



## Budapest, 2018.

## **Basics of Finance**

### **Authors**

Gábor Kürthy (Chapter 1, Chapter 2)  
József Varga (Chapter 3)  
Tamás Pesuth (Chapter 4)  
Ágnes Vidovics-Dancs (Chapter 5.1 - 5.3)  
Ildikó Gelányi (Chapter 5.4)  
Géza Sebestyén (Chapter 5.5)  
Eszter Boros (Chapter 6)  
Gábor Sztanó (Chapter 7)  
Erzsébet Varga (Chapter 8)

### **Editor**

Gábor Kürthy

### **Reviewers**

Ágnes Vidovics-Dancs (Chapter 1)  
György Surányi (Chapter 2)  
Gábor Kürthy (Chapters 3, 4, 5, 6, 7, 8)

**Budapest, 2018.**

ISBN 978-963-503-743-8

## TABLE OF CONTENTS

<b>Chapter 1 Technical introduction.....</b>	<b>4</b>
<b>Chapter 2 Money and Banking from a Historical and Theoretical Perspective ....</b>	<b>7</b>
2.1 Money in history and theory.....	7
2.2 Production of money and creation of money .....	9
2.3 Fiat money.....	18
2.4 Modern monetary systems.....	24
Bibliography .....	32
<b>Chapter 3 Banking Operations.....</b>	<b>33</b>
3.1 Passive banking operations .....	33
3.2 Active banking operations.....	36
<b>Chapter 4 Banking Risks and Regulation .....</b>	<b>39</b>
4.1 Financial intermediation .....	39
4.2 The role of banks and the different types of banking.....	39
4.3 Risks faced by banks .....	40
4.4 Banking regulation.....	43
Bibliography .....	47
<b>Chapter 5 Securities Markets .....</b>	<b>48</b>
5.1. Basic terms .....	48
5.2. Bond markets .....	49
5.3. Credit rating.....	50
5.4 Stock exchanges.....	52
5.5 Derivatives.....	57
Bibliography .....	61
<b>Chapter 6 The Balance of Payments.....</b>	<b>62</b>
6.1 Purpose of the BoP .....	62
6.2 Basic Definitions and Principles.....	63
6.3 Constructing the BoP Step by Step .....	65
6.4 Concluding remarks .....	70
Bibliography .....	71
<b>Chapter 7 Foreign Exchange Markets.....</b>	<b>72</b>
7.1 Introduction to FX-markets .....	72
7.2 FX markets: demand and supply .....	73
7.3 Exchange-rate theories .....	74
7.4 Exchange-rate systems.....	75
<b>Chapter 8 Public Finance and Taxation.....</b>	<b>79</b>
8.1 The economic functions of the government .....	79
8.2 Revenues of the Government.....	82

## CHAPTER 1 *TECHNICAL INTRODUCTION*

*To understand finance properly, one needs to have a solid grasp on the elemental definitions and techniques of accounting. For being able to keep track of the following chapters, we suggest the Reader studying the next few pages thoroughly.*

The balance sheet is a financial statement that represents an economic agent's (a household, a company, a bank, a budgetary institution etc.) wealth by two approaches. Assets are listed on the left-hand side or asset side, resources financing the assets are listed on the right-hand side or liability-equity side. The balance sheet is always in balance, that is:

$$\text{ASSETS} = \text{LIABILITIES} + \text{EQUITY}$$

When constructing the balance sheet, assets are listed first, then liabilities. Shareholders' equity is always a residual, i.e. it is the difference between assets and liabilities. The equity of a company or a bank is frequently referred to as capital, which can lead to misunderstandings. In this context, capital is not a pile of cash that can be invested. It is only a notional entry that shows what would be left if all the company's debts were repaid. A negative book value of the capital means that the company is insolvent in the long run, i.e. it cannot repay all of its liabilities.

### ***Example: the balance sheet of a company***

Company "ABC" has 57,000 EUR worth of assets that are partially financed by long- and short-term liabilities. Long-term (or non-current) liabilities - such as bonds issued or mortgages - are due over 12 months. Short-term (or current) liabilities - such as bills or taxes payable - mature within 12 months.

#### **ABC Company, Balance sheet, at 31-Dec-2017**

<b>Assets (EUR)</b>		<b>Liabilities (EUR)</b>	
Land	25,000	Long-term liabilities	15,000
Machinery	20,000	Short-term liabilities	3,000
Inventories	4,000	<b>Equity (EUR)</b>	39,000
Supplies	6,000		
Cash	2,000		
<b>Total assets:</b>	<b>57,000</b>	<b>Total liabilities and equity:</b>	<b>57,000</b>

Economic events can change the balance sheet in four ways:

- *both sides increase by the same amount*
- *both sides decrease by the same amount*
- *the asset side is restructured, i.e. some assets increase and others decrease*
- *the liability-equity side is restructured, i.e. some liabilities or equity items increase and others decrease*

The following example helps to understand the issues described above.

**Example: bookkeeping**

In the first month of 2018, the following events happened to ABC company:

- ➡ 1,000 EUR worth of inventories were bought, the company promised the supplier to pay in 60 days.

Assets: Inventories, +1,000 EUR      Liabilities: Short-term liabilities, +1,000 EUR  
Equity: no change

- ➡ 1,500 EUR worth of goods were sold for 1,900 EUR.

Assets: Supply -1,500 EUR      Liabilities: no change  
Cash, +1,900 EUR      Equity: + 400 EUR

- ➡ The company repaid 400 EUR short-term loan and 20 EUR interest.

Assets: Cash -420 EUR      Liabilities: Short-term liabilities -400 EUR  
Equity: - 20 EUR

- ➡ The National Competition Authority imposed a fine of 500 EUR on the company, to be paid within 6 months.

Assets: no change      Liabilities: Short-term liabilities, +500 EUR  
Equity: -500 EUR

- ➡ An investment bank granted the company 5,000 EUR worth of loan with the maturity of 20 years. The company spent the proceeds on a new machinery.

Assets: Machinery, +5,000 EUR      Liabilities: Long-term liabilities, +5,000 EUR  
Equity: no change

In order to keep the balance, we followed the *rules of double entry bookkeeping*. At the end of January-2018, after booking all the events, the balance sheet looks like as follows:

**ABC Company, Balance sheet, at 31-Jan-2018**

Assets (EUR)		Liabilities (EUR)	
Land	25,000	Long-term liabilities	20,000
Machinery	25,000	Short-term liabilities	4,100
Inventories	5,000	<b>Equity (EUR)</b>	38,880
Supply	4,500		
Cash	3,480		
<b>Total assets:</b>	<b>62,980</b>	<b>Total liabilities and equity:</b>	<b>62,980</b>

Economic events, mostly exchanges, always happen to two agents simultaneously, which leads to *quadruple entry bookkeeping* on the systemic level. If “A” does business with “B” then two changes arise in both balance sheets, which means four changes altogether. (In Latin, four is quattuor, that is where the term comes from.) Consider the following examples.

**Example: quadruple entry bookkeeping**

- ➔ Company "X" buys inventories from company "Y" and pays 4,000 EUR for them. Before the transaction, the book value of the traded inventories was 3,500 EUR.

Company "X"		Company "Y"	
Inventories +4,000		Supply -3,500	
Bank account -4,000		Bank account +4,000	
			Equity +500

- ➔ Company "Z" pays 2,000 EUR wage to Mrs. M.

Company "Z"		Mrs. M.	
Bank account -2,000		Bank account +2,000	
	Equity -2,000		Equity +2,000

- ➔ Mr. Q. repays 100 EUR of debt plus 5 EUR interest to Mrs. S. in cash.

Mr. Q.		Mrs.S.	
Cash -105	Liabilities -100	Claims -100	
	Equity -5	Cash +105	Equity +5

From an accounting point of view, there are two kinds of goods. **Real economic goods** are on *the asset side of one single balance sheet*, while **financial goods** appear in *two balance sheets simultaneously*: on the asset side of one balance sheet and on the liability-equity side of another one. A slice of bread or a bicycle are real economic goods; a mortgage loan, a commercial bill or a share are financial goods.

Financial goods on the liability-equity side are obligations, while those on the asset side are claims. A commercial bill with the nominal value of 500 EUR is a claim to its owner and an obligation for its issuer. The issuer is legally bound to pay 500 EUR when the bill matures. In case of default - i.e. if the issuer is not able or not willing to pay -, the owner of the bill can sue the issuer.

Shares might be regarded as financial assets too, although in this case the issuer is not legally bound to pay any money. Shares are rather economic than legal promises to pay dividends or provide capital gains through the appreciation of their price. Disappointed owners - in case of no dividend payments and no price increase - can punish the issuer company on the market by selling the shares. What happens if investors start selling the shares of some company en masse? The price of the shares plummets which leads to the simultaneous devaluation of the assets of the company. (Remember, the value of the assets always has to be equal to the summed value of the liabilities and the equity. A price drop of shares devalues equity and assets simultaneously.) As assets are collateral behind the liabilities, a significant drop in their value can lead to financial difficulties.

### 2.1 Money in history and theory

The historical emergence of money can be related to the emergence of market-based economies. For thousands of years, communities were organised by redistributive institutions, centralised rules coordinated production, consumption, investment, etc. Ancient Egypt and Babylonia are the most typical examples of redistributive empires, but even in the feudalistic European kingdoms, markets played only a minor role for a long time. (Polányi, 1944: Chapter 4) These markets are frequently described as places where rural farmers and urban manufacturers exchanged their products directly. However, it is easy to see that barter is a very inefficient way of exchange, as the probability of double coincident of wants is low and by the growth of the number of market participants, it gets even lower. There is no historical proof that direct barter has ever played an important role in coordinating markets (Wray, 1993). Since the very advent of locally organised markets, buyers and sellers have been using a commonly accepted specific good as the medium of exchange. Primitive forms of money had been used before as store of value and standard of deferred payments, but in lack of markets, they have not functioned as the medium of exchange or the measure of value (Polányi, 1957). The most important function of ancient coins was probably the fact that the state (the king or the queen) accepted them when paying the taxes. This characteristic made primitive money generally acceptable on markets: as everyone had to pay taxes, sellers accepted coins because they knew they could (and in most cases, they should!) use them for tax payment, and they knew that other sellers from whom they would buy goods were thinking in the same way. It is tautological, but money is accepted because it is thought to be accepted.

From this short introduction it has to be clear that ***money is defined by its functions***, i.e. we call something money if it is a

- *medium of exchange,*
- *standard of deferred payments,*
- *store of value,*
- *measure of value.*

Money as a means of exchange helps market-coordination in several dimensions. As mentioned above, general acceptance simplifies trade by splitting long and hard discoverable chains of exchanges into small parts. Without money, theoretically, the economy as a whole must find the market-clearing exchanges simultaneously to avoid disequilibrium. This cannot be implemented without the knowledge of some central planner, who, of course, does not exist. Besides, the use of money spares information: in a barter economy with  $N$  kinds of goods, the number of relative prices that market participants have to remember is  $\frac{N*(N-1)}{2}$ , whereas in an economy with  $N$  kinds of

goods and money, the number of absolute prices is  $N$ . If  $N = 100$ , the size of the information set is 4,950 and 100 in the two cases respectively.

In a monetised economy, debt is easy to measure and administer with the help of money, by which the two sides of a transaction (service and payment) can be separated in time. Expressing debts in monetary terms leads to more efficient economic, social and legal procedures. For example, economic agents do not need to pay taxes by sacrificing their labour and working for the state anymore. The state can collect taxes paid in money, and then pay for a competent workforce to execute special jobs. (Without money, some John has to work on state-owned farms or must serve as a soldier. The problem is that being an excellent wool-manufacturer, John knows nothing about agriculture or warfare. If instead, he pays taxes in money, skilled farmers and soldiers can be hired.) Another example from the field of jurisdiction: in a society without money, a culprit always has to be imprisoned, executed or sentenced to penal servitude. However, with money, in a lot of cases, the sinner can literally pay for his sins.

Money as a store of value secures future both in the short- and in the long-run. Between two exchanges, the purchasing power can rest in money, which creates the possibility of intertemporal optimisation. The store of value and the standard of deferred payments functions are closely connected. Surplus agents (those who spent less in a period than they earned) can finance deficit agents. The claim of surplus agents serves as the store of their postponed consumption, while the debt of deficit agents is the price of their impatience for which they will pay later.

Money measures the value of goods, services, wealth, debt, etc., which makes these things comparable. With money usage, a price can be assigned not only to exchangeable products but even to unmarketable stuff like works of art, clear environment or life. It is needless to say that the measure of value and the means of exchange functions are hand in hand with each other - exchanges are based on the knowledge of prices expressed in monetary units.

The transition from redistributive societies to market economies had been a long process, during which not only goods but labour and capital also became the subjects of exchange. This evolution was accompanied by different mutations in the monetary system. Financial innovations were partially forced by the requirements of growing markets, as money supply had to keep pace with economic development. On the other hand, the interests of the state (and not necessarily those of the public...) lead to notable alterations of money and monetary institutions as well. In the next section, we will examine the most important changes through the lenses of an accountant, i.e. we will intensively use the techniques familiarised in the first chapter of this book. However, the essence of the following is not the bookkeeping but the theoretical and practical understanding of how modern monetary systems have evolved and are operating today.



## 2.2 Production of money and creation of money

This tour begins with an imagined world where gold coins fulfil the functions of money. Gold coins are minted by the Royal Mint from raw gold extracted from mines or panned from rivers. Miners are obliged by law to surrender their gold to the Mint who issues stamped gold currency after the coinage. Coins are **legal tender** in the economy which means that producers, merchants, shop owners, etc., must accept them in exchange for their goods. On the other side, buyers are also obliged by the legal tender law to use coins as a medium of exchange. However, upon mutual agreements, parties are allowed to use alternative settlements in a given business situation. Summing up: *if the buyer wants to pay with gold coins the seller must accept them; if the seller wants to be paid in gold coins the buyer must adapt; if they both agree they can use different methods.*

Before the introduction of coinage and legal tender laws, a price system consisting of relative prices (for instance 10 kilograms of bread = 1 pair of boots) had evolved in the economy. An important vector of this system measured the values of goods in terms of gold (Figure 1).

**FIGURE 1: PRICES BEFORE THE INTRODUCTION OF COINAGE.**

1 ounce of gold =	1000 kg of wheat
	500 liters of beer
	...
	5 acres of land

The Royal Mint minted one ounce of gold into 10 pieces of coins with the nominal value of 1 shilling stamped on them (or the equivalent of it, for example, 2 pieces of 5 shilling coins). One shilling as a measurement of mass equals one-fifth of an ounce, thus the Royal Mint issued coins that contained half of the quantity of gold of their nominal value. However, because of the legal tender law, economic agents had to accept these coins at nominal value. Thus the price system changed (Figure 2).

**FIGURE 2: PRICES AFTER THE INTRODUCTION OF COINAGE.**

5 shillings =	1000 kg of wheat
	500 liters of beer
	...
	5 acres of land

What happened at the Mint? The miner sold 1 ounce of gold for 5 shillings, the Mint kept the rest. Suppose that the unit cost of minting 1 ounce of gold was 1 shilling. After

deducing this cost, the profit of the Mint was 4 shillings. This profit served as the revenue of the State.

By appearing on the asset side, the gold found in the mine increases the miner's balance sheet. As the miner knows that he has to surrender the gold, and eventually he will keep half of the amount mined, both his liabilities and equity increase by half of the value of the gold (Figure 3). It is worth to notice that mining is not an exchange of goods or services, thus no other balance sheet has to be involved when accounting for it.

For the sake of simplicity, the costs of mining were set aside, or put it in another way, the result of the mining reflected by Figure 3 is the net result after deducting the costs.

**FIGURE 3: ACCOUNTING FOR THE MINING OF 1 OUNCE OF GOLD.**

Miner	
gold, +10 shillings	liabilities, +5 shillings
	equity, +5 shilling

Surrendering his gold and getting the proceeds after coinage rearranges the balance sheet of the miner: he is relieved of his gold, half of which being his liability and receives 5 shillings in gold coins. The balance sheet of the Mint (which can be identified with the State) increases by 4 shillings: 4 shillings as coins on the asset side and 4 shillings of equity. The remaining 1 shilling is partially the salary of mint-workers (plus salary in coins on the asset side, plus the same amount of equity on the other side), and partially is paid out for minting materials (for example copper) (plus the price of material on the asset side, and minus the material sold on the same side). Figure 4 accounts for these changes.

**FIGURE 4: ACCOUNTING FOR THE MINTING OF 1 OUNCE OF GOLD.**

Mint (State)		Miner	
gold coins, + 4 shillings	equity, +4 shillings	gold, -10 shillings	liabilities, -5 shillings
		gold coins, +5 shillings	

  

Others	
gold coins, +1 shilling	equity, +0,5 shillings
supply, -0,5 shillings	

The profit from coinage can be further enhanced through debasement. This happens when the Royal Mint decreases the gold content of the coins in one of the following two ways: (1) by the power of law, it announces that from now on one ounce of gold is minted into 12 shillings, but new and old coins have equal market value; (2) every old coin is reminted, i.e. one-fifth of their gold content is extracted, and the proceeds are kept by the state.

**Task:** account for the changes that the debasement causes in the different balance sheets!

With the general acceptance of royal coins, the introduction of minting and the legal tender laws lead to more efficient market coordination. However, there are practical and economic problems with coin usage. For security reasons, especially in wholesale commerce, transportation and shipment costs of the gold currency can be enormous. Besides that, coins wear off with intensive circulation thus the ratio between their face value (nominal value) and real value increases. As sellers have to accept coins at their face value, buyers pay with worn ones. **Gresham's law** prevails: *bad quality money drives out good quality money from circulation* as the former is used as a means of exchange, while the latter is used in the function of store of value.

The most important economic problem is the relative shortage of money. This occurs when the growth rate of the real economy is higher than the growth rate of gold-mining, and the velocity of circulation cannot compensate for the difference. The **Fisher-equation** (1) helps to understand this phenomenon.

$$MxV = PxQ \quad (1)$$

On the right-hand side of the equation,  $PxQ$  measures the nominal value of economic transactions in a given period of time. This is the scalar product of the ordered  $P$  and  $Q$  vectors: a  $(p_i, q_i)$  pair denotes the price and the quantity of the  $i$ -th transaction, thus the  $p_i * q_i$  product is the nominal value of the  $i$ -th transaction. The summation of all transactions ( $PxQ = \sum p_i * q_i$ ) is the nominal value of all economic affairs in the examined time period.

The left-hand side of the Fisher-equation measures the monetary side of the economy. One piece of coin can mediate more transactions in a given time period ("A" pays "B" with this coin, "B" pays "C" with the same coin, etc.) The **velocity of money** ( $V$ ) is *the average number of transactions a given coin takes part in*. Last but not least,  $M$  is the quantity of money in the economy.

In each and every atomic transaction, money and goods with the same value flow in the opposite directions, so the Fisher-equation seems to be a mere identity. However, in order to hold this identity at the end of every time period, the dynamics of the two sides have to adapt to each other. The nominal value of transactions ( $PxQ$ ) can increase only if the nominal value of money circulation ( $MxV$ ) follows the growth. Out of the two factors on the monetary side, the velocity of money is constrained by institutional reasons (Bordo - Jonung, 1987).

First, the structure of the economy determines how often money should change hands. An economy where production is vertically integrated requires fewer money flows than a horizontally integrated one. In the former, big companies manage whole production lines (sowing the seeds, harvesting the wheat, baking and selling the bread) without the need of money between the successive production stages, while in the latter, smaller firms

specialise in different activities and money-flows accompany the production. Though the structure of economies is changing constantly, this evolution is a slow process, and so the velocity of circulation adjusts gradually.

Second, the development level of the payment and settlement systems determines how easily money can change hands. In a pure cash economy, parties must meet physically to hand over a payment, whereas, with electronic payment systems, this process is much faster though still bounded.

There could be special circumstances when the velocity of circulation increases beyond these boundaries. During hyperinflation money loses its function of store of value, as economic agents expecting fast growing prices try to exchange money for goods even if they do not need those goods to consume. This, of course, reinforces the hyperinflation process. However, hyperinflation or even inflation triggered by excessive growth of money supply is unimaginable in a commodity money system. The reverse case prevails: the insufficient money supply can lead to deflating prices and as agents in the hope of further decreasing prices postpone their consumption to a slowing economy.

As the velocity of money is constrained, the growth rate of the quantity of money should adapt to the growth rate of the nominal value of transactions in the long run. In a monetary system where commodity-money is the result of production (mining and minting) and the material of it is scarce, the rate of economic growth will be constrained, sooner or later, by the growth rate of the quantity of money. This situation is called the relative shortage of money.

The practical and economic problems of coin-usage described above lead to financial innovations that eventually changed the whole monetary system. First of all, in our imagined economy, private agents founded depository institutions. Anyone could deposit his gold coins in one of these institutions who issued promissory notes (or simply, notes) in exchange. A promissory note is a written promise of the issuer to pay at sight the appropriate amount of gold coins. That is, whenever someone turns in a 10 shilling note, the issuer must immediately redeem it into 10 shillings in coins. Notes are not legal tender, however, as long as market participants believe that they can be converted into coins, notes - upon mutual agreement - can be used as means of exchange.

What happens when a merchant places gold coins in a depository institution? He swaps money for notes, which is a structural change on the asset side of his balance sheet. Both sides of the depository's balance sheet increase: money appears on the asset side, while the promise of paying this money out whenever it is demanded, is a new liability (Figure 5). The note is a financial instrument: it is the asset of the merchant and simultaneously, the liability of the issuer. In its physical form, it is at the merchant, the term "*promissory note*" in the depository's balance sheet is the name of this special liability. The note is a security as well, it can be traded away on the market either for money or for some goods. The promise embodied in the note is not personal: it is not the merchant but any future owner of the note who can ask for the redemption.

It is worth to emphasise that promissory notes were convertible to gold coins by anyone and anytime at face value. That is, a 1 shilling note equals a 1 shilling coin as long as

convertibility is secured and economic agents trust the promise of the issuer institution. As we will see, this promise proved to be the most important disciplinary force in the monetary system.

**FIGURE 5: PLACING MONEY IN A DEPOSITORY INSTITUTION.\***

Depository Institution		Merchant	
gold coins, +10	promissory notes, +10	gold coins, -10	
		promissory notes, +10	

*\* as everything is measured in shillings, we do not use the term on the figures anymore*

Because of the practical problems of coin-usage, promissory notes became enormously popular. As depository institutions proved to be trustworthy, note owners did not worry about the security of convertibility. Practically, private businesses began to replace coins with notes. However, as note issuance did not change the total amount of circulating media of exchange, the problem of relative money shortage was still to be solved.

It is worth to notice that funding and managing a depository institution described above is not a profitable activity. Clerks at the offices change coins for notes and vice versa, but unless there is some cut on the deposits (say, the depository issues 99 shillings in notes for 100 shillings in coins), the costs of salaries and security arrangements will lead to massive losses in the income statement.

**Task:** account for the changes in the balance sheets if the depository institution applies a 2 percent cut on deposited coins!

In order to gain some profit in their business, depository institutions started to lend out money. Shortly after the introduction of this new activity, managers observed a very interesting phenomenon: the bulk of borrowers, immediately after signing the contract, without even leaving the building, deposited their borrowed coins, i.e. they changed their gold coins for promissory notes. This seemingly weird act is quite understandable: debtors needed purchasing power, they wanted to buy something on the market, and for practical reasons, by that time notes have become more popular than coins. Promissory notes substituted gold coins perfectly in their functions of payment and medium of exchange, besides, their physical characteristics, such as weight and portability made them easier to use than coins. As a consequence of this observation, managers made an efficiency modification to the lending business: by signing the credit-contract, borrowers received promissory notes directly. Of course, anyone could redeem the notes into coins, but only the minority of costumers did so.

What happens to the balance sheets of the different parties? Consider first the case when costumers borrow gold coins directly (step 1), then convert them into promissory notes (step 2). Lending out gold coins is a structural change on the asset side of the creditor: coins are swapped for the promise of repayment. The latter is a new liability of the

costumer, while the coins received increase the asset side. Converting coins into notes restructures the asset side of the borrower and increases the balance sheet of the lender (Figure 6B).

**FIGURE 6A: THE BALANCE SHEET OF THE DEPOSITORY BEFORE PROVIDING THE LOAN.**

Bank / Depository	
gold X	promissory notes X

**FIGURE 6B: ACCOUNTING FOR A 5 SHILLING LOAN IN TWO STEPS.**

Bank / Depository		Costumer	
gold coins, -5		gold coins, +5	loan, +5
loan, +5			
<hr/>			
gold coins, +5	promissory notes, +5	gold coins, -5	
		promissory notes, +5	

Consolidating these two steps (Figure 6C) leads to the second case, which shows the result of lending out notes directly, instead of coins. Now the borrower has the notes amongst her assets and is liable to pay back the loan; the lender has the promise of the borrower as an asset and is liable to redeem the new notes into coins whenever it is demanded. The borrower and the lender swapped their IOUs: the borrower promised to pay back money according to the conditions of the credit contract, the lender promised to pay at sight the coins, upon the request of any future owner of the notes.

**FIGURE 6C: ACCOUNTING FOR A 5 SHILLING LOAN IN ONE STEP.**

Bank / Depository		Costumer	
loan, +5	promissory notes, +5	promissory notes, +5	loan, +5

**FIGURE 6D: THE BALANCE SHEET OF THE DEPOSITORY AFTER PROVIDING A 5 SHILLING LOAN.**

Bank / Depository	
gold X loan 5	promissory notes X + 5

By this act, purchasing power is *created* out of nowhere, which is very similar to the money creation in the modern banking system (see later). Initially the depository had gold coins, and after providing the loan it still has the same amount (compare Figures 6A and 6D!). Thus, technically gold is not needed to provide a loan. However, as the created notes are convertible to gold, business wise it is crucial to have enough reserves.

The introduction of lending leads to many changes. First of all, lenders are not only depository institutions anymore, we can call them banks henceforth. Second, lending increases the quantity of money circulating in the economy, which could solve the problem of relative money shortage. On the microeconomic (institutional) level, more complex managing skills are needed. Before starting to lend out money, the convertibility of the total amount of the notes was technically secured, as the amount of gold coins on the depositories' asset side equalled the amount of notes amongst their liabilities. Lending creates new liabilities (new notes) that are backed by the promise of repayment. As there is no difference between notes originating from depositing coins, and those created by lending, the whole quantity of promissory notes are now partially backed by gold coin **reserves** of banks, and partially by loans they granted. Reserves are generally the *highest forms of money or ultimate liquidity, for which economic agents can convert their claims on the members of the banking system*.

Assuming that all debts will be repaid, only a liquidity problem prevails: in the short run, the convertibility of notes is constrained by the level of reserves. However, there are always some debtors who default on their debt, which can lead to solvency problems in the long run. To minimise the probability of failing to keep the promise of convertibility, banks must properly examine their debtors' financial status, and price the loans accordingly.

### **Example: pricing loans**

Let  $p$  denote the probability of default on a loan. If  $p$  is 3% then expectedly 3 shillings out of 100 shillings lent will not be repaid. Of course, banks try to minimise this probability, but even with the most sophisticated screening techniques, it cannot be beaten down to zero.

Let  $i_L$  denote the interest rate on loans. If  $i_L$  is 6% then a debtor has to pay 6 shillings of interest on a 100 shilling debt annually. If the maturity of the loan is less than one year, the debtor pays less interest (for example 3 shillings for half a year). If the debt matures over one year, this 6 percent must be paid accordingly.

Let  $c_L$  denote the unit cost of managing a loan. If  $c_L$  is 1% then the cost of lending 100 shillings is 1 shilling. This cost involves elements such as screening and monitoring the debtor, writing the contract, etc.

Finally,  $r_d$  denotes the cost of the liability created by lending. Although banks do not borrow funds to lend, still, the liabilities (promissory notes, later deposits) incur costs: they have to be managed, sometimes interest is paid on them etc.

Considering the above data the expected profit of the bank on a 100 shilling loan is:

$$100 * (1 - p) * r_L - 100 * p - 100 * c_L - 100 * r_d.$$

The first term is the income of the bank:  $100 * (1 - p)$  shillings will be repaid with interest. The second term ( $-100 * p$ ) is the credit-loss from defaults, the next term is the cost of lending 100 shillings, the last term is the cost of the created liability. Assuming perfect competition, this profit is zero if  $r_L = \frac{p + c_L + r_d}{1 - p}$ . If the probability of default is 3 percent, the unit cost of

lending and the cost of liability are both 1 percent then the minimal interest rate on loans should be 5.15 percent.

Besides bank loans, private credit started to flourish in the economy in the form of **commercial bills**. A commercial bill is a security embodying the short-term debt of a merchant who is unable to pay upon delivery. Instead, he promises to pay later by signing the bill. If the supplier does not want his business to fail, he accepts the bill that he can trade away later, i.e. he can use the IOU of the original issuer (the merchant) to pay for some shipment. (See Figure 7 for accounting details.) Commercial bills are not legal tender, thus, as mentioned before, a mutual agreement between the trading partners is needed to settle business with them. The liquidity of bills depends on the trustworthiness of the issuer. If “A” wants to pay “B” with the bill issued by “C”, “B” will accept this form of payment only if he believes either that “C” is able to repay when the bill matures or some “D” will accept the bill in some later transaction. The more reputable a private agent is, the more liquid his IOUs will be. However, only close business partners can rate the reputation of an agent, which makes the liquidity of commercial bills pretty constrained.

**FIGURE 7: ISSUING A COMMERCIAL BILL.**

Manufacturer		Merchant	
supply, -60		goods, +60	commercial bill, +60
commercial bill, +60			

**Task:** account for the changes in the balance sheets if the sold supply is worth 50 shillings, i.e. the manufacturer earns 10 shillings profit by selling it!

Banks can help this problem by either accepting commercial bills or buying them by issuing their own bills. The two cases differ only technically, as in the first case the bank merely signs or stamps the commercial bill (this is the “bank’s acceptance”), which guarantees payment if the issuer defaults, while in the second case, the bank writes its own IOU and swaps the commercial bill for it. However, the two cases are essentially the same: the bank takes the credit risk of the issuer on its own balance sheet, replacing it with its own credit risk, which is, of course, significantly lower than the original issuer’s.

It is even better if the bank buys the commercial bill by paying out gold coins or by issuing promissory notes. The former can be ruled out on the grounds discussed before: the seller of the bill will convert coins into notes immediately for practical reasons. The difference between the nominal value of the commercial bill and the discounted amount paid for it generates profit for the bank.

Historically it was a long process til the banks started to discount commercial bills by issuing promissory notes. At the first stage of this process the banks bought commercial bills by issuing their own bill, the so called banker’s bill. As it was a short term security embodying the bank’s debt with interest, it did not create an immediate liquidity risk. The banks managed the discounting business by matching the cash (gold coin) outflow caused by the maturing banker’s bills with the cash inflow from maturing commercial bills. A minor modification to this business was when the banks started to issue the banker’s



bills in standardised denomination (e.g. instead of issuing a bill with the face value of 47 shillings, the bank issued two 20 shillings bills, one 5 shillings bill, and two 1 shilling bills). Major modifications came later, when the banks issued bills without maturity and interest. This changed the nature of the above mentioned management. A banker's bill without maturity is essentially a promissory note: it is convertible to gold on demand. Thus, now the bank has to match cash outflows triggered by redemption with cash inflows from maturing commercial bills. This business could be managed by changing the discount rate, i.e. the rate by which incoming commercial bills were valued. If the net cashflow of the bank turned negative, the bank increased the discount rate by which some bill-owners were discouraged from discounting their bills.

**Example: commercial bill**

Suppose that manufacturer "X" has a commercial bill with the nominal value of 60 shillings issued by merchant "Y". "X" has to pay for a shipment next week but he has no money, and the bill matures only in 90 days. As he is not sure that he can pay for the shipment by trading away the bill, he decides to sell it to a bank. The bank buys the bill for 59 shillings paid out in promissory notes. The 1 shilling difference is the price of two services. First, promissory notes are more liquid than the commercial bill, so the bank provides a liquidity service. Second, the bank relieves the customer of the credit risk. The 90-days discount rate the bank applied was

$$\frac{1}{60} = 1.67\%.$$

The bank buys the commercial bill by expanding its balance sheet. The asset side is increased by the discounted value of the bill (59 shillings in the above example), while the liability side is increased by the newly created promissory notes. Upon maturity, the debtor will pay the nominal value of the bill in notes, which removes the commercial bill from the asset side and simultaneously, destroys the same amount of notes from the other side. The difference between the nominal value and the discounted value increases the capital of the bank. If the issuer of the bill fails to serve his debt then this will be a minus bill from the assets (at a discounted value) and a negative item in the capital.

**FIGURE 8: DISCOUNTING A COMMERCIAL BILL.\***

Manufacturer		Bank	
commercial bill, -60		commercial bill, +50	promissory notes, +59
promissory notes, +59	equity, -1		

**\* the bank books the bill at its discounted value (59) instead of its nominal value (60). The capital gain of 1 shilling will enter the balance sheet upon repayment.**

It is worth to notice that there are two different series of events that influence the same balance-sheet structure. If "A" borrows money from a bank and pays "B" with this money for some shipment, then "A" has some goods on his asset side and a debt on the liability side; "B" swapped goods for promissory notes; the bank granted a loan (assets) by creating notes (liability). If "A" buys some goods from "B" and pays by issuing a commercial bill, after which "B" sells this bill to the bank who buys it by issuing promissory notes, the result is the same regarding the balance sheets of the three parties.

An important difference is, however, that in the latter case the private debt the bank has amongst its assets is a tradable security, while in the former case it is a contracted debt that cannot be sold easily.

### 2.3 Fiat money

Despite its powerful means, such as taxing private agents, determining monopoly rights over mine-products, or debasing the currency to raise revenues, the state has been the biggest debtor of the economy for a long time. Sometimes violent or innovative solutions were needed to successfully manage high levels of budget deficit or debt. Before the modern era of market-based economies, kings and queens frequently went into war against their creditors or executed them as the most efficient way of decreasing debt. These ancient methods of debt management, however, faded away over time. (For further exciting features of sovereign defaults, see Vidovics-Dancs (2014).) If debt neither can be repaid nor served in some other way, a bank is needed who willingly grants a new loan upon the maturity of the old one.

The financial affairs of our imagined world gave new ideas to the experts of the crown, which eventually led to the profound transformation of the monetary system. The state convinced some wealthy businessmen to found a new bank (henceforth: the central bank) and lend the raised capital to the state. In exchange, the state endowed this new bank with the right to issue legal tender in the form of banknotes. Banknotes are the liabilities of the central bank.

The significance of this change is worth to emphasise. Before the founding of the central bank, gold coins and promissory notes issued by different banks were circulating in the economy, but only the coins were legal tender. The acceptance of the notes issued by any bank depended on trust, i.e. on the belief that the bank is ready and able to convert them into coins. The acceptance of the central bank's banknotes is, however, forced by the law, which makes these notes and the coins equivalent. Banknotes are called **fiat money** because they *do not have intrinsic value* and yet *must be accepted* by the rules of the state. Fiat money can be distinguished from *fiduciary money*, that does not have intrinsic value either, but its acceptance depends on trust and not on power (Mises, 1912).

Besides the power of the law, economic incentives were introduced to create demand for the new currency. First, the crown and the central bank promised to convert banknotes into gold coins on demand. Second, the state made it possible to pay taxes with banknotes. Two schools of thoughts are connected to these incentives: *Metallists* think that money is valuable as long as it has gold (or silver, or copper, etc.) content or it is convertible to gold at a fixed rate; *Chartallists* think that the power of the state gives value to the money: if it is not only possible but obligatory to pay taxes in banknotes, then it creates demand for the new currency (for details, see Bell, 2001).

The perceptive reader can observe the sentence "*I promise to pay the Bearer on Demand the sum of Ten shillings.*" on the English 10 shilling banknote (Figure 9). Once it meant the

mutual guarantee of the Queen / King and the Governor of the Bank of England to redeem this note at sight to 10 shillings worth of gold. The nature of this promise has changed over time: today it means that the State and the Central Bank guarantee to safeguard the purchasing power of money.

**FIGURE 9: THE ENGLISH 10 SHILLING BANKNOTE.\***



\* Source: [worldbanknotescoins.com](http://worldbanknotescoins.com)

The introduction of the new paper currency initiated significant changes within the banking system. Ordinary banks gradually substituted their gold coin reserves with banknotes issued by the central bank, which was rationalised by the convertibility of banknotes to gold coins. As economic agents (and banks as well) could redeem paper currency to gold at the central bank, it was enough for the banks to hold the central bank's banknotes as reserves. If costumers wanted to convert their promissory notes issued by some bank to gold, they could do it in two steps: first, they applied for redemption to the issuer of the promissory note, then they could convert the given banknotes to gold at the central bank.

For the recommendation of the central bank, members of the banking system made their costumers use checking accounts instead of promissory notes, thus promissory notes gradually vanished from circulation. A checking account is a liability of a bank that can be used for withdrawing cash (central bank notes in our case) or, with the help of a checkbook, for buying goods. In the latter case, the account holder gives a signed preprinted check to the seller of the good. Later, the seller can turn in the check to his own bank who deposits the amount written on the check on the seller's account.

**Example: checking accounts 1**

"A" has a checking account at bank "X", and "B" has a checking account at bank "Y". "B" buys goods from "A" for 13 shillings and pays with a check. "A" turns in the check to bank "X", who deposits 13 shillings on "A"'s account then contacts bank "Y". "Y" debits "B"'s account with 13 shillings and pays bank "X" in banknotes. See Figure 10 for accounting.

**FIGURE 10: SETTLING BUSINESS WITH CHECKING ACCOUNTS.**

A		B	
goods, -13		goods, +13	
checking account, +13		checking account, -13	
Bank X		Bank Y	
banknotes, -13	A's account, -13	banknotes, +13	B's account, +13

**Example: checking accounts 2**

Suppose that there are 5 banks in the economy, X1, X2, X3, X4, and X5. By the end of some business day, the banks have collected checks from their costumers according to the table below (Table 1).

**TABLE 1: BILATERAL GROSS POSITIONS OF BANKS BEFORE SETTLEMENT.**

	X1	X2	X3	X4	X5
X1	3 912	6 021	4 700	1 976	5 728
X2	5 110	6 230	2 918	7 504	1 635
X3	1 132	907	8 702	6 482	7 203
X4	3 374	8 320	439	3 800	854
X5	8 827	2 835	3 325	5 585	1 677

Checks written by the customers of a given bank are in the rows of the table, while those given to them are in the columns. The amounts in the diagonal are checks written by and given to costumers of the same bank, while other cells are containing checks written by and given to costumers of two different banks. The amount 1,976 in the fourth cell of the first row thus means that at the end of the day, bank X1 is due to pay 1,976 shillings in banknotes to X4 (or X4 is due from X1 1,976 shillings). The sum of all the numbers in the table is the total nominal value of the real economic transactions settled by checks. This amount is 109,196 shillings. Instead of paying the gross amounts, the banks first net out their dues and pay according to their net positions (see Table 2).

The due to bank X1 (22,355 shillings) is the sum of the first column of Table 1, the due from X1 (22,337 shillings) is the sum of the first row. X1's net position is 18 shillings, which is a claim on other banks. X3's net position is -4,342 shillings, which is a debt payable to other banks. The sum of the net positions is zero, as someone's revenue is always someone else's expenditure. The sum of net cash flows is 9,494 shillings which is less by a factor of 11 than the amount of gross cash flows (109,196) would have been. (9,494 is the absolute value of debts [4,342+5,152] or claims [18+916+8,560].)