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Pure Money for a Sound Economy

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Abstract

At present, the world-economy is exceedingly fragile. Debt levels of nations peak. Monetary assets increase, too, and concentrate in the hands of few. In this paper, I show that a mechanism at the root of today's monetary system entails an inherently fragile economy. I simulate the consequences of this mechanism within a macroeconomic model. I motivate a new monetary system that gives money the role it should have: to facilitate complex interactions in a stable environment.

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Reform of the monetary system, equity-based money.
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1 Introduction

At present, we face severe economic problems. Debt volumes peak and are less and less tolerated. At the same time, monetary assets are at historic highs and concentrate in the hands of few. Central banking has become less effective. For example in the euro area before the financial crisis, the European Central Bank (ECB) could stimulate the economy by lowering interest rates. Lower interest rates led to stronger bank lending, to more money in the hands of non-banks and to higher aggregate spending. At the moment, although central bank rates are at the zero-lower-bound, lending is weak. Banks have become reluctant to grant risky loans, and borrowers' demand for loans has weakened. Economic growth is expected to remain weak and the economic environment is considered as fragile.

This paper reveals that many of today's problems or the view that something is problematic result from one mechanism at the root of today's monetary system. The fault is that money can only be created simultaneously with interest bearing debt.

According to the definition of the monetary aggregate M1, money consists of coins, bank notes and deposits in the hands of non-banks. In the euro area, national governments still mint coins. Central banks print bank notes and commercial banks create deposits. In the euro zone, more than 80 percent of money in circulation are deposits. Put differently, commercial banks create more than 80 percent of money in circulation.

Today's money creation process is in fact a money-and-debt creation process. When granting a loan to a non-bank, the bank charges an amount of debt D to this non-bank. At the same time, it adds the same amount $M = D$ to the current account of the non-bank. Deposits, which are money M by definition and practice, have been created.

In the euro zone, the bank is required to apply a minimum reserve ratio rr to deposits. For the newly created money M, it has to hold $rr \cdot M$ as required reserves at the ECB.

The bank informs the ECB about its need of new central bank liquidity $rr \cdot M$. Due to the benchmark allotment concept,[1] the ECB increases the allotment of central bank liquidity in its refinancing operations by $rr \cdot M$. The bank borrows $rr \cdot M$ from the ECB. In its balance sheet, minimum reserve holdings at the ECB and refinancing volume from the ECB both increase, see Table 1. Evidently, the first impulse for money creation is the transaction between the private bank and the non-bank. The ECB follows and adjusts the amount of central bank liquidity.

Table 1: Money creation by commercial banks

Assets		Bank	Liabilities
Debt of non-bank	$+D$	Deposits of non-bank	$+M$
Minimum reserves	$+rr \cdot M$	Refinancing volume	$+rr \cdot M$

Today's banks are active in financial intermediation and money creation. Financial intermediation implies that a bank first receives money saved by a non-bank and then lends this saved money to another non-bank. In the above described money-and-debt creation process, the bank does not need any savings. The bank creates money and debt simultaneously out of nothing. Benes and Kumhof (2012) emphasize that the traditionally assumed money multiplier process does not exist and that banks create loans and money on their own initiative, in interaction with loan or rather money demand. The central bank follows in the provision of central bank liquidity.

Note that the transmission process of monetary policy only works if banks actually create loans and money simultaneously. According to the interest rate channel, lower

[1] Traditionally, the ECB applies a benchmark allotment concept to the allotment of central bank liquidity to commercial banks. It implies that the ECB adjusts its allotment in tender operations to cover the minimum reserves needs of banks plus their net deficit from autonomous factors. With the introduction of fixed rate full allotment procedure in the financial crisis, the ECB allots every amount of liquidity private banks demand. For the calculation of the ECB-benchmark allotment, see `https://www.ecb.europa.eu/mopo/liq/html/index.en.html`.

interest rates stimulate demand for loans. The banks grant the loans, and money holdings of non-banks increase. If banks were only financial intermediaries, banks could not meet the higher demand for loans because the lower interest rate would make savings less attractive. Consequently, savings would rather decrease, and loans and money holdings could not expand.

In Table 1, it is familiar to us that borrowing is a means to get money. Regarded from the other side of the balance sheet, the only way to create money is to run into debt. Money creation entails immediate indebtedness and the obligation to pay back the principal plus interest.[2]

In the aggregate economy, the amount of money in the hands of non-banks equals the amount of debt of non-banks with banks. An economy that wants to introduce money, has to run into debt in equal size to the initial amount of money needed. Money will always be necessary in an economy and therefore the principal of the debt, which equals the initial amount of money, will never be paid back. Worse, each period, interest on the initial debt has to be paid. In the aggregate, this money is not yet created. To make interest rate payments in the aggregate, money has to be created by borrowing again. New debt entails more repayment obligations in the future.

One initial amount of debt to create an initial amount of money, leads to endlessly accumulating debt because of the obligation to make interest rate payments. If not enough money is created to make the necessary payments, debt defaults occur. Periods with stagnating loan volumes go along with numerous defaults of non-banks, caused by the debt dynamics of the initial money creation.

In addition, the current monetary system produces high economic inequalities. The wealth gap between lenders, i.e. banks or their owners, and borrowers, i.e. non-banks, widens during time. The wealth of bankers grows during time because of accumulated

[2]The same principle holds for the interactions between the ECB and commercial banks, because the central bank money is financed through refinancing operations, which have the character of a secured loan.

seigniorage profits, while non-banks get more and more indebted. Note that the shareholder or owner of a bank can receive seigniorage profits, while the bank itself is assessed as risky due to risky assets in its balance sheet.

An incomplete perception of the debt-money system implies the illusion that debt can be repaid if the economy grows sufficiently. It induces an assumed coercion to grow. Still, economic growth does not help to pay back debt. To repay in Euro denominated debt, the amount of Euro has to be available in the aggregate. Even if an economy grows in real terms, i.e. the number of goods grows, this does not automatically imply that the amount of money grows.[3] The amount of money only grows through the above described money-and-debt creation spiral. Another argument often raised for growth says that redistribution is easier if there are more goods. In today's monetary system the wealth gap between lenders and borrowers widens due to the accumulated interest rates the former claim and the latter have to pay. There will be less need for redistribution and thus growth if we are able to implement a new monetary system that fosters equality. Then, the economy will be free to grow.

Economic research so far does not model the mechanism of debt-money in its full consequences. Macroeconomic models usually assume that money is *given* to the economy. Monetary policy of the central bank is traditionally captured by an interest rate rule. Effects from monetary policy on the economy take place in an environment of sticky prices. Since the financial crisis, up-to-date DSGE models have put more emphasis on unconventional monetary policy, the central bank balance sheet, and on frictions in financial markets.

In this paper, I introduce debt-and-money creation by banks to a model by Kiyotaki and Moore (2012) and show its long-run consequences on the evolution of debt, money, the distribution of wealth, and the stability of the economy. The Kiyotaki-Moore model is particularly suited for my analysis. First, the authors motivate an

[3]See also Keynes (1936) on the return on wheat in distinction to money.

intrinsic need for money resulting from liquidity and financing frictions. Second, their model exhibits flexible prices which are appropriate for my long-run perspective on the consequences of debt-money for an economy. Finally, the Kiyotaki-Moore model already contains the idea of pure money. Pure money fulfils the functions money should have: to lubricate the economy and foster a stable environment. The Kiyotaki-Moore model represents an economy with pure money, which I will compare to a debt-money economy.

The paper is structured as follows. Section 2 recapitulates the Kiyotaki-Moore model, Section 3 introduces debt-money to the model and illustrates its implications. It further draws a parallel to the history of modern banking and money creation. Section 4 elaborates on the idea of pure money. Section 5 concludes.

2 The Kiyotaki-Moore model (2012)

Kiyotaki and Moore (2012) characterize their model as a liquidity-oriented interpretation of Keynes' IS-LM model, which they augment by fully flexible prices and wages as well as maximizing agents. Frictions in financial markets create scope for money to efficiently allocate resources in an infinite-horizon, discrete-time economy.

Besides a non-durable good and labor, the financial assets equity and money are traded. If equity is fully liquid and entrepreneurs can issue as much equity as they need for financing an investment project, money is superfluous. If equity trade and issuance are restricted, entrepreneurs profit from money as a perfectly liquid asset. They demand money to be liquid for future investment opportunities, and spend the money as soon as they can undertake an investment. The availability of money as fully liquid asset increases aggregate investment and thus output compared to a situation without a fully liquid asset. The authors define the economy with such an essential role for fiat money as a monetary economy.

Money itself has no a priori intrinsic value. It indirectly creates value in the Kiyotaki-Moore model, if investors are liquidity and financing constrained. Then money channels goods used for investment, and higher capital leads to higher output. Thus, money indirectly adds real values to the economy. The price of money becomes positive, reflecting its value added.

Frictions in equity markets reflect a lack of commitment of the issuer and a lack of trust of the buyer. The potential buyer of the share wants to check the credibility of the issuer. Kiyotaki and Moore model this lack of liquidity as a restriction on the resaleability parameter ϕ of equity and on the borrowing parameter θ. ϕ is the fraction of total equity that can be resold in a period, or the fraction of 'unmortgaged' capital that can be issued. θ is the fraction an entrepreneur can pledge of his future returns to investment, i.e. the higher θ, the higher his option of outside financing. Kiyotaki and Moore show that, if θ and ϕ are sufficiently low, stocks are only partially liquid and money is needed as a store of value that can quickly be liquidated and exchanged for goods.

The economy is populated by entrepreneurs and workers, each with unit measure. Entrepreneurs own the capital necessary for production, they can issue and trade equity, hold money and randomly have the opportunity to invest. Workers spend their labor income entirely on consumption goods. The government acts behind the scenes: At the very beginning, it transfers money to individuals. The amount of money remains fixed and the government does not appear again.

At date t, entrepreneurs maximize expected discounted utility

$$E_t \sum_{s=t}^{\infty} \beta^{s-t} u(c_s) \tag{1}$$

of consumption path $\{c_t, c_{t+1}, c_{t+2}, ...\}$, where $u(c) = \log c$ and $0 < \beta < 1$. All entrepreneurs produce output y_t with the same technology

$$y_t = A_t k_t^{\gamma} l_t^{1-\gamma} \tag{2}$$

with start-of-period capital stock k_t and labor l_t. $0 < \gamma < 1$ is the capital share in production, and productivity $A_t > 0$ follows a stationary stochastic process. During period t, capital depreciates to the end-of-period value λk_t, with $0 < \lambda < 1$[4]. Produced goods minus labor compensation $w_t l_t$ give the entrepreneur's profit, which is proportional to the capital stock:

$$r_t k_t = y_t - w_t l_t. \tag{3}$$

With probability π, the entrepreneur has access to an investment technology that produces i_t units of capital from i_t units of output. Investment of period t enters in production at the beginning of period $t + 1$:[5]

$$k_{t+1} = \lambda k_t + i_t. \tag{4}$$

The investing entrepreneur faces a borrowing limit. He can pledge at most an exogenously given fraction $\theta < 1$ of his investment. Exchanging equity against goods needs more time than exchanging money against goods because the quality of equity has to be verified. Equivalently, a fraction $\phi < 1$ of equity holdings is resaleable or a fraction of new equity can be issued. To raise funds, an investor will therefore first spend his money and then sell as much of his equity holdings as possible. Both parameters θ and ϕ are exogenous. Equity comprises inside and outside equity. Inside equity is 'unmortgaged' own capital. Outside equity is equity already traded in the market. Total equity equals total capital.

An entrepreneur with equity n_t and money m_t at start of period t faces two 'liquidity constraints'

$$n_{t+1} \geq (1 - \theta) i_t + (1 - \phi_t) \lambda n_t \tag{5}$$

$$m_{t+1} \geq 0. \tag{6}$$

[4]They choose $\lambda < \beta$ to make the distribution of capital and asset holdings of individual entrepreneurs well-behaved.

[5]Entrepreneurs cannot insure against not having an investment opportunity.

An investing entrepreneur finances at least $(1-\theta)$ of the investment by himself and at most θi_t by issuing equity. He can sell at most ϕ_t of his existing equity holdings λn_t. According to (5), his equity at the start of $t+1$ is at least the capital resulting from the inside financing of investment plus the non-resaleable equity holdings. According to (6), money holdings cannot be negative.

Fiat money has no a priori intrinsic value. This is why the authors use goods as numeraire. They define the price of money p_t in terms of goods.[6] The value of money becomes positive if θ and ϕ are sufficiently low. The price of equity in terms of goods, q_t, is also equal to Tobin's q: the market value relative to the replacement cost of capital. The entrepreneurs' flow of funds constraint at time t in terms of goods is

$$c_t + i_t + q_t(n_{t+1} - i_t - \lambda n_t) + p_t(m_{t+1} - m_t) = r_t n_t. \tag{7}$$

Expenditures on consumption, investment, and net purchases of equity and money equal dividend income in t. At date t, workers have utility

$$E_t \sum_{s=t}^{\infty} \beta^{s-t} U\left[c'_s - \frac{\omega}{1+\nu}(l'_s)^{1+\nu}\right] \tag{8}$$

with $\omega > 0$, $\nu > 0$ and $U[\cdot]$ increasing and strictly concave, and consumption paths $\{c'_t, c'_{t+1}, c'_{t+2}, ...\}$ and labor supply paths $\{l'_t, l'_t, l'_t, ...\}$. The flow-of-funds constraint of a worker is

$$c'_t + q_t(n'_{t+1} - \lambda n'_t) + p_t(m'_{t+1} - m'_t) = w_t l'_t + r_t n'_t. \tag{9}$$

Consumption expenditures and net purchases of equity and money equal wage plus dividend income. Workers have neither investment nor borrowing opportunities:

$$n'_{t+1} \geq 0 \text{ and } m'_{t+1} \geq 0. \tag{10}$$

[6]The literature usually defines prices of goods in terms of money (=how much money is one good). Kiyotaki and Moore use goods as numeraire and define p_t as the reciprocal of the usual definition, i.e. the price of money in terms of goods (=how many goods are one Euro).

Utility maximization of the worker with unit measure subject to (9) and (10) gives an aggregate labor supply of $\left(\frac{w_t}{\omega}\right)^{1/\nu}$. Labor market equilibrium implies an equilibrium wage according to

$$\left(\frac{w_t}{\omega}\right)^{1/\nu} = K_t \left[(1-\gamma)A_t/w_t\right]^{1/\gamma}. \tag{11}$$

The labor market equilibrium wage gives profits $r_t k_t$ of entrepreneurs with

$$r_t = a_t (K_t)^{\alpha-1}, \tag{12}$$

where a_t and α are a combination of A_t, γ, ω and ν, $0 < \alpha < 1$.

In the neighborhood of the steady state, a worker demands neither equity nor money. His optimization implies that he consumes his labor income in each period

$$c'_t = w_t l'_t. \tag{13}$$

The equilibrium for the entrepreneurs can be analyzed separately.

For sufficiently low values for θ and ϕ_t, money has a value $p_t > 0$, the liquidity constraints (5) and (6) are binding for an investing entrepreneur, and his flow of funds constraint (7) becomes

$$c^i_t + (1-\theta q_t) i_t = (r_t + \lambda \phi_t q_t) n_t + p_t m_t. \tag{14}$$

A fraction π of entrepreneurs randomly has access to an investment technology, which transforms goods into the same number of capital units. Resources for investment in t result from profits $r_t k_t$ in terms of goods, money holdings m_t that buy $p_t m_t$ goods, and equity λn_t of which an investing entrepreneur can exchange a fraction ϕ_t against $\phi_t \lambda q_t n_t$ goods. The equity of an entrepreneur consists of 'unmortgaged capital' and equity holdings. Issuing equity on unmortgaged capital is equivalent to reselling existing equity holdings. Furthermore, he can issue θ per unit of investment as equity to acquire θq_t goods. The necessary downpayment for investment is $(1-\theta)$

in terms of capital, or $(1-\theta q_t)$ in terms of goods. The investing entrepreneur uses all his resources available after consumption for the inside financing of investment, thus the inside financing of investment equals his resources available after consumption:

$$(1-\theta q_t)i_t = (r_t + \phi_t \lambda q_t)n_t + p_t m_t - c_t^i \tag{15}$$

which gives investment as

$$i_t = \frac{(r_t + \phi_t \lambda q_t)n_t + p_t m_t - c_t^i}{1-\theta q_t}. \tag{16}$$

Available resources can be leveraged by a factor $\frac{1}{1-\theta q_t}$ to increase the scope for investment. Rephrasing Equation (14), the flow of funds constraint for the investing entrepreneur finally becomes

$$c_t^i + q_t^R n_{t+1}^i = r_t n_t + \left[\phi_t q_t + (1-\phi_t) q_t^R\right] \lambda n_t + p_t m_t \tag{17}$$

with $q_t^R \equiv \frac{1-\theta q_t}{1-\theta} < 1$ as $q_t > 1$. q_t^R represents the financing costs of inside equity, which is not traded in the market, in terms of goods. To acquire one unit of inside equity, the investing entrepreneur needs $\frac{1-\theta q_t}{1-\theta}$ units of goods.

The investing entrepreneur retains the fraction β of his net worth, and consumes a fraction $1-\beta$:

$$c_t^i = (1-\beta)\left\{r_t n_t + \left[\phi_t q_t + (1-\phi_t) q_t^R\right] \lambda n_t + p_t m_t\right\} \tag{18}$$

$$n_{t+1}^i = \beta\left\{r_t n_t + \left[\phi_t q_t + (1-\phi_t) q_t^R\right] \lambda n_t + p_t m_t\right\} \tag{19}$$

$$m_{t+1}^i = 0 \tag{20}$$

For the non-investing entrepreneur, the flow of funds constraint reduces to

$$c_t^s + q_t n_{t+1}^s + p_t m_{t+1}^s = r_t n_t + q_t \lambda n_t + p_t m_t \tag{21}$$

Consumption of the saving entrepreneur is $1-\beta$ of his net worth:

$$c_t^s = (1-\beta)\left[(r_t + q_t\lambda)n_t + p_t m_t\right] \tag{22}$$

His equity and money holdings in terms of goods make up for β times his net worth, while the choice between equity and money is reflected in f_t, the share of equity in the portfolio of the saving entrepreneur.

$$n_{t+1}^s = \frac{\beta}{q_t} f_t[(r_t + \lambda q_t)n_t + p_t m_t] \tag{23}$$

$$m_{t+1}^s = \frac{\beta}{p_t}(1-f_t)[(r_t + \lambda q_t)n_t + p_t m_t] \tag{24}$$

To determine his optimal portfolio between equity and money, the saving entrepreneur can choose between sacrificing one unit of consumption in t and purchasing $1/p_t$ units of money or $1/q_t$ units of equity to increase consumption in $t+1$. The first order condition is

$$\begin{aligned} u'(c_t^s) &= E_t\left\{\frac{p_{t+1}}{p_t}\beta[(1-\pi)u'(c_{t+1}^s) + \pi u'(c_{t+1}^i)]\right\} \\ &= (1-\pi)E_t\left\{\frac{r_{t+1} + \lambda q_{t+1}}{q_t}\beta u'(c_{t+1}^s)\right\} \\ &+ \pi E_t\left\{\frac{r_{t+1} + \lambda\phi_{t+1}q_{t+1} + \lambda(1-\phi_{t+1})q_{t+1}^R}{q_t}\beta u'(c_{t+1}^i)\right\}. \end{aligned} \tag{25}$$

If the saving entrepreneur sacrifices one unit of goods to purchase $1/p_t$ units of money this period, he can use this money to buy p_{t+1} units of goods in the next period. Without investment opportunities in $t+1$, buying $1/q_t$ units of equity gives a dividend return plus the market price of the remaining capital next period. If an investment opportunity arises in $t+1$ with probability π, the return to equity is modified in that the non-saleable fraction of equity is valued at its effective replacement cost q_{t+1}^R.

In the aggregate monetary economy, aggregate investment from (16) is

$$(1-\theta q_t)I_t = \pi\left\{\beta[(r_t + \lambda\phi_t q_t)K_t + p_t M] - (1-\beta)(1-\phi_t)\lambda q_t^R K_t\right\}. \tag{26}$$

Aggregate supply and demand for the entrepreneurs' goods market becomes with (18) and (22)

$$r_t K_t = a_t K_t^{\alpha} = I_t + C_t = I_t + (1-\beta) \tag{27}$$

$$\left\{[r_t + (1-\pi+\pi\phi_t)\lambda q_t + \pi(1-\phi_t)\lambda q_t^R]K_t + p_t M\right\} \tag{28}$$

For the aggregate portfolio decision between equity and money, it remains to more closely consider the decision of saving entrepreneurs. The stock of equity saving entrepreneurs hold at the end of the period is $\theta I_t + \phi_t \pi \lambda K_t + (1-\pi)\lambda K_t \equiv N_{t+1}^s$. Investing entrepreneurs issue θI_t as new equity, which is demanded by the saving entrepreneurs. They further demand the equity holdings that investing entrepreneurs sell and they keep their previous period's equity holdings.

The portfolio choice (N_{t+1}^s, M) of non-investing entrepreneurs in (25) concretizes to

$$(1-\pi)E_t\left[\frac{(r_{t+1}+\lambda q_{t+1})/q_t - p_{t+1}/p_t}{(r_{t+1}+\lambda q_{t+1})N_{t+1}^s + p_{t+1}M}\right] \tag{29}$$

$$= \pi E_t\left[\frac{p_{t+1}/p_t - [r_{t+1}+\lambda\phi_{t+1}q_{t+1}+\lambda(1-\phi_{t+1})q_{t+1}^R]/q_t}{[r_{t+1}+\lambda\phi_{t+1}q_{t+1}+\lambda(1-\phi_{t+1})q_{t+1}^R]N_{t+1}^s + p_{t+1}M}\right]$$

Kiyotaki and Moore show that the expected return on equity $E_t\frac{r_{t+1}+\lambda q_{t+1}}{q_t}$, if the entrepreneur is a saver in $t+1$, will be higher than the expected return on money $E_t\frac{p_{t+1}}{p_t}$. If he has an investment opportunity, the expected effective rate of return on equity, $E_t\frac{r_{t+1}+\lambda\phi_{t+1}q_{t+1}+\lambda(1-\phi_{t+1})q_{t+1}^R}{q_t}$, will be lower than the return on money. The optimal portfolio balances these return differentials, weighted with the probabilities for investment and marginal utilities, which are the reciprocals of consumptions for logarithmic utility.

The only endogenous state variable in this system is K_t, which evolves according to

$$K_{t+1} = \lambda K_t + I_t. \tag{30}$$

Exogenous state variables are the parameters for liquidity ϕ_t and technology A_t, which follow an exogenous stationary Markov process, and the fixed amount of money M.

The equilibrium can be solved recursively as a function (I_t, p_t, q_t, K_{t+1}) of the aggregate state variables (K_t, A_t, ϕ_t) that satisfies (12) and (26) to (30), as well as the law of motions of A_t and ϕ_t.

Kiyotaki and Moore model a rich set of interest rates. These are in descending order the expected marginal product of capital, the time preference rate, the expected return on equity, the expected return on money and the expected rate of return on equity contingent on the saver having an investment opportunity in the next period. The fact that the expected rates of return on equity and money are lower than the time preference rate imply that savings of entrepreneurs rest at a level which makes them liquidity constrained in case of future investment opportunities. It also explains that borrowing-constrained workers do not save.

These interest rates imply a nominal return on equity. According to the Fisher equation, the nominal return on equity equals the real return on equity plus the expected inflation rate. In terms of the notation of Kiyotaki and Moore, this amounts to subtracting the expected return on money from the real return on equity.

In the Kiyotaki-Moore-framework presented, a helicopter drop of additional money proportionately reduces the price of money. Real money holdings $L_t = p_t M_t$ stay constant. Real aggregate quantities remain the same.

3 Debt-money in the Kiyotaki-Moore economy

Kiyotaki and Moore model money in its pure form: the government *produces and gives* money to individuals. The resulting equilibrium represents the benchmark economy with pure money.

In the following, I will introduce the debt-side of money into the Kiyotaki-Moore economy. In line with their model, the government gives money to individuals. In addition, a bank produces money against interest-bearing debt.

The government in the model subsumes all non-banks that borrow money from banks in reality. One single bank in the model represents the banking sector including the central bank in reality. Today's central banks issue central bank money, i.e. reserves and cash, against interest bearing debt. Commercial and central banks both create debt-money according to the same principles.

3.1 Exponentially growing money and debt volumes

Consider a Kiyotaki-Moore economy with scope for money, while money does not yet exist. The government perceives that money would improve the allocation of resources. To increase aggregate welfare, it aims at providing an amount of money M to the economy. A banker appears and persuades the government of the following deal: The bank will print paper notes that the government will institutionalize as money. The government will sign a perpetual debt obligation in return for receiving the money. Each year, the government will pay a fixed interest rate i^D on the outstanding debt. Debt-money has been initiated.

Note that for money to have a value in an economy, several conditions have to be met. First, in the Kiyotaki-Moore setup, no other asset is perfectly liquid and investing entrepreneurs are financing constrained. Second, more generally speaking, people have to acknowledge something as money. The people in an economy legitimate and use money. They elect a government, which institutionalizes money by law. Third, money has to exist. While people create the idea of money, the bank materializes money by printing. Consequently, the people, represented by the government, have the highest position in the hierarchy, the bank should have a subordinate role. The function of the bank should be to carry out the orders of the government.

By making the above described debt-money deal with the government, the bank has reversed the hierarchy. It has become the creditor to the government and has gained the most powerful position. Its immense profits are in no relation to its veritable

function of printing paper notes. The government has lost by accepting the role of a perpetual debtor. In the end, the people will have lost in every possible way: First, their government is indebted. Second, the bank owner will have deprived the entrepreneurs of all of their capital. Third, seeing huge accumulated debt obligations on the asset side of the bank's balance sheet, people fear that the bank operates at high risk. They fear a break-down of the bank, associated with a fear that the monetary system and consequently the economy will collapse. Not knowing the true mechanisms, they will blame the government for lax debt policy. Both, the government and the people, do not perceive the true underlying mechanism in all consequences. The bank veils the true mechanism and deliberately profits from it.

Consider the following setup to see the implications of the banker's deal on debt and money volumes. At the end of period $t = 0$, the government receives an amount M of the bank and immediately transfers M to the entrepreneurs. Aggregate money at the beginning of $t = 1$ is thus $M_1 = M$, and the government owes $D_1 = D = M$ to the bank. At the end of period $t = 1$, interest rate payments $iD_1 = iD$ are due. Since, obviously, the government has no money left and cannot print it, it has to borrow $i^D D_1 = i^D D$ from the bank. The government receives money $i^D M$ and immediately returns $i^D M$ to the bank to pay the due interest.[7] Accumulated government debt at the start of $t = 2$ increases to $D_2 = (1 + i^D)D$.

The interest rate payments of the government represent monetary seigniorage profit for the bank. I assume that the bank hands profits over to the bank owner, analogous to issuing dividends to a shareholder. End-of-period $t = 1$ seigniorage profits are available for spending for the banker in $t = 2$: $M_2^{bk} = i^D M_1 = i^D M$. The aggregate amount of money in the economy in $t = 2$ equals the initial amount of money plus money spent by the banker: $M_2 = M_1 + i^D M_1 = (1 + i^D)M$.

[7] In reality, an individual or the government borrows new money, spends it, and someone else uses it to pay due interests.

At the end of $t = 2$, the government has to pay due interest $i^D D_2 = i^D(1 + i^D)D$ and again has to borrow the amount from the bank. Bank seigniorage profits disposable in $t = 3$ are $M_3^{bk} = i^D M_2 = i^D(1 + i^D)M$, such that aggregate money becomes $M_3 = M_2 + i^D M_2 = (1 + i^D)^2 M$.

For $t \geq 2$, outstanding nominal debt $D_t = (1 + i^D)^{t-1} D$ can be rewritten as $D_t = D + i^D D \sum_{k=0}^{t-2}(1+i^D)^k$. The more the economy advances in time, the smaller becomes the initial amount D relative to the accumulated debt D_t and the larger becomes the nominal interest rate burden $i^D D \sum_{k=0}^{t-2}(1 + i^D)^k$. Interest rate payments made by the government result in accumulated seigniorage profit $i^D M \sum_{k=0}^{t-2}(1 + i^D)^k$ for the banker. Table 2 illustrates the process in the bank's balance sheet.

Debt-money induces exponentially growing volumes of debt, of aggregate money and of the banker's nominal assets. Hannigan (1971) was the first one to point to these implications of debt-money.[8]

Figure 1 illustrates the evolution of debt and money for an interest rate of $i^D = 0.008$ per quarter and an initial amount of money $M = 10$.[9] Following the balance sheet logic in Table 2, debt and money volumes evolve identically. Both grow exponentially with rate i^D per period. The more time advances, the more both variables increase until they get excessively high compared to the initial amount of money. The same is true for the banker's profit represented by the distance between money volume M_t and the initial amount of money M. Figure 1 extrapolates the balance sheet identities for an exemplarily chosen number of $t = 300$ periods.

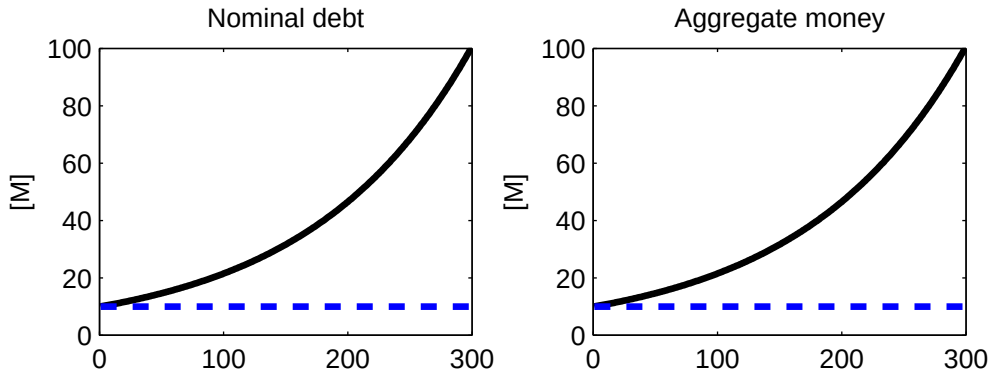
[8] See also Ms. Victoria Grant for a clear and simple exposition of debt-money on `https://www.youtube.com/watch?v=G16WYdmkGRo`.

[9] I set i^D equal to the steady-state real return on equity in the Kiyotaki-Moore model.

Table 2: Bank balance sheet with debt-money

	Assets		Bank	Liabilities
$t = 0$, end				
	Initial debt	$+D$	Initial money	$+M$
$t = 1$				
	Accumulated debt	$D_1 = D$	Aggregate money	$M_1 = M$
$t = 1$, end				
	New debt	$+i^D D$	New bank profit	$+i^D M$
$t = 2$				
	Accumulated debt	$D_2 = (1 + i^D)D$	Aggregate money	$M_2 = (1 + i^D)M$
$t = 2$, end				
	New debt	$+i^D(1 + i^D)D$	New bank profit	$+i^D(1 + i^D)M$
$t = 3$				
	Accumulated debt	$D_3 = (1 + i^D)^2 D$	Aggregate money	$M_3 = (1 + i^D)^2 M$
$t = 3$, end				
	New debt	$+i^D(1 + i^D)^2 D$	New bank profit	$+i^D(1 + i^D)^2 M$
	.	.	.	.
	.	.	.	.
	.	.	.	.
$t = j$				
	Accumulated debt	$D_j = (1 + i^D)^{j-1} D$	Aggregate money	$M_j = (1 + i^D)^{j-1} M$
$t = j$, end				
	New debt	$+i^D(1 + i^D)^{j-1} D$	New bank profit	$+i^D(1 + i^D)^{j-1} M$
$t = j + 1$				
	Accumulated debt	$D_{j+1} = (1 + i^D)^j D$	Aggregate money	$M_{j+1} = (1 + i^D)^j M$
	.	.	.	.
	.	.	.	.
	.	.	.	.

Figure 1: Exponentially growing money and debt volumes in a debt-money economy



Notes: Solid black line: Exponentially growing volumes of debt D_t and money M_t. Dashed blue line: Initial volumes of debt D and money M. Distance between black and blue line: Seigniorage profit of the banker. All variables in terms of money.

3.2 Banker buys world

This section embeds debt-money into the Kiyotaki-Moore model presented in Section 2. The banker is the new economic agent to enter the scene. His counterparty, the government, has transferred the initial amount of money M to entrepreneurs, and does not interfere further with the equilibrium of the economy. Behind the scenes, it is involved in the debt-money creation spiral with the bank according to Section 3.1.

Debt-money first implies exponentially growing volumes of nominal debt and money. Since prices are fully flexible, they adjust proportionally to keep real money balances constant. Money and debt in real terms stay at their initial levels. We do not observe any changes in aggregate, real steady state values if money or debt volumes increase.

Second, the bank makes seigniorage profits. Even if prices of goods in terms of money increase, the banker's profits in real terms are positive. The banker uses these seigniorage profits to buy the world.

In the Kiyotaki-Moore economy, workers are confined to consuming their labor income. The central action takes place among the entrepreneurs. This setup reflects the central

position of the entrepreneurs as wheel of the economy: they own the capital and have the specific knowledge of how to use it in a productive way, see also Kiyotaki and Moore (1997) for this thought. When introducing a banker, I will therefore focus on his interactions with the entrepreneurs.

I assume that entrepreneurs do not fully understand the underlying economic model because the deal between the banker and the government is opaque for them. They only have a fragmented view on the banker's strategy, in particular his sources of profit. They optimize with the Kiyotaki-Moore model in mind. They regard the bank as a financial intermediary and adviser. They cannot form systematically correct expectations neither about the future wealth distribution nor about the evolution of money. In particular, they assume that the amount of money will remain constant. During the course of a period, entrepreneurs are surprised by actual changes in money flows and realize that their profit situation deteriorates more and more. They live according to the principle of hope: They hope that things will get better again, i.e. that they can live again in the Kiyotaki-Moore economy with pure money. The bank, in contrast, has full understanding of the behavior of non-banks, veils its own strategy and profits from the asymmetry of knowledge.

Regarding the interplay among entrepreneurs in the Kiyotaki-Moore model, a fraction π of entrepreneurs randomly has access to an investment technology that transforms goods into capital. To finance the desired level of investment, investing entrepreneurs issue new equity, and sell equity and money holdings. While the resaleability of equity is restricted to a fraction ϕ, they can spend all their money holdings in exchange for goods. At the end of a period, non-investing entrepreneurs have demanded all money available to be liquid for future investment opportunities.

Two circumstances favor the bank in the economic processes. First, there are many heterogenous entrepreneurs while the bank is one institution known for giving out money and for assisting in financial services. An entrepreneur perceives the bank

as a central trading partner, who is more convenient to deal with compared to the costly search for an adequate trading partner among the entrepreneurs. In seeking financing, he directly goes to the bank. Second, the bank is the only agent with full understanding of the economic model. Only the bank knows that it will inject more money and that prices will adjust. It is thus the first agent willing to pay more money in exchange for goods. Both circumstances imply that the banker is served first.

Aggregate money in the debt-money economy in t is $M_t = M_t^{ep} + M_t^{bk} = M_{t-1} + i^D M_{t-1}$. At the start of period t, the entrepreneurs can dispose of their money holdings saved in $t-1$: $M_t^{ep} = M_{t-1}$. During period t, the banker spends his seigniorage profits $M_t^{bk} = i^D M_{t-1}$ in exchange for $p_t M_t^{bk}$ goods. The entrepreneurs will start the next period $t+1$ with money holdings $M_{t+1}^{ep} = M_t$.

In t, the banker applies the same utility maximization as entrepreneurs

$$E_t \sum_{s=t}^{\infty} \beta^{s-t} u(C_s^{bk}) \tag{31}$$

of consumption path $\{C_t^{bk}, C_{t+1}^{bk}, C_{t+2}^{bk}, ...\}$, where $u(C^{bk}) = \log C^{bk}$ and $0 < \beta < 1$.

In distinction to the entrepreneurs, the banker does not save in form of money because each period, he prints new money. It is helpful to consider the starting periods of the economy for his accumulation of wealth.

The economy starts in $t = 1$ with $M_1 = M$. The banker is not yet active in the markets, because he has not yet made any seigniorage profits. The equilibrium in $t = 1$ corresponds to the equilibrium in the Kiyotaki-Moore model with aggregate real balances $p_1 M_1$.

At the end of $t = 1$, the banker makes seigniorage profits $i^D M_1$, which become effective for spending at the beginning of $t = 2$: $M_2^{bk} = i^D M_1$. The banker is the first one to buy goods at the very beginning of $t = 2$ at price $p_2 < p_1$. Of $p_2 M_2^{bk}$ goods, he uses

$(1-\beta)$ for consumption:

$$C_2^{bk} = (1-\beta)p_2 M_2^{bk} \tag{32}$$

The banker now disposes of $\beta p_2 M_2^{bk}$ remaining goods. For the acquisition of equity, he can buy equity from investing entrepreneurs at the market price q_t. If he manages to get involved in the internal financing of investing entrepreneurs, he can acquire equity at the lower, internal price $q_t^R < q_t$.

To finance investment, the π investing entrepreneurs sell equity holdings and issue new equity to the banker and the saving entrepreneurs. They also sell their money holdings to the saving entrepreneurs in exchange for goods, which they transform into capital goods[10]

$$N_3^{ep,i} = \frac{\beta}{q_2^R}\pi\left\{\left[r_2 + \phi_2\lambda q_2 + (1-\phi_2)\lambda q_2^R\right]N_2 + p_2 M_2^{ep}\right\}. \tag{33}$$

The investing entrepreneurs realize that the transactions brought them less goods compared to $t=1$ resulting from lower real balances $p_2 M_2^{ep} = p_2 M_1 < p_1 M_1$. The banker having foreseen this, has put aside $\pi\beta p_2 M_2^{bk}$ of the goods he had bought at the beginning of the period. He offers these goods to the investing entrepreneurs under the condition that he will get the equivalence in terms of inside equity. His 'internally financed' equity is then

$$N_3^{bk,if} = \frac{\beta}{q_2^R}\pi p_2 M_2^{bk}. \tag{34}$$

With equity from trading in the market

$$N_3^{bk,tr} = \frac{\beta}{q_2}(1-\pi)p_2 M_2^{bk}, \tag{35}$$

total equity of the banker adds up to $N_3^{bk} = N_3^{bk,if} + N_3^{bk,tr}$.

[10] When the banker has spent his money on goods, money in the hands of entrepreneurs increases to $M_2 = M_2^{ep} + M_2^{bk}$. Their goods produced, $r_2 N_2$, reduce by $p_2 M_2^{bk}$, and their money holdings in real terms increase by $p_2 M_2^{bk}$, with a net effect of zero on net worth.

The $(1-\pi)$ saving entrepreneurs demand the equity left over by the bank and the money holdings of the investing entrepreneurs. At the end of a period, all money is held by the saving entrepreneurs: $M_3^{ep} = M_2$. Their equity holdings reduce relative to the Kiyotaki-Moore economy to

$$N_3^{ep,s} = \frac{1}{q_2}\left\{\beta(1-\pi)\left[(r_2+\lambda q_2)N_2 + p_2 M_2^{ep}\right] - p_2 M_3^{ep}\right\}. \tag{36}$$

Total equity holdings of entrepreneurs diminish to $N_3^{ep} = N_3 - N_3^{bk}$.

At the beginning of $t=3$, investment opportunities arise again randomly for π entrepreneurs. Investing entrepreneurs now have not only less real balances, but also less own equity for the inside financing of investments. The bank's offers to also fill the equity gap under the condition that it is treated in ownership and return for his part of financing like the investing entrepreneur. An investing entrepreneur wants to invest as much as possible, even if he then will only be the manager instead of the owner of the newly created capital. He accepts the financial assistance of the bank. With the banker buying more and more equity, the entrepreneur will gradually become a mere manager of production.

The bank's 'internal financing' department accumulates equity according to the same principles as the investing entrepreneur

$$N_4^{bk,if} = \frac{\beta}{q_3^R}\pi\left\{\left[r_3 + \phi_3\lambda q_3 + (1-\phi_3)\lambda q_3^R\right] N_3^{bk} + p_3 M_3^{bk}\right\}. \tag{37}$$

The bank's 'trade' department buys equity and accumulates equity holdings

$$N_4^{bk,tr} = \frac{\beta}{q_3}(1-\pi)\left[(r_3+\lambda q_3)N_3^{bk} + p_3 M_3^{bk}\right]. \tag{38}$$

Total equity holdings of the bank add up to $N_4^{bk} = N_4^{bk,if} + N_4^{bk,tr}$. Consumption of the banker is

$$C_3^{bk} = (1-\beta)\left\{\left[r_3 + (1-\pi+\pi\phi_3)\lambda q_3 + (1-\phi_3)\lambda q_3^R\right] N_3^{bk} + p_3 M_3^{bk}\right\}. \tag{39}$$

Generalized for period t, the banker's choices lead to

$$C_t^{bk} = (1-\beta)\left\{\left[r_t + (1-\pi+\pi\phi_t)\lambda q_t + (1-\phi_t)\lambda q_t^R\right] N_t^{bk} + p_t M_t^{bk}\right\}, \tag{40}$$

$$N_{t+1}^{bk,if} = \frac{\beta}{q_t^R}\pi\left\{\left[r_t + \phi_t\lambda q_t + (1-\phi_t)\lambda q_t^R\right] N_t^{bk} + p_t M_t^{bk}\right\}. \tag{41}$$

$$N_{t+1}^{bk,tr} = \frac{\beta}{q_t}(1-\pi)\left[(r_t+\lambda q_t)N_t^{bk} + p_t M_t^{bk}\right], \tag{42}$$

and

$$N_{t+1}^{bk} = N_{t+1}^{bk,if} + N_{t+1}^{bk,tr}. \tag{43}$$

Equity of all investing entrepreneurs evolves according to

$$N_{t+1}^{ep,i} = \frac{\beta}{q_t^R}\pi\left\{\left[r_t + \phi_t\lambda q_t + (1-\phi_t)\lambda q_t^R\right](N_t - N_t^{bk}) + p_t M_t^{ep}\right\}. \tag{44}$$

and of saving entrepreneurs

$$N_{t+1}^{ep,s} = \frac{1}{q_t}\left\{\beta(1-\pi)\left[(r_t+\lambda q_t)(N_t - N_t^{bk}) + p_t M_t^{ep}\right] - p_t M_{t+1}^{ep}\right\}, \tag{45}$$

with $M_{t+1}^{ep} = M_t^{ep} + M_t^{bk} = (1+i^D)M_t$.

Equity and consumption of all entrepreneurs reduces to

$$N_{t+1}^{ep} = N_{t+1} - N_{t+1}^{bk} \tag{46}$$

and

$$C_t^{ep} = (1-\beta)\left\{\left[r_t + (1-\pi+\pi\phi_t)\lambda q_t + (1-\phi_t)\lambda q_t^R\right](N_t - N_t^{bk}) + p_t M_t^{ep}\right\}. \tag{47}$$

Consider now the equilibrium conditions in the economy with the banker. Although money M_t and prices p_t vary, real total balances $L_t = p_t M_t$ are of the same value as in

the Kiyotaki-Moore economy. Since the banker mimics the behavior of entrepreneurs in trading and investment, aggregate investment remains the same as in (26):

$$(1-\theta q_t)I_t = \pi\beta\left[(r_t+\lambda q_t\phi_t)K_t + p_t M_t\right] - (1-\beta)(1-\phi_t)\lambda q_t^R K_t \tag{48}$$

The banker's demand for consumption adds to the goods market clearing condition (28)

$$r_t K_t = I_t + C_t^{bk} + C_t^{ep}. \tag{49}$$

The portfolio equation (29) describes the allocation of equity and money and their expected returns from the point of view of those who demand these assets t. In (50), equity is demanded by the trading department of the bank and saving entrepreneurs, money as end-of-period savings are demanded by saving entrepreneurs. Investing entrepreneurs and the internal financing department of the bank offer equity. They issue new equity on investment θI_t and sell existing equity holdings $\phi_t\lambda(N_t^{ep,i}+N_t^{bk,if}) = \phi_t\lambda\pi(N_t^{ep}+N_t^{bk}) = \phi_t\lambda\pi N_t$.

From the previous period, saving entrepreneurs and the bank's trading department own equity $\lambda(1-\pi)(N_t^{ep}+N_t^{bk}) = \lambda(1-\pi)N_t$. Thus, total equity by non-investing economic agents $N_{t+1}^s = N_{t+1}^{ep,s}+N_{t+1}^{bk,tr} = \theta I_t+\pi\phi_t\lambda N_t+\lambda(1-\pi)N_t$ equals the N_{t+1}^s in (29). The return to money holdings is relevant for the end-of-period money holders, i.e. the saving entrepreneurs. From their perspective, c.p. $E_t[p_{t+1}] = p_t$ because in t, they expect money to stay constant in $t+1$. In consequence, the portfolio equation (50) is equivalent to (29):

$$\begin{aligned} & (1-\pi)E_t\left[\frac{(r_{t+1}+\lambda q_{t+1})/q_t - p_{t+1}/p_t}{(r_{t+1}+\lambda q_{t+1})N_{t+1}^s + p_{t+1}M_{t+1}^{ep}}\right] \\ = \;& \pi E_t\left[\frac{p_{t+1}/p_t - [r_{t+1}+\lambda\phi_{t+1}q_{t+1}+\lambda(1-\phi_{t+1})q_{t+1}^R]/q_t}{[r_{t+1}+\lambda\phi_{t+1}q_{t+1}+\lambda(1-\phi_{t+1})q_{t+1}^R]N_{t+1}^s + p_{t+1}M_{t+1}^{ep}}\right]. \end{aligned} \tag{50}$$

Of course, the composition of assets between banks and saving entrepreneurs changes according to the principle, that the bank buys equity first at the price q_t in line with

(50). The ownership rights of aggregate capital change:

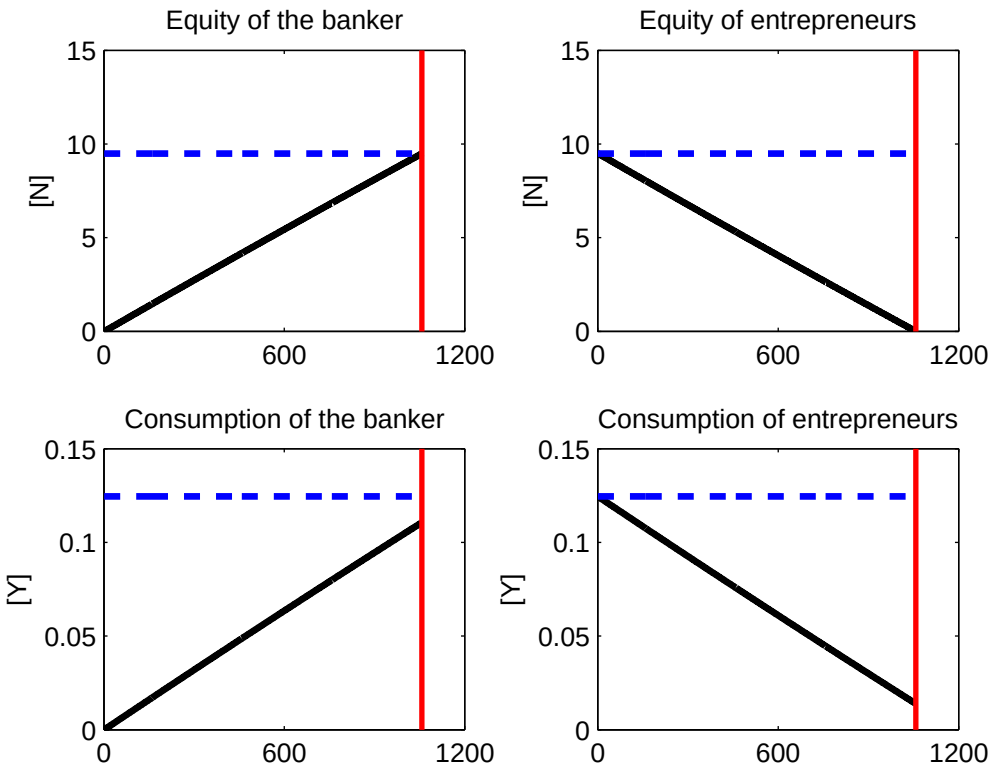
$$K_{t+1} = N_{t+1}^{ep} + N_{t+1}^{bk}. \tag{51}$$

Figures 2 and 3 illustrate the evolution of variables in absolute and relative terms. Figure 2 first shows that the Kiyotaki-Moore economy with pure money attains a stable long-run steady state (blue dashed line). The entrepreneurs produce with a constant capital stock that generates constant output and consumption. The aggregate steady state values of the Kiyotaki-Moore built the outer frame for the debt-money economy, which exhibits strong redistribution within. As soon as the banker and his invention of debt-money are introduced, the banker gradually buys the capital stock of the economy. In period 1058, he has taken possession of all capital. In consequence, the entrepreneurs' returns to capital are zero, they have no more means for consumption goods.[11] They die and with them dies the knowledge of how to productively use capital. The economy breaks down.[12]

[11] According to the modeling strategy, the entrepreneurs end up with positive money holdings. At this point of time, they are in fact worthless, because the banker does not demand money.

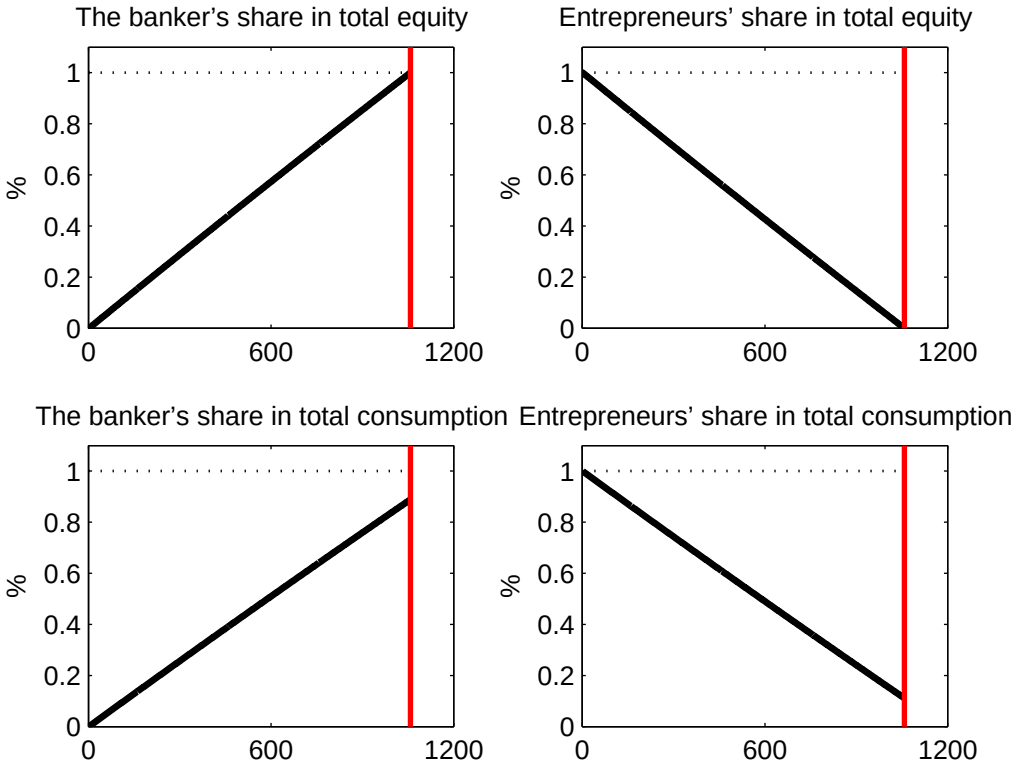
[12] Note that the banker's maximization strategy assumed an infinite horizon. When maximizing, the banker is not aware of the fact that also he depends on others. Finally, owning the world is not profitable if the world breaks down.

Figure 2: Real wealth and consumption under debt-money in comparison to pure money



Notes: Solid black line: Evolution of variables in the debt-money economy. Blue dashed line: Aggregate steady-state variables for entrepreneurs in the Kiyotaki-Moore-pure-money model. Variables in terms of goods. Vertical red line: Break-down of the economy.

Figure 3: Wealth and consumption shares in the debt-money economy



Notes: All variables relative to aggregate steady-state variables in the Kiyotaki-Moore-pure-money model, which represent total capital and maximal consumption. Vertical red line: Break-down of the economy.

3.3 The historical evolution of debt-money

In earlier times as in the Roman Empire, minting coins was the privilege of the feudal seigneurs. Banks received coins from the rich and lent it to third parties against interest. They were true financial intermediaries.

By the end of the 16th and in the 17th century, modern banking emerged in London. At that time, wealthy merchants were storing their gold with the goldsmiths. The goldsmiths issued certificates that attested the ownership of the gold stored. Each merchant could at any time withdraw his gold in stored in vault. These certificates,

or deposit notes, first could not be assigned to a third person. Gradually, the character of these individual certificates changed. The goldsmiths started to issue promissory notes. Everyone could now use the promissory note as a claim to the gold in storage. Paper money was fully backed by gold.

The goldsmiths discovered that people would never claim all the gold corresponding to the paper notes in circulation. In fact, if people claimed all gold, there would be no more paper notes in circulation. The goldsmiths realized that they could pyramid their loans and their money issued on the gold stored, see Angell (1935). For the pyramiding, the goldsmiths granted a loan and issued paper notes to a person in need for money. These paper notes were a claim to a specified amount of gold supposed to be stored with the goldsmiths. However, they actually held only a fraction of the assumed amount of gold in their vault. This scheme is most striking if we imagine a fraction of zero gold backing: The goldsmiths would print notes and lend them. This transaction has the character of a loan, thus the goldsmiths would claim it back plus interest. Modern banking was established, where banks created loans and deposits virtually out of nothing. Notably, they also created own profits out of nothing: The new scheme promised immense profits to the banks from interest rates they claimed for self-made money and that made in turn new interest bearing money creation necessary.[13] One banker family whose lineage can be traced back to their origins as goldsmiths in London is the Rothschild family.[14]

[13]For the outsider, it is hardly possible to distinguish whether a bank grants a loan and has received savings before (this is financial intermediation, corresponding to full gold backing in this early context) or whether the bank creates the loan and the money simultaneously out of nothing.

[14]See `http://en.wikipedia.org/wiki/History_of_banking`.

4 Pure money

Money serves as means of payment, as numeraire and as an asset. Today's monetary system creates an environment of debt and inequality.

In a new system, money will continue to fulfil its functions. The environment created by pure money will be different. Pure money will provide a basis on which we can build a prospering, stable and equilibrated economy.

Pure money already exists in macroeconomic models. It is money dropped by helicopters to non-banks. Macroeconomic models model money as it should be: The government gives it as a transfer, a present to people, to lubricate the economy. Macroeconomic models do not correspond to reality where money and debt creation are two sides of one coin. The point is to adapt money creation in reality to macroeconomic models.

In a translation of pure money of macroeconomic models to reality, the government creates money by giving monetary transfers to individuals. The decision about the optimal amount of money can be delegated to an independent central bank that calculates the optimal amount of money in line with price stability. Commercial banks transfer the resulting individual lump-sum amounts to the current accounts of people. The government adequately recompenses banks for their money creation services.

From an accounting perspective, the aim is to find an appropriate counterpart position for money. This counterpart position guarantees that the money will be in the economy for disposition.

Since people create the idea of money out of their own authority, the counterpart position of money should represent their own authority, their own capital, i.e. equity. Equity represents the economy, its people and their potential. It symbolizes the engagement of everyone. It is not tradable. It amounts in value to the money in

circulation.

In the Kiyotaki-Moore economy, equity-based money M and the newly created equity position N^M would appear in the balance sheet of a bank as presented in Table 3.

Table 3: Bank balance sheet with equity-based money

Assets		Bank	Liabilities
Equity	N^M	Money	M

The idea of equity-based money was first raised by proponents of the Chicago plan after the Great Depression, see Douglas, Fisher, Graham, Hamilton, King, and Whittlesey (1939), the most popular among them being Irving Fisher, see Fisher (1935). Recently, Benes and Kumhof (2012) refined the idea and simulated the US-economy under the Chicago Plan in a state-of-the-art DSGE model. They show that the economy will profit considerably from an equity-based money creation. Existing debt will be replaced by equity according to well-defined criteria. In consequence, debt of non-banks will be substantially reduced. Business cycles will be alleviated compared to the current system. They also design details for a transition period and simulate the transition path of the US-economy from the old to the new system.

5 Conclusion and Outlook

In today's monetary system, money can only be created simultaneously with debt. Although money fulfils its functions, the debt-side of money leads to an unfavorable economic environment: It implies increasing volumes of money and debt, and economic inequality. The economic system is made unstable: It needs demand for loans to generate new money. If the economy lacks demand for loans, it also lacks the money to make interest rate payments for outstanding loans, and bankruptcies are the likely consequence. The debt-side of money further leads to the illusion that we

need economic growth to service our debt. Seeing these drawbacks of debt-money, I motivate a new monetary system with pure money.

Pure money fulfils the functions of money. By being available as fully liquid asset and as means of payment, it fosters a sound environment and represents a stable basis for an economy to be in equilibrium, to prosper and to be free to grow. In accounting, the counterpart position of money becomes non-tradable equity. The value of equity reflects the potential of the economy and its inhabitants. With equity as counterpart position, money receives the character of an endowment for individuals.

The idea of equity-based money was raised by proponents of the Chicago Plan after the Great Depression and was recently refined by Benes and Kumhof (2012). Benes and Kumhof detail the transition to equity-based money for the U.S. and present a coherent framework for its implementation.

I conclude that it is most pressing to renew the monetary system and restart the economy with equity-based money. A well-functioning monetary system will make it easer for governments to tackle further reforms, too.

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