow and repayments of loans. Note that M is not only reduced by the repayments, but also by the bank profits. When the bank in the next round extends a loan, exploiting that it is somewhat above the $k_{\min}$ limit, the amount of money created has to be more than $rD + F_p$ for net credit money creation to occur.

2.3 Stage 3

The bank now extends a loan x so that the capital/asset ratio becomes $k_{\min}$ again:

$$\frac{D + R + x - (M + x - F_P)}{D - rD + x} = \frac{D + R - (M - F_P)}{D - rD + x} = k_{\min} \tag{4}$$

We solve for x, exploiting that $(D + R - M)/k_{\min} = D$:

$$x = (rD + \frac{F_P}{k_{\min}}) \tag{5}$$

For net money to be created through the process, x must be greater than $rD + F_P$ as stated above. We get that net money created is

$$\Delta M = x - (rD + F_P) = (rD + \frac{F_P}{k_{\min}}) - rD - F_P = (\frac{1 - k_{\min}}{k_{\min}})F_P \tag{6}$$

Observe that the net new loan is F_P larger than the net money amount created. This is reasonable, since the profits after expenses of the bank, allows it to extend loans without having to create money.

Note also that for $k_{\min} = 1$, which corresponds to a 100% reserve banking system with $M = R$, no net money will be created by lending.