Money:
In gold we trust

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Money: In gold we trust (paperback)
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The subtitle, "In gold we trust" is from Incrementum Liechtenstein. And is a parody on the text "In God we trust" found on the American dollar.

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Chapter 1

Introduction

> ”So you think that money is the root of all evil. Have you ever asked what is the root of all money?”
>
> – Ayn Rand

To start right off, the why of this book. Money. I have personally never much cared about it. I lived and grew up in a society where there was wealth for nearly everybody. The Netherlands. To give you an example, I had two brothers that studied at the same time with me at a university (*the* university, namely University of Amsterdam). That all without borrowing any money, but paid by the salary of my father, a teacher at a secondary school. In 2016 that would not be possible.

Why not? Let's face it, why not?! Average productivity has increased, hasn't it? Moreover, an ever larger part of the population has employment (aging of society is primarily a problem of the future; at this moment we 'dechildrenize', less children and more and more people actually working). Why, then, have these things become unaffordable?

In the meantime I have moved to Portugal. Later more about that. Portugal is in deep trouble and the rhetoric of the northern countries is that the Portuguese themselves are to blame. Classical words such as ”... have lived beyond their means” are often uttered.

"Have made a mess of things", "Borrowed too much". "Have to suffer now". All this rhetoric is nonsense. From experience I know that the Portuguese work harder than the northern people and are not less educated nor generally more stupid. That they are paid less is therefore remarkable and unfair. It is not for nothing that an exodus to northern countries takes place (1% of the population per year). It is not for altruistic reasons, to help out the suffering North. No, it is from self interest; receive more money for less work. Economical refugees, fortune seekers.

However, the fact remains that Portugal is in trouble. And, since my salary is paid by the Portuguese government, I directly feel these problems. Draconian measures are taken. Named 'Austerity', (*Austeridade*, or better to say thrift). And if you suddenly see your income drop, with an outlook for more drops in the future, and moreover your job security is gone, then you start thinking about things. That is why I asked myself these two questions and started doing research – after all, that is my profession, researcher; for me Physics (my primary research area) is the same as Economy; everything can be studied and I am not one to be confined inside a box of 'my area'. The two starting questions were

- Why are we in trouble?
- What will be the result of the measures of Austerity?

I will immediately give the answers to these questions here: We are in trouble because of our financial system, principally the fractional reserve banking (FRB) and the result will be an inevitable bankruptcy of the weakest elements in the system. For instance Greece of the Euro Group. (In case a country isolates itself by having its own currency, then that system will go bankrupt, even if it is now the strongest country). Austerity will not make us avoid this fate. If bankruptcy is avoided the system will wind up in war or any other form of capital destruction.

Probably Austerity is not meant to stave off bankruptcies, because they are inevitable, but instead to make a 'soft landing'. Without entering a political discussion (this book is not about politics), this indicates that the politics are not aimed at protecting the interests of the electorate, but rather the interests of 'the system', consider-

ing the fact that it is the system that most benefits from saving the structures. Politicians are convinced with an argument "If it is good for the capital, it is good for the citizens". That while one could easily invert this sentence, "If it is good for the citizens, it is good for the capital", as many economists have said before. This is a form of 'without consumption no production and no profit and survivability of the capital'. That this is true can be seen in the statements of many politicians that encourage us to consume in order to save the economy. An ailing economy is blamed on the citizens that forgot to do their civil duty of consumption.

Here and there some remarks will be made about the political-economical entwinement. (The examples are mostly taken from Dutch society because the author is Dutch and the book is a translation of a Dutch version). Once again, this is not a political-analytical work. I haven't the faintest clue about what the motivation is of the politicians. Self interest? Hunger for power? Money? Lobbying (being fooled by lobbyists of financial institutes)? Being bribed or blackmailed? Could all be true and I would not be surprised. But it is all irrelevant. What is stated here is about the mathematical laws of the system.

It is then clear that there is no big conspiracy. No Bilderberg, Rothschild or Rockefeller family that pulls the strings behind the scenes. That is because a conspiracy is not needed to explain the observed phenomena. And, as my great inspiration William of Ockham already said long time ago, the best model is that one that has least ingredients. In other words, a conspiracy is not needed to explain things therefore there *is* no conspiracy.

Everybody only looks to the future and never to the past, while looking at the past can be very informative and helpful indeed. As an example, at the introduction of the euro we were convinced by Mr. Duisenberg, thence president of the European Central Bank. A question of a journalist, "What if Greece will not stick to the rules?", he answered, "But, of course, we will not allow Greece to not stick to the rules". Meanwhile, in an office of Goldman Sachs in New York (led by later prime minister Monti) a department was busy covering up the Greek deficit*. Did Mr. Duisenberg not know this (and is he

*Deficit: difference between state spending and state income. Debt is accumu-

incompetent), or did he know it (and is he a liar)? Because I do not know the motivation of the politicians I do not give them the benefit of the doubt. Which of these scenario's is worse? Liar, I think. Duisenberg should convince us that he did not know what was going on, for instance by paying back his salary, because he seems to have been overpaid, considering the results.

In any case, the blame is not on the euro. If each country had maintained its own currency, each country would have gone bankrupt. That is all the result of how the system works.

That became clear when analyzing the system and reading up on classics. And at every step people around me said, "That cannot be true", or, "No, it's not like that, that would be scandalous". Often they gave counter arguments that mounted to nothing more than a firm belief in the fairness and correctness of the system. In extreme cases I did not manage to convince people of the facts and they remained denying them and insisting on their own reality. People prefer to believe in fairness of the system, because facing the truth would make them unhappy. Ignorance is bliss.

I did realize at those times that most people have no inkling about the concept of money (or, alternatively, I didn't). What is it? Where does it come from? What's behind it? Even people that had lessons of Economy at school still have a wrong idea about money. That is mostly caused by the fact that the concept of money is not taught at schools. Believe it or not, in my class of 1984 the subject money was not in the curriculum. We were too busy talking about the social-economic triangle and things like that, how political-economical discussions take place. Or we focused on the models of Keynes. That is remarkable. We all work for money, but don't know what it is! I would even go so far as to call it scandalous. Lectures in Economy should start with the concept of money. I can recommend the online lectures of Khanacademy.

Intermezzo: Money knowledge puzzle:

On a Saturday afternoon a tourist walks into a bicycle shop in a village. The man wants to buy a bicycle of

lated deficit.

300 euro. However, he only has Traveler's Cheques of 500 euro. Banks are closed until Monday and the seller has no 200 euro cash back. No problem. He pops in to his neighbor's shop, the owner of a snack bar. The neighbor exchanges the check for 5 notes of 100 euro. The bike seller walks back to his shop and gives the tourist 200 euro. He disappears on his new bike. Next Monday the snack bar owner tries to convert his check, but he is informed that the check is counterfeit. He walks angrily to his neighbor and demands his money back, which he got.
The question is now: who lost how much money? If you know the answer to this question you have more than enough knowledge to easily read through this entire book. The level will not get much higher.

The tourist got a bike for free, worth 300 euro, plus 200 euro in cash. The snack bar owner and bank played neutral. The bike shop owner lost 200 euro and a bike.

The result is that people are often misled by micro-economic ideas. Basic housekeeping counting. Gut feelings. Like "You cannot endlessly spend more money than you earn". That seems a very reasonable statement and seemingly does not need an explanation. Yet, it is untrue. That is a nice starting point of this book.

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A household, or a small company indeed cannot indefinitely spend more than it earns. However, that is not the case for the entire economy. In fact, it is easily proved mathematically. If the economy – the gross domestic product (GDP)* – grows with 4% per year, and government has a structural deficit of of 3%, the state debt will have a constant ratio to the GDP. It can easily be calculated that the final debt (D) relatively (!) to the income (I) is given by

$$\frac{D}{I} = \frac{d}{g}, \tag{1}$$

*Also often used is gross national product, GNP. The difference between them is that GDP is based on location and GNP on ownership. If a company has a seat in Panama, but produces in England, the income counts to the GDP of England and to the GNP of Panama. In the book GDP will be used.

in which d and g signify deficit and economical growth, respectively. (See Appendix A for a derivation of this equation).

This demonstrates that the condition to have a constant relative debt implies that the debt is constant relative to income and thus budget. In other words, if the deficit in percentage is constant, we wind up in a steady-state situation in which everything is relatively constant. As an example, at an annual growth of 4% and a deficit of 3%, the debt will be 75% of the income. Eternally borrowing money is indeed possible in a macroeconomical (state budget)* analysis, there where it is an absolute taboo in a microeconomical (family budget) analysis. This thus immediately debunks a myth that goes around in society and that politicians use at every opportunity when they want to reduce our purchasing power. For these politicians I use the famous words of Arnold Schwarzenegger: "Talk to the hand!"

There is therefore a logical and mathematical relation between state debt and state deficit. If the economy stalls, or grows little, state debt will rapidly rise, even if the budget is in principle in order. On the other side, the intuitively correct idea that a large deficit leads to economical downturn cannot be proved mathematically and is in the realm of micro-economic gut feelings and therefore often used by politicians that play the sentiments in society where people that have no knowledge on the subject are being falsely informed by those parties involved that do have interests in the discussion (a.k.a. lobbyists). The real insiders know that our economical system has as an unavoidable condition that it must grow. If not, then the entire system will collapse like a soufflé.

Likewise, it is a myth that "the economy has to grow faster than the debt, $g > d$, to make the debt sustainable". The above equation demonstrates that a deficit that is larger than the economical growth results in a debt that is more than 100% of the income but sustainable nonetheless. Only when the economy stops growing do we have a problem, because the debt relative to the income becomes infinite, as the above equation shows.

Researchers Reinhart and Rogoff had established that there exists a magical limit of around 90% (in this case relative to the GDP).

*Microeconomics studies the individual agents/actors with respect to limited resources. Macroeconomics studies the aggregate of all agents together.

Countries that have more debt have statistically proven more problems with their economy, namely a stagnation. The solution is then evident: make sure no country enters this danger zone. That is the political culture in Europe, where measures to avoid such a debt are blindly implemented. When Portuguese debt rose above the 90% limit, immediately intervention was started. Austerity was implemented. However, the above equation does not show what is cause and what is effect; it is merely an equation in which causality is not included. Is slow growth g the result of large debt D/I, or is the large debt the result of slow growth? Nobel Prize winner Paul Krugman claims the latter. That would imply that intervening in the debt will have no effect and can be counterproductive because stimulation of the economy (injection of money) is absent. In 2015 the national debt of Portugal had risen to 136% of the GDP and reality has proven Krugman correct. In the meantime, Iceland, that also suffered a severe (financial) crisis, is already out of trouble.

More importantly, many countries show a shrinking economy (or 'negative growth'). Shrinking economy (g negative) is possible if the debt is negative, meaning that credit has been built up over the years. This situation of shrinking and credit, or 'eating into one's reserves', means that stocks are being consumed without replenishing them. It is clear that that is not sustainable. If the economy is shrinking *and* there is debt, than money has to be paid pack, a budget surplus is needed (d positive). This is impossible, because there is more debt in the world than money, see the chapter on fractional reserve banking (FRB, Chapter 7).

Another solution would be a negative income, meaning that the state only spends money. Money it doesn't have; it only has debt. Only a fool loans money to such an entity. In other words, it is a bankruptcy, because the state cannot do the spending of money, because it doesn't have it and nobody loans it.

Growth is therefore absolutely essential and should be achieved at all cost! Our society is therefore one big pyramid game, where we have to borrow money indefinitely – paying the cost of living of today with (promises of) income of tomorrow, which, moreover, have to be bigger than those of today. In Chapter 3 it will be explained that that is not possible because of natural limitations of our planet. Therefore, our system is not sustainable and goes kaput. Full stop. Without knowing

the exact road we will take – something that moreover depends on the whims of the politicians – it is already clear here that it'll go wrong. The first person that also appreciated this, the problem of the unlimited exponential growth, is Thomas Robert Malthus (1766-1834), who in his model, known as The Malthusian Catastrophe, envisioned that populations sooner or later would be struck by hunger and sickness.

Two centuries later and his models have not become reality. Or did they? Devastating world wars have ravaged the world and set back the system in time by decimating the populations and the infrastructures (capital) in such a way that we might speak of only a delay of the inevitable conclusions foreseen by Malthus.

It boils down basically to this:

1. The economy has to grow. If not, disaster starts
2. Economy is energy consumption

The first one is clear, as shown here. The second one maybe less obvious, but it is a law of Thermodynamics (see for instance the work of Timothy Garrett at `declineoftheempire.com`, "Wealth And Energy Consumption Are Inseparable", Jan. 2012). It will also be discussed at the end of the book (p. 194), but we can take it as an assumption here. This immediately bypasses all environmentalists (who instantly enter a phase of denial). There are then basically two outcomes:

1. The economy perishes
2. The world perishes (and the economy with it)

This book tries to find an answer to this. It is focused on the concept of money. But money and economy are inseparable and therefore we need also to introduce some economical concepts. We'll start off with a link between the two. A chapter on the origins of economy and money.

Intermezzo: Money knowledge puzzle 2:

A New York stock-trading company MoneyForNothing, trading shares listed on the Crash Daq and Down Jonas indexes, one day made 50% loss and the next day 50% profit. In total, did the company make a loss,

had a profit, or was breaking even?

The order of loss/profit does not matter. $0.5 \times 1.5 = 1.5 \times 0.5 = 0.75$; 25% loss.

Chapter 2

Economy and money

"If you have a gun, you can rob a bank, but if you have a bank, you can rob everyone."

– Bill Maher

In a remote region of Europe lies a small village. The village is breathtakingly beautiful. With amazing views and beautiful scenery. However, the village suffers from enormous problems, Financial problems. Everybody has a debt with everybody and therefore cannot get any more loan from the local bank. The economy has therefore stalled. The baker sells no bread to the milkman, because the latter has no money nor credibility for a loan. Because of this, the baker can no longer buy the grain from the miller. Etc.

One day a tourist visits the village. He books a room in the local hotel and decides to pay in advance the 100 euro. The innkeeper immediately runs to the baker and pays his debt and, uses the opportunity to buy some bread for breakfast. The baker, in his turn, runs to the miller and pays off his debt accumulated for the grain received over time. The miller goes to the

milkman and pays for the milk received. The milkman to the teacher. The teacher to the mason. And, the mason to the hotel, 100 euro. Everybody manages to pay off his debt.

Then the tourist gets a message from home that an emergency has occurred and he is recalled back home. He cancels his room and the innkeeper gives back his 100 euro – curiously, it is the same note he had given the baker in the morning. At the end, no money was added to the system, but the economy is kicking off again.

Economy is production, distribution, trade and consumption of scarce goods and services. That money plays an important role in this is clear, namely the part of trade. In principle it is possible to do trade without money, but money makes it a lot easier. Without money goods would have to be traded by bartering, direct exchange of goods. Imagine we have a farmer that makes grain and a baker that bakes bread. The baker needs grain and the farmer needs bread. They meet each other daily, exchange these with each other by everyday negotiating and establishing the exchange ratio. It can namely be so that the harvest of grain was disappointing and production of bread remarkably high (don't ask me how, but it can happen). The supply of these two goods can vary from day to day.

This defines an exchange of goods. Note that in an exchange always both parties involved are happy. If not, the exchange would not take place. Let's highlight this, for future reference:

In a trade exchange on the free market, both parties are happy!

Even in the theoretical extreme case of a robbery – "The money or your life!" – that makes the robbed person seemingly unhappy, this robbed one is any way very happy with his exchange. He* managed to bargain

*The words 'he' and 'his' are used throughout this book as a linguistic style, rather than limiting the possibility of the persons being described as exclusively male.

his life for some dimes. He could have chosen to not conclude the exchange, but he actively decided to do so. Other forms of robbery, in which the robbed has no influence on the process, for instance because he is not present, are not an exchange, but rather plain theft. In an exchange in a free-market economy both parties are always satisfied. Full stop.

As mentioned above, under normal circumstances the exchange ratio will be determined by the scarcity of the products. That information can, by the way, be limited. This way the OPEC (Oil-Producing and Exporting Countries) had managed to create the illusion of scarcity of oil. Notions like 'peak oil' have been invented by them. Namely that there are reserves of oil to last us about 30 years. An example is the Report of the Club of Rome (*Limits to Growth*) that wrote in 1970 that many resources would be depleted in the near future and for oil it was predicted to occur in 1999. Remarkable, since in 1999 oil did not finish but at that time there were reserves for ... 30 years. In 2016 there are reserves for ... 30 years and this is claimed with the same insistence as was done by the Club of Rome in 1970. Oil is so abundant that, where a peak in oil production was predicted and associated astronomical rise in prices, the oil price is factually dropping rapidly. Without drop in demand, it can only be a rise in (apparent) supply and (apparent) reduced scarcity. The result of the illusion of scarcity, as is wont in a free market governed by supply and demand, is that the price is determined by the *apparent* scarcity rather than the scarcity itself.

Likewise, a real scarcity can also be created. In 2014, the European Union (EU) destroyed tomatoes when, due to an embargo on Russia, there was a risk of surplus of tomatoes caused by a lack of demand from the east. Upon closer look, the EU artificially increased the demand by acting as a buyer of products and subsequently destroying them. This to increase demand on the market and creating an artificial scarcity in order to guarantee a price to not let the producers go bankrupt.

In a trade the prices (exchange ratios) on the market are variable and determined by supply and demand and thus scarcity and needs. That is basically the economy as we all imagine it. Note that exchanges that are not taking place on the free market are not part of the economy because they do not exist. What is not observed is not existing, a rather scientific view on a seemingly non-scientific subject

of the economy. Later we'll come back to this and we'll take a closer look on the phenomenon of observability. Now we continue with the free and open market.

Even if we have only two individuals entering the market – the equivalent of a proto-economy of prehistoric man – even then we can expect complications. It can namely be so that the goods of one person are not available at the same time as the goods of the other person. Think again about the grain. It is harvested once per year, that while the farmer needs bread all through the year. "Hey, neighbor, can you give me a bread? In summer I'll give you a bag of grain in return". Lo and behold, we have defined the first loan. The grain farmer makes a promise to deliver, at a certain time in the future, a certain product.

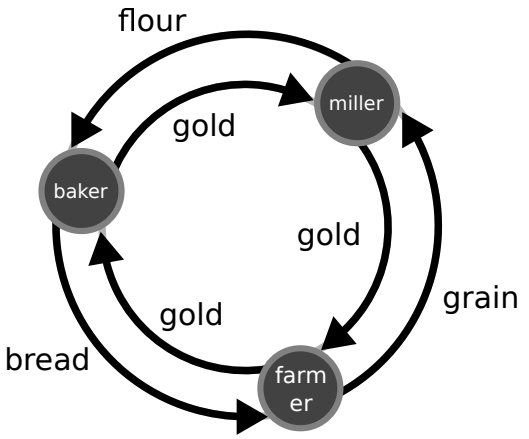
This kind of promises can be registered and will generally be registered, because the receivers of the initial products occasionally have a bad memory, for sure a worse memory than the givers of the products.

These promises can now, if they are transferable, serve as means of payment. That is very convenient if a third party enters the market and that does not need the products found there. Visualize a miller. He needs grain from the grain farmer and would be able to pay with flour, but that is not what the farmer needs. The baker would like to have the flour of the miller, but can only pay with bread, something the miller does not need. How to solve this?

The solution is that we express all exchange ratios in promises. And these promises are transferable. In the old days in Mesopotamia this used to be barley. A certain amount of barley was a shekel and that became the currency, the means of payment. Either directly a physical shekel of barley, or a promise thereof. This way the miller could buy grain for promises of barley – shekels – and sell his flour for shekels. The concept of money was born.

> Money is every product that can be used to pay for goods and services.

At a certain moment – it is not exactly clear when – a less perishable good was used instead of barley. For instance gold. Or maybe that certain product served as a means to keep an administration of promises. It does not matter so much for the narrative how and when it happened. On the other hand, it is important that the good itself



Picture 1: Trade of goods. A flow of goods goes around and a flow of money (a generally accepted means of payment) goes in the opposite direction

was also available on the market. It is therefore not possible to determine when and how shekels of barley were replaced by pieces of gold or even gold coins. Fact is that over time a system evolved in which payment for goods was done by a common 'unit', money.

See Picture 1. There existed two flows of goods. The first one is a flow of 'normal' goods, for instance grain, flour and bread. The second flow is those of 'payment goods', for instance shekels or gold.

Some conditions can be set for this currency that make it handy:

- Everybody trusts that it can be converted into goods when needed.
- Everybody accepts it. This implies and is the result of the property above.
- The good is scarce, so that it has a high trade value per kilo. Useful, to avoid carrying around too much weight and volume.
- It is non-perishable. Nobody likes to see his purchasing power rotting away.

In some parts of the world seashells were used for this currency purpose. I presume it was done far away from a beach, otherwise the value per kilo would be quite low, considering the large supply. Money has after all the same role in the bartering, it is a good that is being exchanged on the market and thus follows the laws of supply and demand. The only difference is that the receiver of the money expects that he can later exchange it for something else, this is contrast with normal goods that are processed into new goods or consumed. To make it more confusing, note that also the non-money goods can be bought and sold in the same state and by the same person. These people we call 'traders', while the people processing the goods into new goods are called 'producers'.

Note that the money itself does not need to be of 'utility' – usage utility – but only trade utility. This also applies to other goods, but in particular to money. To make the narrative even more vague, sometimes the currency did obtain also usage utility, for instance in the form of jewelry. Perhaps to give the owner prestige or status.

An important aspect of money is thus the scarcity of the product. It is rather inconvenient to have to pay a bread with three wheelbarrows of sand. It is all about value of exchange per kilo and this is mainly determined by scarcity. This way gold – precious metals in general – grew rapidly into a standard means of payment. The first precious-metal money in the form of a recognizable coin – the Lydian Lion – was minted in Lydia, in modern day Turkey. "The Lydian invention of money was introduced into Europe via Aegina at about 625 B.C., greatly stimulating trade, bringing in its wake great riches for some and indebtedness and slavery for others".*

For a long time Spain used silver as currency. However, when in the Americas large quantities of silver were found and when silver bullion was sent back home, the large supply of silver inundated the market and it lost all its value. This caused what was probably the first documented case of hyperinflation. People lost their trust in silver since it seemed more abundant than sand.

This way gold remained in most regions the preferred currency because it nearly perfectly met all criteria of a means of payment. The amount of gold was nearly constant and not much was delved anymore

*see: `educationalphilosophy.blogspot.pt`.

(until 1849 when in the hinterlands of San Fransisco large quantities of gold were found. To commemorate the reception of the enormous amount of gold diggers, half a century later the newly constructed bridge in the San Fransisco Bay was baptized Golden Gate Bridge).

In the meantime also coins were minted of the gold, silver and copper. The latter being obviously of lesser value, considering the relative abundance of the metal. A coin served as a means to guarantee the value (weight). A recognizable image of the coin enforced this guarantee. Moreover, already at that time, lesser value coins were minted to bypass the depraving behavior of bankers. Banking was already seen at a very early stage as something deplorable. King Midas, for example, declared per decree that copper coins bearing his stamp had the same exchange value as the same coin in gold. That because banks were hoarding all the gold and the economy was slumping. This is an effect of banking, as we will see in a moment. What is worth mentioning at this point is that this was the first case of governmental interfering in the financial system.

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Let us continue our narrative assuming that the means of payment is gold and only gold. That makes our story easier to tell.

We now have a system in which gold is the unique form of payment for goods and that is accepted by everybody. That is then also where danger arises. Considering the fact that the seller of goods – the receiver of the gold – does not ask, nor care, where the gold came from – basically he couldn't care less, as long as the gold was going to be accepted later by others – the gold is effectively detached from the legal owner and its value is face value. It means that others can steal it and buy things with it as if it were their own gold. Theft of gold must have been rather common.

For this reason some people built strongrooms or hermitages where, for a small payment, the gold can be stored safely. The keeper of the strongroom or hermitage (not to be confused with a hermit, rather to the contrary, a man of esteem in the city as we will see), wrote in the books how much money was in the 'safe' and to whom it belonged.

If a client came to collect his money to use it in a trade, it was entered in the books of the safe keeper. It must often have happened that a client came to collect the gold and paid with it another client

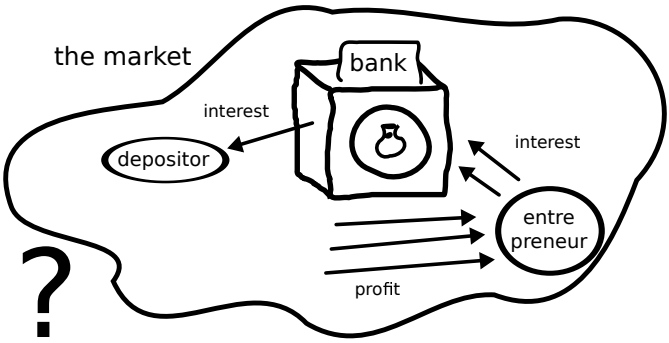
of the same safe storage that subsequently came to deposit the exact same gold. The safe keeper must have found it amusing. Moreover, traders must also have been aware that walking the streets with the gold was rather tedious, if not quite risky. An obvious solution must have been that traders concluded their business *in* the safe. Or better yet, in the office next to or above the vault. The guard must have noticed that customers in many cases never came to collect their gold, or even came to check if it was still there.

At the same time it must have happened that the guard of the safe received requests to lend gold. Perhaps customers who were temporarily short of money, but in themselves were quite reliable. Perhaps initially family members or so. But also successful (and less successful) entrepreneurs. He got a brilliant idea. Since the owners of the gold never came to pick up their own gold or even wanted to see it, there's the motto "what is not known will not hurt". There's no problem to lend the gold temporarily. "Before they notice it, the gold will be back in the vault."

Nothing is for free. The guard was willing to follow this scheme if there was something in it or him. There was of course a considerable risk. Maybe the entrepreneur would never show up again putting the guard in deep trouble. What if the owner of the gold showed up the next day? Maybe because he got an air of the scheme (with his gold) and demanded to be reassured that his gold was still there. The guard wanted to be compensated for this risk. The more risk, the higher the compensation.

In the murky back rooms of the building some negotiation of the premium to pay for borrowing the money was probably taking place. Lending of the money that was not owned by the safe keeper.

The real owners of the gold perhaps got air of the scheme, perhaps because they one day saw a coin which they recognized and imagined to be safe in the vault. The commotion that would have resulted is understandable. So, maybe the owners of the gold also demanded their share of the spoils. The safe-guard paid a certain premium to the gold owners – depending on how often they wanted to see it, or not at all – and received an (obviously higher) premium of the gold-borrowing entrepreneur. Everybody happy. The gold owners received a bonus – 'interest' – on their gold deposits. The safe guard received a premium on the loan (higher than that paid to the gold owner) and



Picture 2: Gold is brought to a bank by a depositor that wants a premium in the form of interest. That gold is being lend by the bank, that wants a higher premium, to an entrepreneur that wants to make profit enough to pay the paid premium plus a bonus. Because the amount of gold in the world is finite – gold is thus a zero-sum game – one of the three, for sure, will not manage to obtain his goal

the entrepreneur got to use the gold for doing lucrative business that produced more gold than he had to pay to the safe keeper. All's well that ends well.

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The negotiating premiums on borrowing and lending money was soon the main activity of the guard. It now took place in a stately office, also to impress the market and feign a reliability to the gold owners so that less premium would have to be paid and the profit margin would go up.

Lo and behold, banking was born. The guard – let's call him banker from now on (although the word banker comes from much later, namely from the Italian word 'table' on which Jews in Ghetto Vecchio near Venice conducted their business).

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The average reader will think that the narrative stops here. However, if this were the entire description of banking, not much would be wrong with it. The involved parties all take risks that are rewarded. From the risk that the lucrative business of the entrepreneur

goes wrong, to the risk the banker will never see back the gold, to the risk the owner of the gold will find the bank doors closed (the bank bankrupt), everybody takes a risk. And this risk is rewarded.

However, an attentive reader with some idea of mathematics will already understand that there is something fishy here; an uneasy feeling will assail him that something is not right. It actually comes down to this: how can *all* parties involved be rewarded?! The quantity of gold in the world is constant, so this whole thing is what is called a zero-sum game. In other words, if someone wins gold, then there must be someone else who loses gold. There is no other way! Someone should not be able to fulfill their promises. (See Picture 2).

With this cliff hanger we finish this chapter. With a promise that it will get much worse. Those of you who cannot wait can skip to the chapter on Fractional Reserve Banking. First we continue with a look on economy. This has its own problems that can also be understood with simple mathematics. Don't be afraid, it does not go beyond simple linear equations. We'll keep it really simple.

Starting with the problem of production and productivity.

Chapter 3

Production and productivity

> ”My goal is no longer to get more done, but rather to have less to do.”
>
> – Francine Jay

The magic word of the 21st century is '*sustainable growth*' or '*sustainable economy*'. That the first one is a contradiction in terms is immediately evident; the economy cannot and grow indefinitely and at the same time be sustainable for the world (the planet). To put it in a simple equation: the total production (and exploitation of the planet) is per definition equal to the number of people that participate in the production process (better known as 'laborers') multiplied by their average individual productivity,

$$P = N \times p. \tag{2}$$

This is a commonplace. (By the way, we can also make the definition the inverse of the above: The total productivity of an average laborer is per definition the total production divided by the number of people, $p = P/N$, or – maybe stranger – the number of people is per definition equal to the total production divided by the average productivity). If

we have more people (N rises), for instance because of population growth or by reduced unemployment, at equal productivity, we'll produce more. Likewise, if the average laborer produces more (p rises) the total production also rises. In both cases the total production P rises. Solid reasoning. Clear as water.

In spite of its simplicity, this equation immediately demonstrates the problem. On the one hand we demand in our modern economy that everybody has a job (thus N in principle equal to the population). In free liberalism everybody has to take care of himself. Somebody that does not work and does not earn an income loses the right to consumption and should therefore die. This is the extreme form of liberalism, something that is not easily found in society, not in history and not in the 21st century. In earlier days, a (small) part of society ('aristocracy') did not have to do anything and still had rights to consumption. Also, in modern society children are not forced to work. Also the elderly are let off the hook. To a certain extent. Napoleon introduced the concept of a state pension at 65 years, that because the average (male) state worker lived 66 years and Napoleon wanted to reward his loyal employees with a free year at the end of their lives. That's how the legend goes. In 2016 this one year has become some 15 years. (Unsustainable? Not really). We live ever longer.

In other words, not everybody has to work, but in recent years the tendency is to go in that direction. A direction in which people should start to work at an earlier age and continue as long as possible. A tendency to make N equal to the entire population. Everybody must have a job! Note for instance that our society now basically requires women to participate in the work force. It is being sold to women as 'emancipation', but instead of allowing men to be emancipated to work less and take care of the family, the woman was forced into emancipation to enter the labor market. The idea – illusion – is that women are *allowed* to work, but the fact is that they are *forced* to work. How else can a couple maintain a family in 2016? Look at the prices of houses and housing in general. A standard flat has become unaffordable for a single-income household. Both have to have a job. This immediately doubled N.

By the way, if unexpectedly not everybody has a job, this is not a big problem for the system. Also people that enter the labor market help the system, because they increase the supply of work, thereby

lowering the salary of others that do manage to get a job. Also labor is offered at the market through a method of supply and demand and the excess supply lowers the price of labor, thereby increasing the yield on investments. Pressure has to be put to ever increase N.

This also has a marked effect on education. Youths are nowadays only allowed to study if this is an investment. A university degree is no longer a consumption product (knowledge that increases the quality of life), but has become capital. The acquisition of knowledge by a person is only meant as an investment. If the studying is not profitable, then people should be forced immediately into the labor market. That is called free liberalism. N has to be as high as possible.

On the other hand, since about 1980, politicians on the liberal spectrum of politics have reshaped society to increase productivity. All universities have been remodeled into technical high schools. On the other side, all technical high schools have been relabeled universities, probably because 'university' sounds sexier and anyway, the level of education in high schools was as good as universities – if not better in many cases.

However, there is a substantial difference between a technical high school and a university. Where the latter teaches knowledge, the former educates people into highly-skilled workers. So-called engineers that regulate production, steer machines and design things, including new machines. Moreover, they innovate the products and the production process. On the drawing board they design things that make production more efficient. These engineers thus make p rise in two ways. First, because they design new ways of production and new products and moreover, they also become more efficient themselves by their education. (He who has learned to work with a computer is more efficient than he who uses pen and paper).

The technical high schools thus have a clear goal – factually the *only* goal – to increase productivity. The European Union puts all effort on this single card. They call it in Brussels a 'knowledge-based economy'. Namely, by always being intellectually one step ahead of competition the industrial battle can be won. This way we have basically outsourced any 'stupid work' to low-wage countries like where mostly unskilled workers live (as of yet). The reasoning implies that who educates his own personnel, automatically becomes a high-wage country. The think-industry versus the make-industry.

This way we are prepared for the future because it is not difficult to imagine that all unskilled labor will be replaced by machines. Nowadays cars are being made by the press of a button. And there we immediately see the problem. If everybody (N) is required to have a job to have a right to consumption of the goods being made and the productivity (p) reaches heights such that a single worker can make twenty thousand cars per day, then we have a problem.

Namely, what happens with the cars? According to Jean-Baptiste Say (French economist, 1767-1832) every product creates its own demand. In other words, the price on the free market shall drop until everything will be bought and consumed. (The alternative that means of production are used to make more means of production – capital – will be treated in a later chapter. Here we temporarily assume that all production consists of consumption goods). In other words, consumption is equal to production,

$$C = P = N \times p. \tag{3}$$

We again recognize a simple commonplace that puts us in a difficult position. If every worker produces twenty thousand cars, then every worker should consume twenty thousand cars per day. And everything our society does, forcing everybody into having a job and betting on a knowledge-based economy, will only make things worse. At this moment we allegedly need four planets for our manic consumption. Since we do not allow for a reduced work force – nay, pensions are increasingly called 'unavoidable', likewise education; we need to work at an earlier age – and continue to invest in productivity increasing (knowledge-based economy), it will only get worse. Next decade eight planets. Then sixteen. Etc. That is exactly the opposite of a sustainable economy. It is an accelerated exhaustion of our planet. (We can already remark here that the law of Say does not apply by mentioning that everything is becoming rapidly unaffordable; Apparently the prices do not drop fast enough).

We could all agree to behave nicely, for instance by consuming less and thus save the planet. However, that is not possible because the economy that is based on debt *must* grow, or the debt becomes unsustainable (see the introduction, Chapter 1). Besides, even if we organized the economy that is not based on debt and that does not lead to exhaustion of resources by means of strong agreements (in other words,

a centralized government) it will still go wrong. As Garrett Hardin in 1968 already wrote in his much referenced essay in Science "Tragedy of the Commons", there is no technical solution to the exhaustion of our planet. If everybody behaves nicely – like doves – the behavior of a hawk will be a winning gene and will start to proliferate in society, which puts us back to square one. A system cannot be based on 'nice behavior of its citizens'. I urge readers to read the article of Hardin which is highly recommendable. Moreover, as Hardin wrote, "If the great powers continue to look for solutions in the area of science and technology only, the result will be to worsen the situation".

At this point one may think that innovation consists of the development of sustainable production and products. In such a way that productivity will increase, but with less burden to the planet. More recycling of materials, etc. That seems at a first glance indeed to be true. However, economy is energy consumption and reduction of energy costs can thus only be sustainable in immediate increase in consumption. Moreover, to see where it will go wrong in the same way anyway, imagine that we indeed have a situation where we make twenty thousand cars per day per employee and that they are made by sustainable means, for instance 100% recycled. Because the number has to constantly increase, we should imagine that they eventually are delivered at our home with high speed (even relativistic speeds, so close to the speed of light that Einstein turns over in his grave) in a constant column entering my garage to be immediately dismantled and recycled there. An equal large column of trucks with recycled materials leaving my garage on their way back to the factory. That all because nobody is allowed to be without employment and the productivity of each employee is very large and all produced products *have* to be consumed.

All those who understood the above narrative, will also immediately understand its solution. Don't complain about low productivity (don't demand an ever growing efficiency of production) or don't demand that everybody has full-time employment all their life. In the current society, what the economy needs is not so much a large number of producers or a high productivity, nay, what is lacking at this moment is consumers. Without consumers, the current system is doomed. To save it, people should be allowed to consume without having right to this consumption on basis of their production, maybe even without

ever having worked for a living. Technically this is possible, a situation where people work because they like to and not because they have to. The liberal now immediately enters into a spasm. "The goofing off is incentivated like this! That cannot be the intention".

First of all, many Western countries are already full of goofer-offers. Exactly as described above. Most production is done outside the countries and still their populations have right to consumption. That is often ascribed to the intellectual superiority of the citizens of these countries over others; highly educated, or something like that. That, however, is a myth (probably fed by the ideology of Nietzsche where North-Europeans are *übermenschen*). The Northern European has right to a share of consumption, because in earlier times he used a substantial part of his production facilities to build up capital, means of production. This capital now supplies consumption rights to its owners (all of us in the Western rich world) without that we (seriously) have to work. We did a good job in setting up our society.

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In other words, the total production is not only that of the workers, but also of the capital and its associated productivity. Equation (2) should be replaced by

$$P = p_{\mathrm{n}} \times N + p_{\mathrm{k}} \times K. \tag{4}$$

The total production in the North is quite high because there is more capital (also in foreign hands). This way the average northerner produces quite a lot. The productivity per person (P/N) is astronomical, but when we look in detail we see it is mainly caused by a lot of capital (K) and its accompanying high productivity (p_{k}). Factually the human productivity (p_{n}) is rather close to zero. The northerner is standing aside and does not work much or has goofing-off jobs. Goofing off in this case means jobs that do not substantially contribute to the economy, but are somewhat important (at least in the eyes of the person doing the job). This way we have:

Politician
Banker
Scientist
Artist
Performer

Sportsman
Religious leader
Lawyer
Teacher

To name but a few. All professions that do not contribute directly to production, but at best are indirectly of importance; An artist will make people happier and a happy person produces more, etc. It is clear that there are ever more people with these kinds of jobs. Nothing wrong with that. We can recognize the Greek society. (That is, the ancient one, not the modern one). The highest degree of civilization on our planet ever. Due to the landscape – thousands of small islands with a large ratio of coast to land – the productivity was enormous. (Hunger? Fishing and five minutes later you have your meal. Pick a couple of grapes to accompany it and ready is Kostas). This way a lot of free time was available and there was space for a lot of useless professions. The excess of political and scientific philosophers is known, as well as a surplus of athletes and artists. Exactly the uselessness makes their profession beautiful. A lot of people think science should be useful – to serve the society – but that is a false idea. Useful research is called technology, where useless research is – or can be – science. Thus spoke Einstein: "People that think that science is to make the world a better place are utterly wrong".

Also lawyers belong on this list of (semi)useless professions that were already known in ancient times. One of the most famous is probably Socrates. He promised his pupils, lawyers-to-be, that they would win their first court case, if not they would get their tuition fees paid back in full. One pupil, Plato, the smart Alec that he was – probably caused by an excess of free time – put Socrates himself in court and demanded anyway to get his tuition fee back. A win-win situation; if he wins he gets his money back, if he loses he gets his money back. That is how the legend goes. (Anthony Kenny, in his book *Western Philosophy*, attributes this to Protagoras). Plato was mostly famous as founder of his philosophical school located in his house – named 'Academus'. We still often call schools 'academy' in honor of this.

Note also the presence of the banker in the list. Banking produces nothing, but at best makes the production of others more 'efficient' (or something like that). Remarkably enough, already in 2006 45% of the

economy of the United States consisted of banking (grown from 17% in 1987). Nearly half of the GDP was banking and financial services. Considering that banking does not produce anything, it implies that half of all production effectively is confiscated by bankers and financial experts that are heavy parasites in society. For every worker, there is a financial employee that profits from the work of the worker. That would be no problem, as long as the productivity of the worker at least doubled by the financial services of the banker. That seems, however, highly dubious.

Even more remarkable is that the entire financial sector is dominated by the central bank ('Fed', or Federal Reserve Bank). In a dialectical way, it means that – mind you very well – half of the largest 'free' economy is centrally led. That should give us food for thought about the feasibility of a free economy, if the freeest economy is not free.

Also the teacher belongs on the list of 'useless'. At best the teacher educates new engineers; trained workers and innovators. In earlier days a part of the teachers spent its time educating scientists, philosophers, politicians, etc. Those were the times of the universities, where people went, not to become good workers, but instead to enrich themselves with knowledge. Plato: "If you ask me what education is for, then my answer is simple; education makes people good and good people act noble". Or as Professor Richard Wolff says in his talks about economy: Universities are not meant to make workers efficient, but to make people wise and satisfied, just like hospitals are not meant to make workers productive, but to make people have a good life by making them healthy. Not so in 2016. Everything has a cost-profit analysis. The idea that an increased efficiency will lead to a happier society of highly-educated people has become in a dialectical way an idea that educating people serves to increase the efficiency. The means have become the goal. My question to everybody is, But what purpose does the increased efficiency serve? What is the goal of our society? Efficiency cannot be a goal, but only a means to a goal. Our governments seem to focus on a single facet, namely economical growth. Economical growth is indeed essential for our economy (especially in the light of money, see the chapter on GDP). But economical growth is only important if we want to have a system that grows as fast as possible, for instance in a situation of recovery after a devastating war,

when capital should be built up as fast as possible. This in close similarity with biological systems, where a run for resources occurs. Each biological system goes through phases: genesis, growth, rapid growth, stagnation, exhaustion, death, after which a new cycle starts. An example is swarms of locusts that destroy themselves by overexploitation of the resources. Our economical system very much resembles this; the economy periodically gets into saturation and destroys itself, often by intensive wars. This is the idea of Thomas Malthus, the British economist who saw for the first time that exponential systems unavoidably get into trouble.

Thus, our goal cannot just be economical growth. Our goal should be to strive for a Utopian society like those of the ancient Greek. (By the way, the word 'utopia' also comes from Plato, and meant "no place"). As many people as possible with useless but interesting jobs that give people satisfaction. This includes all professions on the list mentioned above, except banker, because these have a detrimental effect on society.

Intermezzo: Professions

Politician: Art of lying. Winning the discussion. The truth is what the people think is the truth. The discussion is a way to play out power.
Banker: The truth does not matter. What matters is how much money can be made. Truths can be bought if necessary.
Scientist: The relevance of the truth for society does not matter. What matters is the truth and nothing beyond it. Any discussion is to ascertain the truth. Any 'truth' should always be doubted.
Artist: Truth?
Religious leader: The truth is what we say is true. No discussion. Asking questions is allowed, doubting not. The leaders are in possession of the truth.
Lawyer: The goal is to win the discussion. If I win, my side of the story is per definition true.
Teacher: Teach the above things to a new generation. No discussion.

The Greek lived in a nearly Utopian society. One that we in Europe also pursue (or pursued until approximately 1980; when Reagan and Thatcher and local acolytes like J.-P. Balkenende in The Netherlands reintroduced liberalism, so called neoliberalism, or neocon for short). There is however, a problem on the horizon. Capital has a tendency to concentrate, and wind up at an ever smaller group of people. That this is unavoidable will be explained in the next chapter. Apart from this, this small group dominates the political landscape and increasingly there is talk about taking back consumption rights of non-producing people. This is unavoidable in a liberal political system. But, first of all, this makes the economy less sustainable (liberalism leads unavoidably to the destruction of our planet) and moreover, it leads us away from utopia.

To show that this is indeed the case, one has to remember that far into the 20th century there was no problem with education and pensions. Now these are suddenly considered problematic. The concept of demographic 'aging' was coined in politics. That is strange. The productivity has probably increased by a factor of a hundred or more. That means that with the same quality of life, instead of going one year on pension, we could be 100 years on pension. Or instead of a 40-hour labor week, we could have a twenty-four minute labor week. Remarkably, the tendency is exactly opposite. Even at the moment when the workforce is larger than ever (never before was such a large percentage of the population of an age between 18 and 65) the rhetoric is an unaffordable education (below 18 years) and pension (above 65 years). The age of retirement is rising and working week is extended. All rights acquired on the way to utopia have been squandered. It is not a matter of (un)affordability, but rather just a matter of political choices. Who has right to consumption of the produced goods. That is the result of the political economy, liberalism, to be more precise. One would expect that liberalism is orthogonal to a social state, and that in the former all consumption rights go to the ones that produce and in the latter these rights are confiscated and given away to the ones that do not produce. It is not that simple.

So, let's have a look where liberalism came from (Adam Smith) and after that why it leads to concentration of capital (Karl Marx). These are the two extremes of the econo-political spectrum, from extreme right (liberalism) to extreme left (Marxism).

Chapter 4

Adam Smith; Liberalism

> "It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest."
>
> – Adam Smith

The founder of economy as an object of study is Adam Smith (Picture 3). This philosopher from Scotland wrote his famous book *An Inquiry into the Nature and Causes of the Wealth of Nations*, or simply *Wealth of Nations* the moment the United States declared themselves independent. That is not a coincidence. In 2016 we can still notice this link, the US are one of the biggest advocates of the ideology of Smith. The influence of Smith was so large that many countries soon followed suit. But what is so remarkable about Smith? What did he say that others before him had not thought of yet? In fact he is the founder of liberalism. The free-market economy. The principle of *laissez-faire* (let them do).

Adam Smith lived in a time that was economically characterized as 'mercantilism'. This as a transition from feudalism that was an evolution of a society based on slavery. In short, in slavery the boss is owner of both the slave as well as his production. In feudalism the worker is free, but his production belongs to his boss. In mercantilism everybody is free to be what he wants to be, but tied to the instructions

Picture 3: Adam Smith (1723 - 1790)

of the big boss who more or less organizes everything. This is some kind of centralized economy. Smith didn't like it. Smith considered every limitation of freedom a brake on wealth of humans.

The ideas of Smith boil down to two things. First, Smith was a advocate of the free market. Don't obstruct anybody. If everybody acts in sheer self interest, then the entire system will also benefit. This idea is called 'the invisible hand'. While everybody is just taking care of optimizing their own lives, it looks as if there is a hand that governs the system and tells everybody what to do. If everybody acts in self interest, the entire system acts in the interest of all. As an example, a person might decide to become a shoemaker, because there are few of them – or better to say, he sees that a lot of money can be made in shoemakery, but that is of course caused by scarcity of shoemakers that drives up the price – without anybody telling him to become a shoemaker. The order to become a shoemaker seems to be coming from some kind of invisible hand. It makes sense. However, Adam Smith himself said that the interest of the individual *sometimes* results in the protection of the interests of the entire system. Modern liberals often distort this into an idea that a free market wherein everybody

can decide himself what to do *always* results in optimization of the common interests. Possibly because liberalism (the extreme form of capitalism) has proved to be very successful for countries where it was introduced. Many countries saw their production and wealth rise immediately when they introduced this economical system. The question remains, however, if the self interest always results in optimization of the whole.

The invisible hand is, as it were, the economical version of the laws of evolution as described by Darwin. If somewhere there is a vacuum for a species/company, this species/company will evolve. Where in nature it depends on arbitrariness and random fluctuations, in the economy there is steering by the species themselves. A person, namely, takes a *decision* to start a certain company and make a certain product. In nature nobody takes any decision. In both cases, however, there is no need for some master brain to design the system and make it spin. Nature finds its own way.

Intermezzo: Adam Smith on self interest:

"But the annual revenue of every society is always precisely equal to the exchangeable value of the whole annual produce of its industry, or rather is precisely the same thing with that exchangeable value. As every individual, therefore, endeavours as much as he can both to employ his capital in the support of domestic industry, and so to direct that industry that its produce may be of the greatest value; every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that

it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it. I have never known much good done by those who affected to trade for the public good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it." (Adam Smith, *Wealth of Nations*, IV.2.9)

Note also that the invisible hand says nothing about the morality of the people, nor of the end result. The people (and companies) act solely out of self interest, and if what they do is morally correct is not relevant. The question "Why they do that?", hinting at a morally condemnable behavior, is the same as "Why do dogs lick their balls?" The answer is, "Because they can". No discussion about if it is nice or acceptable. We will often make reference to this canine behavior in this book. It is the basis (or consequence) of Adam Smith's theories.

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The other part of the intellectual heritage of Smith was that he saw the advantages of division of labor. If everybody specializes in something specific, a sub-task of the entire production, the average productivity will increase. This is rather evident. Think about it. Imagine I am hungry and I want to eat a bread. It would be rather inefficient if I'd have to sow the grain, harvest it, thresh it, mill it, mix into dough (for which I'd need salt that has to be mined, water to be pumped, etc.), and bake it. I probably would not manage more than a couple of breads per year. Much better is to let each do a part of the total process, for instance only do the milling of the grain. This seems very obvious to us, but don't forget that to implement this, an efficient market is needed where trade can easily take place, otherwise the miller will be left with sacks of flour (and a popping hunger) even if he managed to lay hands on sacks of grain. In turn, this efficient market then needs an efficient money system. For instance because the grain is available only a couple of months per year while flour is needed all year long. The payment from the miller to the farmer has to be done in some kind of common payment means; barter is quite impossible. Indirect trade, in the form of a good that makes both

parties happy is the solution. For instance gold. See Picture 1 of Chapter 2.

In this way, Adam Smith saw the limiting effect of everything that blocked freedom and free trade. In particular he was vehemently opposing any form of import tax, because it has a negative effect on wealth (see intermezzo). This kind of taxes was often levied to protect local companies, who benefited from the laws (see intermezzo). Politics, as a mouthpiece of industry, acted in defense of industry. That it is detrimental for wealth can easily be demonstrated in a numerical example.

Intermezzo: Adam Smith on import barriers:

"To give the monopoly of the home-market to the produce of domestic industry, in any particular art or manufacture, is in some measure to direct private people in what manner they ought to employ their capitals, and must, in almost all cases, be either a useless or a hurtful regulation. If the produce of domestic can be brought there as cheap as that of foreign industry, the regulation is evidently useless. If it cannot, it must generally be hurtful. It is the maxim of every prudent master of a family never to attempt to make at home what it will cost him more to make than to buy. The taylor does not attempt to make his own shoes, but buys them of the shoemaker. The shoemaker does not attempt to make his own clothes, but employs a taylor. The farmer attempts to make neither the one nor the other, but employs those different artificers. All of them find it for their interest to employ their whole industry in a way in which they have some advantage over their neighbours, and to purchase with a part of its produce, or what is the same thing, with the price of a part of it, whatever else they have occasion for". (Adam Smith, *Wealth of Nations*, IV.2.11)

And as to why it happens:
"That this monopoly of the home-market frequently

> gives great encouragement to that particular species of industry which enjoys it, and frequently turns towards that employment a greater share of both the labour and stock of the society than would otherwise have gone to it, cannot be doubted. But whether it tends either to increase the general industry of the society, or to give it the most advantageous direction, is not, perhaps, altogether so evident".(Adam Smith, *Wealth of Nations*, IV.2.8)

Imagine a situation in which Germany and China do not trade with each other but produce cheese and electronics independently from each other. Germany is better at making cheese (production cost only 1 euro*, while electronics cost 9 euro to produce) and China is better at making electronics (reverse costs). *Inside* both countries there is free trade and the market is fully crystallized. Every product that costs one euro also generates one 'wealth point' (wp). If this were not true, the invisible hand of Smith would correct this mismatch. If, for instance, in Germany the cheese would produce more than 1 wp people would retract from electronics production and go into cheese fabrication business. Until the return-on-investment is equilibrated (and probably a little more than 1 wp per euro). We thus have the situation as shown in the table below:

	Germany		China	
	cost	wealth	cost	wealth
Cheese	1 euro	1 wp	9 euro	9 wp
Electronics	9 euro	9 wp	1 euro	1 wp

Assume both countries have 10 production units, as in 10 factories or something like that:

Situation 1: Without open borders: Independent of how the means of production are used, the production of goods will always result in 10 wealth points in both countries. For example, Germany

*The convention used in this book is that the unit euro has no plural when applied to an amount that is a real number, as in "A train ticket costs 45.13 euro". It does get an 's' when we talk about euros as coins, as in "I have 4 euros in my wallet (four coins of one euro) worth a total of 4 euro"

produces 1 unit cheese and 1 unit electronics which results in a wealth of 1×(1 wp) + 1×(9 wp) = 10 wp at a total cost of: 1×(1 euro) + 1×(9 euro) = 10 euro. The same applies to China: with a total cost of 10 euro always 10 wealth points are created.

Situation 2: Open borders, *laissez faire*: If the wealth points for these goods stay the same, then the following situation is the best: Germany produces 10 cheese. Cost: 10×(1 euro) = 10 euro. China produces 10 units of electronics. Cost: 10×(1 euro) = 10 euro. They trade with each other. Imagine they do this on a one-to-one ratio basis (considering the symmetry in the example, it seems logical, yet it is not necessary). They'll trade everything with each other. Germany receives 10 units of electronics. wealth: 10×(9 wp) = 90 wp. China receives 10 units cheese. wealth: 10×(9 wp) = 90 wp.

It is obvious that opening the borders has increased the wealth in both countries from 10 wp to 90 wealth points. It is as simple as that! Well, in Germany the producers of electronics will send their lobby to Berlin (and the Chinese cheese lobby will go to Beijing). Often with success, because the lobbyist swarms in the political capitals whisper constantly in the ears of the politicians. The people suffer, because, apart from once every four years, politicians tend to not listen to them.

"Yes", speaks the industry lobbyist, "China is flooding our country with cheap products and all our companies go bankrupt because of this". Also that is not correct. In the table below is summarized a situation in which China makes everything cheaper, even Germany's cheese. To facilitate the calculation different wealth points are used for Germany and China. Wealth is something relative, there where a price is something absolute. In any case, absolute wealth is not relevant for the discussion. Also, we assume that the Chinese yuan has the same value as the German euro. For ease, we use the euro in the calculations:

	Germany		China	
	cost	wealth	cost	wealth
Cheese	1 euro	1 d-wp	0.9 euro	0.9 ch-wp
Electronics	9 euro	9 d-wp	0.1 euro	0.1 ch-wp

Imagine both countries again having 10 production units that they can use at their choice.

Situation 1: Without open border: Again, irrespective of how the 10 production units are used, the production of goods will result in 10 wealth points. For example, Germany produces 1 unit cheese and 1 unit electronics:

wealth = 1×(1 d-wp) + 1×(9 d-wp) = 10 d-wp,

with total production cost:

cost = 1×(1 euro) + 1×(9 euro) = 10 euro.

The same applies to China, for example 10 units cheese and 10 units electronics:

wealth = 10×(0.9 ch-wp) + 10×(0.1 ch-wp) = 10 ch-wp,

cost = 10×(0.9 euro) + 10×(0.1 euro) = 10 euro.

Situation 2: With open borders. *Laissez faire*: Germany has nothing to offer to China. China can make everything itself much cheaper. All German companies go bankrupt and everybody will be unemployed. But, wait, we have an open market with free market effects. The high unemployment push down the salaries of employees. Let's do this. Let's ignore all those leftist idiots with their syndicates. Production cost will go down. And the problem will be solved. The salaries do not even have to go down much and it will actually result in higher wealth. 10% reduction is probably enough. We get the situation summarized as:

	Germany		China	
	cost	wealth	cost	wealth
Cheese	0.9 euro	1 d-wp	0.9 euro	0.9 ch-wp
Electronics	8.1 euro	9 d-wp	0.1 euro	0.1 ch-wp

The optimal situation (for both countries!) is achieved when Germany uses all its infrastructures to make cheese and China uses them all to make electronics and fully exchange them:

Germany:

cost = 11.11×(0.9 euro) + 0×(8.1 euro) = 10 euro.

wealth = 0×(1 d-wp) + 100×(9 d-wp) = 900 d-wp

China:

cost = 0×(0.9 euro) + 100×(0.1 euro) = 10 euro.

wealth = = 11.11×(0.9 ch-wp) + 0×(0.1 wp) = 10 ch-wp

It is clear. Because Germany opened its borders with China and brought all the factories on the brink of bankruptcy that demanded

lowering of salaries, the wealth *increased* from 10 to 900; a factor 90! It matters nothing that the salaries were lowered. What matters is that wealth increased. The opening of the borders *cannot* have a negative effect. Never ever. Absolutely impossible. Every form of protectionism always has a negative effect on wealth. This is based on the fact that both parties, per definition, are happy in a trade, as we have seen before (on p. 12). If it is not the case that both parties are happy in a trade, the trade is not finalized.

Adam Smith saw these things very clearly in his mind and thus was vehemently against any form of import barrier or other forms of protectionism. Hence the name liberalism. Also note that trade embargoes, meant to hurt a country that is politically misbehaving, always cause an equal damage to the country issuing the embargo; since both parties before were happy with the trade, *both* parties are now unhappy the trade does not take place. Free markets are the source of wealth.

The question is now, is the Invisible Hand of Smith enough to guarantee free trade? Asking the question is answering it. For sure, not always is it the case that if everybody acts in self interest the result will be optimal for the whole. A nice example is the so-called Prisoner's Dilemma.

Intermezzo: Prisoner's Dilemma

A system that suffers from the Prisoner's Dilemma effect is one that is not capable to find the optimum because the forces for individual actors steer the system away from it:

Imagine there are two criminals, Albert (A) and Barbara (B), that both have been arrested for a bank robbery. They are kept in two separate cells so that they cannot talk with each other. The police tries to make them both confess. If both refuse to talk, they both go scot-free. To avoid this, the police is making propositions to both of them (independently): "If you confess, and your friend doesn't, we'll give you ten thousand euros where you friend gets 50 years in

prison. If you both confess you'll both get 20 years in prison". The decision table for Albert and Barbara thus looks like this:

Confession	A yes	A no
B yes	A: 20 year prison, B: 20 year prison	A: 50 year prison, B: 10 keuro
B no	A: 10 keuro, B: 50 year prison	A: scot-free, B: scot-free

It is clear that the best option for Albert is to confess, independent of what Barbara decides to do. In the table the decision translates to a move from the right column to the left column. Either his sentence is reduced from fifty to twenty years, or he goes free and even receives a hefty premium of ten thousand euros. However, the same reasoning applies to Barbara whose decision to cooperate with the authorities and confess lifts her reward from the bottom row to the top row in the table. They will thus both decide to confess, that while it is obvious that the optimum situation is the one in which they will both not confess; they'd go scot-free (with the loot). Because Barbara and Albert are not allowed to converse with each other, they'll both decide to optimize their personal, local situation, without worrying about the overall situation. This is the Prisoner's Dilemma. A situation that shows that the Invisible Hand of Adam Smith does not always work. The optimization of each individual does not result in an optimization of the whole.

But we can also imagine situations in which exactly the communication between actors leads to a non-optimal result. Or situations in which communication is irrelevant. If somebody has enough power to manipulate prices, this entity will do it. Exactly *because* it is in its own interest. It boils down to this question: Why does a dog lick his balls?

Because he can! The same with monopolies and price manipulations. Companies will do that if they can.

This way we have landed in the 21st century into a system of industrial liberalism. Companies are powerful and act purely in their own interest, completely in the spirit of Adam Smith. Note that a company does not have morality. It has a single purpose: satisfy its own interest. They come up with a rhetoric that "What's good for the companies is good for the employees and thus the population". Companies should not be obstructed in any way. This is a dogma that is repeated at each and every occasion, in fact so often that politicians start believing it. That while in the ideas of Adam Smith there is no logical difference between companies and persons; they are both simple 'actors' in the economy. We might as well say, "what's good for the people is good for the companies". To give an example, here a list of wishes of people and companies and the implementation by the governments in 2016:

People	Companies	Government
high wages	low wages	low wages
high euro	low euro	low euro
import	export	export
low stock market	high stock market	high stock market

As an example, most governments send trade missions to foreign countries with the only goal to sell products to these countries – often they go accompanied by representatives of companies; thick as thieves – there where, logically speaking, half of the time should be spent on getting good buying deals, preferentially the governments should be accompanied by representatives of consumers. As far as I know this never happens.

The stock market will be treated in another chapter. Suffices to say here that high stock markets (a lot of money for capital) automatically imply a low euro rate (little capital for money). Generally speaking, people are not the owner of much capital and thus want a low price for everything, including shares. Government and the entire society scream for a high stock market. Look for instance at the programs of Bloomberg TV, where the state of the economy is measured by the rise and fall of the stock market, that while the presenters of the programs – pathetic as they are – do not realize that the money they earn is

getting more worthless with every rise in share prices. (Unless they are immorally trading in the shares they euphorically talk into heaven on TV).

The above list shows effectively that workers want to get as much value for their money ... and the companies also. That is to say, the companies want to be able to buy as much labor on the free market for as little money as possible and sell as many products as possible for a as high as possible price. There where workers want to sell their labor for as high a price as possible and buy products for as low a price as possible. These two actors are basically equal in the economy. They both act in self interest and in the spirit of Adam Smith.

However, it is obvious that it is the companies that rule in most countries. (See the documentary Brussels Business). This happens through industrial lobbies that have settled in the political capitals. This forms an asymmetry in the democracy because the people only once every four years have contact with the politicians. It is therefore not strange that politicians have become mouthpieces of industry, the latter nearly living at the doorsteps of government buildings. Is it illegal? No. Is it immoral and undesirable? Yes.

A clear example of lobbying is the actions of tobacco industry. It is sheer impossible to think how it can be that governments do not manage to ban smoking from public places. (Even in the US, where companies have less power than in Europe, they manage to implement laws against it). There is no doubt about the negative effects of smoking on health. In spite of this, no strong anti-tobacco laws are made. I imagine how in 2060 the current ministers of health care will be asked, "You are are under suspicion of large negligence and considered responsible for the death of two hundred and sixty thousand people. Two questions: In 2016, did you know that smoking caused health problems and if yes, did you do your best to reduce smoking?"

But, even without the interference of companies into politics, liberalism often leads away from an optimal situation. Liberalism has the underlying tenet that competition will lower prices, which is something laudable. However, as discussed above, monopolies will tend to *rise* prices instead of lowering them. Formation of monopolies and cartels is thus in the interest of companies, but not in the interest of the whole. That is why in many countries there are laws about how much

market share a company can have. That is in itself a sign that full liberalism does not work; otherwise it would not need laws to avoid these problems. Moreover, now we get a side effect that companies that are on the edge of this magic market-share limit – anyway, how is the exact maximum share determined? – no longer have any incentive to lower the price. So much for competition lowering prices! The Microsoft effect, named after the company with the largest monopoly that no longer did any product-innovation for lack of incentive. They basically never invent anything. Every time someone still manages to invent something, they – MS – buy the patent or whole company, monopolize the market of this new product and sell it.

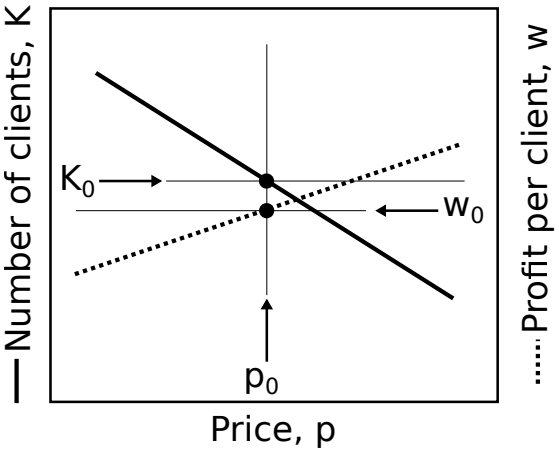
Instead of a single company, the power can also be concentrated at a small number of companies, the oligarchs that do price fixing in so-called cartels. Why they do this? Why does a dog lick his balls?

That is the reason why governments are on top of these things, trying to prevent them. An example is Neelie Kroes, who in the European Union government had the task to prevent such effects. The question is, did she manage? She once fined Microsoft for integrating the browser – Internet Explorer – into their operating system Windows. But Microsoft simply ignored the fine, kept on appealing in court until the point the entire problem became irrelevant. Companies are powerful and act, fully in line with the ideas of Adam Smith, completely in their own interest. The Invisible Hand makes that people are extorted out of their money. The Invisible Hand is not always something beneficial.

❇

Even if no monopoly exists and also no agreements are made between companies in the form of cartels, even so, naturally cartels can form. The idea that competition will always lead to lowering prices is an illusion. The idea is that a company will lower the price of its products to attract more clients. But no company, whatsoever, has a goal of getting as many clients as possible. The only goal a company has is making as much *profit* as possible. That means that a company only will lower prices if the gain of number of clients in terms of percentage is larger than the loss of profit per client in terms of percentage. Picture 4 illustrates this.

The profit per client (w) and the total number of clients (K) are both a function of price charged for the product. This defines the



Picture 4: Number of clients K and profit per client w as a function of price of the product p

relative effects – elasticity – of raising prices on the profit per client (β, how many percent more profit is made if the price is raised 1%) and the number of clients (α, how many percent clients are lost at a 1% price increase). These are the slopes of the curves of Picture 4. If the price is raised, then the total effect on the profit is the difference between the two elasticities, $\beta - \alpha$. (See Appendix B for a derivation of this). If the price is increased and the profit per client rises faster than the number of clients decreases, $\beta > \alpha$, than more profit is made. In this case the company is well served by price *increments*. Even in the presence of full and fair competition.

As an example, in the extreme of a monopoly the number of clients is independent of price (to a certain extent, but for sure for small variations of p) and α is equal to zero. This means that profit will always increase when the price is raised, because the slope of the profit function is always positive. Generally speaking, the price will be raised when $\beta > \alpha$ and lowered if $\beta < \alpha$, until $\beta = \alpha$.

❇

The above also implies that in a fully crystallized market there is only place for a certain number of companies. We have seen that

integration of the common market has led to mergers of companies and that is the direct result of the above rule. In every market some seven companies will remain. We can call this the Magic Number Seven.

Here is a numerical example. The absolute numbers can be different (although the order of magnitude is probably correct). The total number of clients is constant and they are distributed over n companies. Assume the profit is about 20% per client. For example, the cost of the product is 1 euro and it is sold for 1.20 euros. Thus, a raising of the price by 17% (20 cent) has an effect of doubling of the profit (+100%), a profit elasticity of $\beta = 6$ in Eq. (32) of Appendix B. To estimate the effect on the number of clients we assume that 10% lowering of price steals 10% of the clients from the competition – we can call this client elasticity – and thus adds $(n-1) \times 10\%$ clients to the company, $\alpha = (n-1)$. The price is stable (profit optimization) if the slope of the total profit as a function of price is zero. That slope was proportional to the difference between client and profit elasticities, that thus should be zero: $(\beta - \alpha) = 0$. If we substitute the values for α and β we get

$$6 - (n-1) = 0. \tag{5}$$

We see that the price is stable if $n = 7$, the Magic Number Seven, a phenomenon we see in practice. The globalisation of the world economy has caused for instance that only seven car makers remained, that while in earlier days countries like France each had seven of their own. Lost companies: Simca, Talbot, Citroën (all part of PSA, but the latter brand still marketed) and some hundred more that existed before the French market crystallized. In other words, in a market there is place for seven companies. This because that is the optimal number in a crystallized market.

This can also be reasoned in the opposite direction. How many companies will survive given a certain profit margin and client elasticity? That can easily be calculated. Imagine, in the end the companies make a factor x profit. (In the previous calculation x was 20%). Profit elasticity is then equal to $\beta = (1+x)/x$ (in the above example $\beta = 6$). Imagine that the effect of 1% price lowering $y \times 1\%$ client stealing from other companies, or $(n-1) \times y \times 1\%$ extra clients to the company, then

$\alpha = (n-1) \times y$. Then, if $\alpha = \beta$, eventually

$$n = 1 + \frac{1+x}{x \times y} \tag{6}$$

companies remain. In the above example, $x = 0.2$ and $y = 10\%/10\% = 1$, which resulted in seven companies. Note that if more profit needs to be made, there is place for less companies. At 100% profit, only one company remains. A profitable sector of economy is thus for instance telecom; there are only some four present on the market (Vodafone, T-mobile, Orange and a local provider, for example KPN or TMN, that still exists for nostalgic reasons). Bad sectors are car makers (Toyota, Ford, General Motors, PSA, Renault, Volkswagen, Mercedes, BMW, Honda) that thus make less profit. This can also be reversed; the less companies, the more the profit, as it is not clear what is cause and what is effect in these calculations.

The result of this market optimization to seven companies is that, in a (capitalist) optimal market, there will indeed be seven, yet it is not efficient for all types of economical activity. Imagine seven electrical power lines, side by side. Seven grids of telecom antennas. Seven railway tracks, one next to the other. Seven water pipelines. Seven highways, each at least 4 lanes, making two cities be connected by at least 28 lanes. It is obvious that, especially for infrastructures, the centralized (state) monopoly is the way to go in some cases. (The alternative is less than seven commercial companies that have effective monopoly, a fatal combination; they'd promise not to steal your money, while they have the means, opportunity and the motivation to do so). The banking system should maybe be considered such a case.

❇

The important conclusion that has to be made at this point is that factually there is no need to exist agreements between companies in order to come to intrinsic price settling. Every company looks at the market and optimizes its own profit, without ever communicating with the others. This is nicely exemplified in the next riddle:

Riddle: On an island lives a king with 100 citizens. All citizens are deaf mute and cannot communicate with each other in any form. They all wear a hat, either a blue one or a red one. They see the hats of all the others but not their own. The men – they are all men – assemble every evening at the town square, watching the sunset. One day an edict of the king was found at the center of the square. "Fellow countrymen, I am dying and it is time to find a successor. From the people that first guess the color of their own hat, I will choose one. Guessing wrong will be punished by public execution on the town square. I give the following information: There is at least one blue hat and one red hat". The islanders are deaf mutes, but very smart. Every evening they meet to see the sunset. Not a word exchanged. Suddenly, after 23 days, a large set of people walks to the king. How is that possible? How many blue and red hats were there and how many walked to the king?

Solution: Let's say I am one of these people. Everybody, by the way, thinks *exactly* like I do; we all have the same algorithm, namely the following: Imagine I see only red hats, then I know that myself must have a blue one (considering the information given by the king who said there is at least one of each). I immediately walk to the king. The other people, those with the red hats, see one blue hat and thus do not know enough. Either one of them does not know if there are 1 or 2 blue hats. Pity for them. Good for me. I will be the new king.

Now imagine that I see 1 blue hat. In that case there can be one or two people with blue hats. I do not know if I have a red or a blue hat. The other people also do not know. They see either 1 or 2 blue hats, depending on if I wear a blue hat or not. *Except* the man with

the blue hat. He sees none or one. He possibly sees my blue hat, or no blue hat whatsoever. He possibly does know his own color. If he sees zero blue hats he is in the same situation I was above. In this case, he goes to the king. Next day he will not be back. In case he does come back next day, it means he did not know his hat the day before and thus I conclude that he must have seen a blue hat, mine! I know my color and go to the king. Mr. Bluehat concludes exactly the same and together we go to the king.

Now imagine that I had seen 2 blue hats the first day. Then there are two possibilities, there are either two or three blue hats, depending on if I have one or not. I do not know my color, so I go home and come back next day. Next day everybody still shows up, of course, because there are at least two blue hats and that situation is not resolved the first night; they would have seen at least one blue hat and nobody would have known his color. After sunset we all go home again. Next day we gather again. If now two people are missing, those two with the blue hats, then they apparently knew their color yesterday and I know I have a red hat. I now know the color of my hat, just like all the other red-hatters, but we are all exactly one day too late, all blue-hatters are nicely at the king's palace.

If, on the other hand, everybody was still there, I also know my color. Knowing that the two blue-hatter yesterday did not know, now I know, together with them that our hats are blue. The three of us walk to the king laughing, knowing that tomorrow everybody will know, too late!

In other words, with n blue hats the wearers of them know on day n that they wear a blue hat and march to the king. The reasoning can also be done with red hats if they are in the minority.

This shows how information can be exchanged without communication, by simple observation of each other's behavior. In the case of formation of cartels it is exactly the same. Cartels form naturally when companies keep a good watch on each other. We see here a classical case of the Invisible Hand of Smith not working in practice. Companies act purely in self interest – of the type, "Why does a dog lick his balls?" – that does not result in optimizing the interests of the whole.

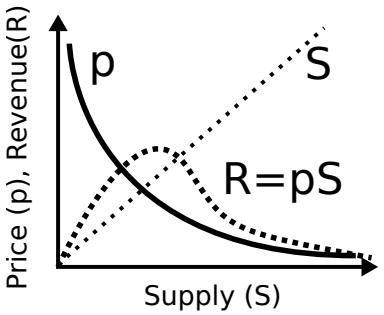
Also it is clear that fighting cartels is useless, because it is a natural process that does not need agreements between companies. Moreover, it is rather contradictory to be in favor of free markets and then not tolerate free market agreements. That is rather schizophrenic. That is basically admitting that the free market system does not work and still being in favor of it. Who says "A" should say "B". Who is against cartels is against the free market of Adam Smith.

❇

Coming back to the idea that n companies will remain in a market, we can also reason in another way. Above, the calculation was about how many companies will remain given a certain profit margin (x) and client elasticity (y). We can also ask ourselves what would be the profit of a fixed number of companies (n) and client elasticity. Solving Equation (6) for profit x gives

$$x = \frac{1}{(n-1) \times y - 1}. \tag{7}$$

We see that if by take-overs, mergers or bankruptcies, companies disappear the profit margin increases. Remember this when they talk about 'synergy' and 'cost saving', magic words of any company report, they are factually only interested in skimming more money from their clients because they can increase the price for lack of competition. And if they can raise the price and there is also a clear incentive, they will do it. Why? Why do dogs lick their balls? It is the result of the Invisible Hand of Smith that results in a situation that is beneficial for some, but clearly not for the whole, that is, the others. The agreements that need to be made can be done by non-communicative communication. This way they can also not be legally prosecuted for formations of cartels.



Picture 5: Price and revenue (price times number) as a function of supply. The latter has a maximum. Thus a producer of the goods is advised to destroy some of them if he produces too much.

❊

The same effect of non-optimal optimization also takes place within a company. Imagine a farmer producing 100 tons of potatoes. Well, that's what the ground and nature produce, not something the farmer can regulate. He goes with his potatoes to the market and sees that if he *destroys* 10 tons, he can actually get *more* for the rest. How can it be that less products can make more profit? The answer is simple. In a free market of supply and demand the price can drop faster than the supply grows and rise faster than the supply shrinks.

Picture 5 demonstrates this. It shows the price and total revenue (number times price) as a function of supply. It is clear that the price drops with increasing supply, but the total revenue has a maximum somewhere. If the farmer produces more than this maximum it is better to destroy them. And if people starve because of this, that is not his problem; he thinks only about his self interest.

This effect for sure occurs when the production costs are constant, like those of our farmer; a certain field of potatoes basically produces a certain amount X. But also when the costs are variable it can be useful to reduce production. A good example is oil. Oil fields, just like potato fields, have a certain productivity. An oil baron had better close down the tap to make more profit. The entire idea of OPEC is based on reducing the production to increase the profit. Maximizing income by fine-tuning the supply.

❇

Another problem of the free market in which everybody can do what he pleases and tries to optimize his own life is a biological phenomenon. A species normally has the tendency to exploit and exhaust its own resources. This phenomenon is best visible in human economy in the fishery sector. A fishermen depletes his own seas. The problem is namely that if the fish get scarce, the price of fish goes up and the fishermen is even more incentivated to fish. The Invisible Hand of Smith deserves a correctional slap on the wrist. The modern organization of fishery is an example of centrally-governed economy, fully opposing the liberalism ideas of Adam Smith.

❇

All these problems sound rather dramatic, but the problems of the free market are even worse than described above, as can be shown. For that we have to look at the theories of Karl Marx. That will be done in the next chapters. At this moment suffices to say that the Invisible Hand of Adam Smith not necessarily results in an optimum for the whole. The other half of the ideas of Smith, namely Division of Labor, seem correct and indisputable; they guarantee a higher productivity. Yet, they may cause an exhaustion of our planet if increments in productivity are not accompanied by shorter working hours (longer education and earlier pension), but instead society demands that everybody works from cradle to grave, women equal as men.

❇

Remains to say here that in the free market one can do basically everything, start whatever company, *except* a bank. That is restricted to the privileged. But why should I not be allowed to lend money to my neighbor? The answer is that indeed, that is allowed, but *that* is not banking! In spite of what the public at large thinks, that is not what comprises banking, simple lending of money to others. The most important task of banks is money *creation*, and that is prohibited to the general public – then called 'counterfeiting'. This shows once more how the 'free' market, apart from the fact that most is centrally organized, is also bound by strict rules that make it inaccessible to the individual.

Finally, it is clear that the companies that are the biggest advocates of the free market, in practice often are exactly the opposite. If

a company goes bankrupt this is good in the spirit of Adam Smith, because the remaining companies are on average stronger through natural selection. However, the companies that are at risk of bankruptcy often have a pawn in political arenas and arguments like "maintaining jobs" are used to keep non-viable companies alive. This lowers the overall efficiency of the society. An example of this occurred in 2012 in The Netherlands, when with a lot of hubris it was announced by local politician Maxime Verhagen that car manufacturer NedCar, subsidiary of Mitsubishi in Born, was saved from bankruptcy and 1,500 jobs were saved. "At the saving of NedCar many parties were involved. Not only potential buyer of NedCar, VDL, car manufacturers Mitsubishi and BMW, but also politicians play a part. Maxime Verhagen, resigned Minister of Economical Affairs has, together with regional politics of Limburg and the trade unions, contrived schemes to save NedCar" (NOS Nieuws). Maxime Verhagen was prominent member of the coalition of liberals VVD of government Rutte-I. As such, you might have expected them to adhere to the rhetoric of Adam Smith. Apparently not. As the story goes, the subsidy to NedCar was effectively some 500 euros per constructed car. In other words, BMW, the proud new owner of the factory, managed to lower the cost of production by 500 euros per car. Adam Smith turns over in his grave when he sees that economical inefficiency is subsidized in the economy. A real liberal lets the things go bankrupt. With the Verhagens in the world, we'd still be sewing T-shirts together and Limburg would still have its coal mines instead of entering the 21st century.

In 2008 we had a threatening situation of imminent bankruptcies of banks. In the same way, these banks were saved *coûte-que-coûte*. "Too big to fail", "system banks", are the words most often heard at that time. But, if a system has elements that are too big to fail, but that operate in the free market, than that is an inconsistency. The fact that they are not allowed to fail, means that they are supported and thus centrally governed, specifically by central banks (see the chapter on central banks, Chapter 8). Adam Smith once again turns over in his grave.

❇

It would indeed be very nice to rely on a free market with an invisible hand that guides the system to eternal bliss. Moreover, something

that does not need interference of anybody and on top of that leaves everybody have his freedom to do what they want. Rather naive. This sounds too good to be true. And, indeed, it is. We can mark free markets as an illusion in the 21st century. And all true liberals failed big time. All liberal parties in Europe have sold out their own philosophy. They all adhere to a system where a committee of the central banks decides about the economy. Calling our system social is even further from the truth. We must conclude that we have a system of industrial liberalism, also known as 'corporate fascism', or neo-conservatism (neocon). Using the word 'fascism' seems quite strong, but is adequate. The word comes from the Italian word '*fascio*' (meaning bundle), and fascism was used to describe political factions that joined forces to become stronger. Neo-fascism is the bundling of government and industry. In the neocon version, it is industry that is dominating in the bundle. In this system, the interests of industry are always placed on the first priority. There has never been a plan to save small actuators in the economy – too small to fail – like John and Mary, that have difficulties paying their mortgage. Why not? Because nobody listens to them in the political capitals; they have not organized – bundled – themselves into a lobby that might influence politics and yield power. That after years of propaganda of false-liberalism, corporate fascism.

And everybody is held a carrot in front of them that hints at that if you work hard, and invest well in yourself in the form of studying, that you also have a chance to be on the winning side of the system. The Liberal Dream. Some exceptions notwithstanding, this is as good as impossible. Mister Marx, you have the floor ...

Chapter 5

Capitalism

> "Too many people spend money they haven't earned to buy things they don't want to impress people they don't like."
>
> – Will Rogers

One who mentions capitalism, mentions Marxism, the two being considered diagonally opposite. Karl Marx wrote his bulky work *Das Kapital*, in which he presented a rather somber outlook on economy and society. The laborer is being exploited. Maybe even more somber is his work *Manifest*, in which he described the problems that came forth from capitalism. Because, one thing is showing by equations and analyses that capital has an exploitative character, something completely different is reasoning what effect this will have on society. The former being science, the latter more like philosophy.

In this chapter the ideas of Marx are being prepared by telling them in the context of the rest of the book, namely money and economy. It is maybe not following the core narrative of Marx, but that is done to keep the narrative of this book to the point. In any case, the narrative often follows from the definitions, and slightly different definitions are used here to clarify things better. Readers that want more details are referred to the original works of Marx.

The basic starting point is the definitions. If things are defined in a certain way, possibly set in equations, then logical conclusions follow if

we apply the logic of straightforward mathematics. I can, for instance, define percentage profit as the selling price minus the production cost divided by the production cost, something that is done in this book. But I could as easily have defined percentage profit as the difference divided by the selling price. It is all in the definitions. As long as we are consistent, we can understand things like that if today stock prices drop 50% and tomorrow they rise 50%, they are still going with a loss of 25%, where inconsistent definitions will make us think they are trading at the same price.

The remarkable thing is that with a couple of simple definitions and mathematical equations we can explain all important phenomena of the economy. It is so remarkable that people are often their entire life busy denying the simplicity. Maybe to keep a job. Others, by adding complication upon complication wind up concluding that "Well, it has become incomprehensible, but I see that things are working around me, so I guess it is more or less OK".

Therefore we should start by defining some things and then reason from there. Marx was talking about 'capital' and 'labor', but what are these? Marx made very concise definitions. However, they are not really adequate for our times, not because they are wrong, but because we look at things differently in the 21st century. It is simply more convenient to use concepts that sound less archaic, although the reasoning of Marx, after the definitions are made, are fully correct. We will use slightly different definitions. Starting with the concept of capital. What is it?

Often money and capital are equated. "My uncle made a capital in oil". "This company started with a small capital". Surely in this book, that is mostly about money, it seems evident to make the two equal. But that the two are not equal is also clear in statements such as, "That was a capital mistake!". Capital can thus be defined in a myriad of ways. And, like everywhere, it is not so important to use the 'correct' definition – something that is not possible – but to consistently use the definition, once it is made. Therefore, any definition can be used.

Capital comes from Latin word '*caput*' which means 'head'. Well, that didn't help much. A better definition we can find in a dictionary (Dictionary.com):

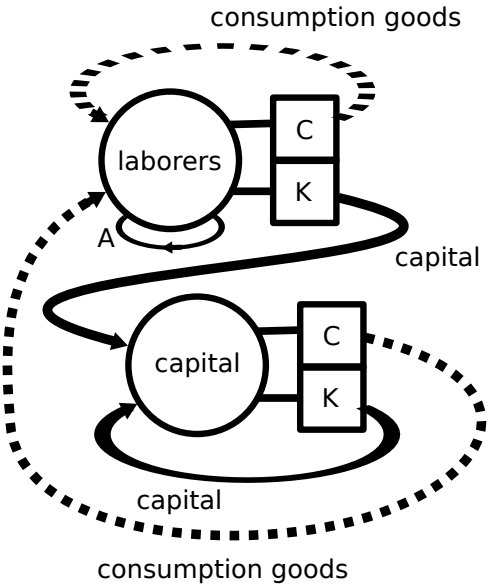
> Capital is any form of wealth that can be used to create more wealth.

That is a nice self-referential definition. We can thus divide all products into consumption goods and capital, the former being 'consumed' (by which they disappear) and the latter used to produce more consumption goods and capital. Since this capital is not destroyed, it accumulates, in contrast with consumption goods.

In the chapter about production (Chapter 3) we had already seen that we can divide production units into humans ('labor') and the rest ('capital'). More or less like in Picture 6. In earlier societies in some cases also labor can be considered capital, namely when it existed in the form of slaves. Slaves were like machines that could be bought and sold and that partook in production. In this analysis we assume that people have full freedom, after all we analyze capitalism and one ingredient of capitalism is the existence of the free market, also for labor. We will see that labor will lose the battle with capital. If labor is capital to start with, there is no battle and no need for an analysis. We thus continue with the distinction of (human) labor and the rest. This rest for instance also includes horses and other working animals that are considered capital for the production process. This may make animal rights organizations angry, but that is how things are in our society, horses are slaves to people.

So, now we have a clear picture of what are capital and labor. Together they take part in production. Labor is the contribution of humans, capital is all the rest. This then includes all the machinery, infrastructures (physical and logical), land, intellectual property, etc. And, it also includes money, since it does take part in production but is not labor.

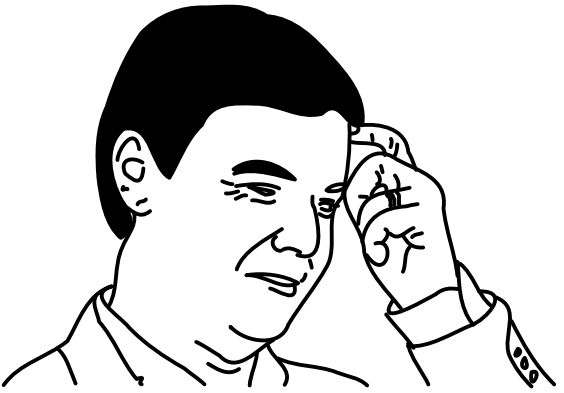
The two classes, labor and capital, both produce consumption goods and new capital. The consumption goods, although produced by both, are being destroyed by laborers. In a computer simulation we could mark this as negative production. And to make it totally complete, we could have workers produce new workers (something that is indicated by a 'A' in the drawing). This effect, however, is not included in the narrative here, but it is important to notice that if the waxing of workers is faster than the growing of capital, then a completely different analysis can be made here. A situation that had occurred



Picture 6: Production of things. The producers are labor and capital. The produced things can be divided into consumption goods and capital. Capital is all means – except humans – with which things can be made

many times in history. Here we only analyze a relatively small and insignificant population growth.

Part of capital perishes every year (houses fall into ruin, factories become obsolete, etc.) and capital also needs maintenance to keep it productive. (One could even say that capital 'consumes', making the symmetry between capital and labor even more evident). Also workers are susceptible to decline; they get sick and die. To phenomenologically better explain what is happening, we ignore all these effects at this moment. Thomas Piketty (Picture 7), in his book about modern capitalism – *Capital in the 21st Century* – did take all these effects into consideration, for instance a deterioration of the capital of 10% per year, and came to basically the same conclusions as presented here. We assume that the number of workers is constant and they



Picture 7: Thomas Piketty

have constant quality and also that capital does not perish.

The situation is made here as symmetric as possible for man and machine – maybe a little forced. This is done on purpose because the situation for an *external* observer, say a Martian, is fully symmetric. For an external observer it is not clear whether a human is plowing a field with the help of a horse or a horse is plowing the field with the help of a human. The observer can namely not look in the heads of the two to determine what the 'master plan' is and who serves or controls whom. For us, humans, it seems that the goal is to increase the wealth of humans, but for the outsider it may seem that the goal is to have as many horses as possible, the plowing of the field merely part of this big scheme.

This can even be made a bit more abstract. The outsider may even think that the plow is the center of all. The plow works on the field with the help of horse and human, with the aim to feed the horse and the human in order that they maintain the plow and even make more of them. This is a rather farfetched way of looking at things, but an outsider, analyzing only the system without emotion or looking for a purpose in the system, may look at it like this.

But the outsider will probably readily see that the horse and the plow are basically parasites of the human; where there are no humans, also no horses nor plows can normally be found. It is therefore more

sensible to make a humano-centric analysis, like Marx did, and assume that the human – its labor – produces, with the help of capital. Moreover, the goal is (or must be) the maximization of wealth of the humans. That is, maximization of *consumer* goods. The building up of capital in itself is not a goal, but only a means to reach the objective of maximizing the amount of consumer goods.

In the chapter on production we have seen that the Law of Say says that all production needs to be consumed. That we can now extend to the condition that all production needs to be consumed, *or* is new capital, (ΔK),

$$P = C + \Delta K. \tag{8}$$

This cannot but end in an accumulation of capital. And, worse, at the end it will end in stopping production altogether! This is a corollary of a simple combination of the chapters presented until now. Look again at the picture earlier in this chapter (Pic. 6). Production consists of consumption goods and new means of production (capital). The consumption goods disappear – are consumed – but the new capital doesn't. The circle 'labor' stays the same, while the circle 'capital' keeps on expanding. This in itself is no problem – it makes that we all together produce ever more and that was the goal (or could be the goal). The amount of production is given by the earlier equation, which we repeat here:

$$P = p_{\mathrm{n}} \times N + p_{\mathrm{k}} \times K. \tag{4}$$

The second term on the right hand side is getting bigger and bigger, while the first term stays the same (the marginal effect of education on the human productivity p_{n} ignored). If we combine these two equations we get for one step in production, for example one year:

$$p_{\mathrm{n}} \times N + p_{\mathrm{k}} \times K = C + \Delta K. \tag{9}$$

C is being destroyed by humans N, that in this simple analysis do not produce new people ΔN. If to the contrary they do produce new people, the equation would have been

$$p_{\mathrm{n}} \times N + p_{\mathrm{k}} \times K = C + \Delta K + \Delta N, \tag{10}$$

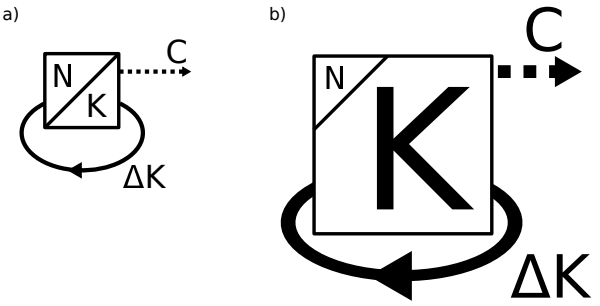
and the question would be if the relative expansion of the number of people in a step is larger or smaller than the relative expansion of

capital, $\Delta N/N > \Delta K/K$? In most cases ΔN is relatively small and can be neglected. The efficiency of human expansion is smaller than that of capital expansion. Once again, Thomas Piketty has taken all this into account in his analysis presented in his book.

❇

There is no problem with this system and it might even be argued that it is desirable. Because consumption goods disappear and do not contribute to the population (or contribute to a lesser extent) the capital will have an increased share in the economy, see Picture 8, that graphically represents Equation 9. Capital increases and thus total production increases, including consumption goods (if the percentage of consumption goods in the production, C/P stays the same) and thus welfare increases, even exponentially. If every year capital makes 5% new capital then both capital and total amount of consumption goods will grow according to 1.05^n; a speeding up of production (see the Appenix for a derivation of this formula). Moreover, the contribution of labor is ever diminishing – according to 1.05^{-n} – and after a while nobody has to work anymore, because labor has become irrelevant, at which stage we have reached utopia.

The only problem is that the capital is accumulating. And if it is connected to part of the population, then this part shall gather more and more wealth – capital and consumption goods – without that it is having to work harder for it. Consumption rights will become an acquired right. Soon it will not have to work at all, and still see their wealth increase because they get the lion's share of the goods produced. By this time, who doesn't own capital will never manage to get it. Don't forget that the goods that are produced have to be consumed by humans or become new capital. We recognize in this the situation of the aristocracy of the 19th century. A certain group of privileged people that owned all the capital and thus was getting richer in an accelerated way. Since payment is done according to share in production, one who doesn't own capital will get a minute share. Look again in Picture 8, the consumption rights of N (labor) have not increased. Only the consumption rights of (owners of) capital increased. It is an intrinsically divergent system. If owners of capital do not use all their consumption rights, and consume (C) – basically living like a playboy having wild parties on yachts in Mediterranean



Picture 8: Capital cycle according to Eq. 9. a) The system starts with a number of people (N) doing labor and an amount of capital (K) that together partake in production, consisting of consumption goods (C) and new capital (ΔK). Because C disappears (is being consumed) and capital grows, the share of capital in the production process and economy (all production) increases, leading to the situation depicted in (b)

harbors – something that is sheer impossible, capital will grow and the situation worsens, there where others do not see any increase in their wealth.

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Let's explain this with a small imaginary situation. In the beginning there were two brothers, let's call them Cain and Abel. (The names hint at a catastrophic end to the story. Don't be afraid, it will indeed happen; blood will flow). Both produce the same good, namely manna, the food to live on. The source is not a horn of plenty, but just enough to survive; every day scraping away a meager meal, continuously living on the edge of starvation. One day Cain finds a machine that can gather manna by itself. Let's say, just the same amount as a human can gather per day. Now the human can also copy the machine. And assume that in this respect the machine is also equal to the humans, it can also make a copy of itself in exactly the same amount of time, say one per year. Living in a liberal society, the choice of what to do with the time or with the machine is for each to decide for himself.

After a while, Cain has gathered a lot of manna and his machine is also making a lot. He is also busy making a new machine, maybe using half of the time of the machine to make a new one. Cain thus has more than enough manna to survive and after a while he has two machines. The new machine also starts producing manna and machines. The extra manna he can consume, but after a while, even with a very luxurious life, the excess of food starts getting him problems with his health, he gets quite rotund. To make things worse, he does not work anymore at all; the little he produces is irrelevant when compared to the mountains of produce made by his machines. He does not even get out of the house anymore, the entrance to it has become too narrow for him.

Meanwhile, the situation of Abel did not change at all. He still barely produces enough for his own survival. With envy he looks at his brother Cain. There are now a couple of ways this story can continue:

- Abel goes to Cain and begs him for some extra food. Cain says, "Why don't you work harder, you lazy bum? Get lost!". Abel knocks Cain on the head, killing him, and takes home his machines. End of story.

- Abel goes to Cain and begs him for some extra food. Cain gives it to his brother, both knowing that Abel now consumes more than he produces; he is living beyond his means. Actually, Cain even gives away a machine, so that Abel can also take care of himself. Both live happy ever after.

- Abel goes to Cain and asks him, "Could you please borrow me some manna so that I also have time to make such a machine? Then I'll produce more manna and can pay you back the borrowed amount". Cain points out to Abel that he is not allowed to copy his machine since he is the owner of the patent. Abel knocks Cain on his head and takes machines and patent back home.

- Abel goes to Cain and asks him the same question. Cain agrees, but demands a compensation for it in the form of manna interest. Better known as usury. After a couple of years, Abel also has

such a machine, but it turns out that he has to keep on handing over all produce to Cain. Cain says "You have lived beyond your means. Hand over the manna *and* the machine. And you still owe me manna!" (In modern jargon: he now has a negative capital). Abel knocks Cain on the head.

- Abel steals the machines of Cain. Cain, however, had constructed in his free time and with the help of his machines an apparatus of protection of his interests. He has registered everything. His police machine arrests Abel and puts him in his machine court where he is sentenced to death, in full accordance to the carefully constructed law that was voted for democratically (Abel had no time in his life to think about politics and trusted his wise brother that seemed so wise in view of his large wealth).

- Abel confiscates at a certain moment the entire machinery. The situation is now reversed. After a while Cain knocks Abel on the head.

As is clear, there is only one way that does not lead to the shedding of blood, namely socialism, namely the transfer of consumption goods and/or capital without any form of compensation. This is also called leveling. About that later more (in the chapter on alternatives, Chapter 11).

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Those who are interested in seeing this idea in action can play a game of Monopoly. (The game was even invented for that exact purpose, to demonstrate the effect of capitalism in a playful way): Everybody starts equal, with the same starting capital. And everybody works equally hard – walks around the board with the same speed and creates wealth at the same rhythm, every time he or she passes Start. (The money that players get every round when passing Start is the external source of wealth, like nature in real life). By sheer coincidence – luck – namely the outcome of die rolls (and possibly a minute contribution of intelligence, although I have never seen a correlation between a person's intelligence and his 'acumen' in the game of Monopoly) the distribution of capital becomes skewed. One player owns more of the

streets, stations and utilities. Once this skewness exists, it rapidly grows. Initially it is still possible to invert the tendency by – again by pure luck – miraculously avoiding the streets of hotels of opponents. But larger skewnessess are self-amplifying and eventually one player obtains all the capital. All streets, stations, utilities, etc. Everything!

In other words, whatever arbitrary initial distribution, independent of the scale, the skewness, as long as it is larger than the statistical 'noise' (random fluctuations), will tend to get more skewed. This is a mathematical certainty. In engineering we call this 'positive feedback'. Such a system with positive feedback will tend to saturate and in the case of distribution of wealth it concentrates wealth where there is already a lot of it. In the extreme case all of the wealth will befall one person. Or a family, if within the family wealth *does* get distributed without compensation. In other words, if socialism exists, like it normally does, within the family. In most families spouses and children do get free life support, no questions asked.

The full concentration of wealth is never actually reached, although history is littered with examples of where wealth was accumulated at a few privileged people. Because wealth yields power and power enables accumulation of wealth, normally those privileged few were people in power. From sun kings to oil barons. From Ceasescu to Marcos. We see that families of powerful people, ideally dictators, acquire wealth, which gives them more power. They often think themselves that they deserve it because of hard work. Just as a winner of a game of Monopoly attributes the victory to his own acumen. But often the wealth was inherited from a parent (dictator) and the rest is a natural phenomenon of condensation of wealth.

We can summarize this in the statement "If you are rich, you must be really really stupid to end up poor and if you are poor, you must be really really intelligent and work really really hard to wind up rich". According to Piketty 67% of all wealth in the world is inherited. There are always exceptions, especially in new areas of industry, like informatics and telecommunications a person can get lucky and build up an industrial empire from scratch. This is the so-called American Dream, the carrot that is then held in front of people that it is possible for any person in society to get filthy rich by a combination of intelligence, hard work, and luck. Indeed, it is possible, and it happens every now and then, but they are rather exceptions to the

rule. Much more important is it to have a starting capital. Play again the game of Monopoly and this time, apart from the regular starting capital that everybody gets, also give the two most expensive streets – Mayfair/Boardwalk and Park Lane/Park Place in the English versions – to a player as an heritage. And give the green streets – Bond Street/Pennsylvania Avenue, Oxford Street/North Carolina Avenue and Regent Street/Pacific Avenue – to a second player. A third player gets the yellow streets Piccadilly/Marvin Gardens, Coventry Street/Ventnor Avenue, while a fourth player gets the red streets Trafalgar Square/Illinois Avenue, Fleet Street/Indiana Avenue and The Strand/Kentucky Avenue. (This combines into more or less 67% of all properties). The rest, the proletariat, will just get the starting money. (In a next game this leftist idea of starting capital equal for everybody can also be substituted by a loan). Guess who will get to be the suckers ...

Thomas Piketty in his book *Capital in the 21st century* has fully researched this and found that we temporarily had a period – from just after the Second World War to about the end of the previous century – where this effect of the necessity of a starting capital was rather small and people got rewarded principally on basis of their personal qualities, namely productivity. This system is called a meritocracy. The current generation lives in the illusion that we have left behind the times of capitalism in which people are rewarded for the capital (and accompanying productivity p_{k}) and not for their personal productivity (p_{n}). However, that effect was caused by destruction of capital by two devastating wars. We effectively went back from situation 'b' to situation 'a' in Picture 8. This was done by the negative production of both humans and capital when in war. Instead of producing new consumption goods and new capital, means of production and labor were used to build weaponry and this weaponry was used by labor (soldiers) to destroy capital. Effectively a negative production in Equation 10. In those days consumption C was a lot smaller and hunger reigned, but was still positive (since it cannot be negative). Both increase in capital (ΔK) and increase of population (ΔN) were negative. The destruction of capital was bigger than the destruction of population. It may have been in the order of 90% and 10%, respectively.

The small amount of capital in the world caused a relative increase of salaries on labor, since labor and capital are competing with each

other on the free market, scarcity makes the prices go up. The smaller the percentage participation of capital in production, the higher the percentage share of labor in the earnings. Something that always happens after a war (unless the destruction of capital is smaller than the destruction of humans; an ideal bomb is a 'clean' bomb that only destroys humans and leaves infrastructures intact, and a lot of effort is spent on developing such a bomb). Thus, after the Second World War the reward on labor was relatively high. In the 21st century we see that again most production is done by capital and not by labor. Rewards - rights to consumption – again mostly go to (owners of) capital. Considering that the owners of this capital do not reasonably manage to use all those rights and consume all their profits – not even with a flamboyant lifestyle or being overtly philanthropic – these rights will be converted into even more personal capital, for instance money (read: consumption rights) that are parked in fiscal paradises. Like a game of Monopoly, the distribution of wealth drifts further and further away from a homogeneous situation. Until the next 'resetting' war.

All the capital thus accumulates. (Marx called it 'concentration of wealth'). The end situation is that all wealth is at a single point, like a person or family. It actually never reaches that point because the people, that see a lot of wealth being produced (basically by them), but get no share of the rights to consumption, just like Abel in the example above, will intervene in one way or another. A revolution is normally resulting, with often heads rolling. Ceausescu in Romania, Marcos in The Filipinos, Tsar Nikolai in Russia, sooner or later a revolt – an internal war – of the people is inevitable, if not anticipated by an external war.

Dictatorships are thus often looking for external enemies and wars, just to prevent a revolt and maintain power. A good example is Argentina that started in the 1980s a hopeless war with England about the Islas Malvinas (by the English named the Falklands), a group of islands in front of the coast of South America. In order for the leader to survive, the people have to be convinced that the enemy is not *inside* the country, that is, the dictator himself, but *outside* it. That is very well described in the book *1984* of George Orwell, see the intermezzo below.

Intermezzo: *1984* - George Orwell

In the book *1984* of George Orwell about every week by decree it was announced which of the other two empires, Eurasia or East Asia, was the enemy in the eternal war and which was the ally of Oceania to which England (Airstrip One) belonged. Much of the things were written with the former Soviet Union in mind. However, nearly everything he wrote applies perfectly to our current *western* society, with the European Union in the role of Oceania: Big Brother (our big leader) that keeps an eye on everything with cameras and through the system of anonymously denouncing one's neighbors. A government that is looking for external enemies to distract the people, for instance Russian president Putin (in the role of Goldstein, Russia in the role of Eurasia) for whom daily Two Minutes of Hate are reserved in the news. The art of speaking politically correct (named Newspeak), in which politics tell us how we must formulate our thoughts, hoping that the formulation will steer our thoughts (instead of the other way around). An example in The Netherlands is the forbidding of using the term Zwarte Piet (Black Pete; a character in a popular celebration for children, allegedly 'black' alluding to the tradition of slavery). (The underlying idea is that if you do not use discriminatory terms, you will stop discriminating, fully inverting causality). No reference to race or background can be used. Note that forbidding Black Pete immediately shoves blacks into the corner of inferiors. Nobody complains about French wine, or German *bratwurst*, but complains are made about branding Gypsy sauce or Jewish cookies. Well, why? Are French and Germans strong enough and the weak Gypsies and Jews and everything that is black have to be protected because they are inferior? Is calling somebody gay (for instance at a football match) in-

sulting? Is being gay being inferior? That point of view is quite discriminatory, I must say. Likewise, every comment about the number of women on high positions (like in politics) is the most sexist remark one can make. The people uttering these remarks judge their fellow human being on their gender and not on their qualities. They probably all mean well, but they create an atmosphere in society where women, blacks, etc., are considered inferior. As a solution, I propose to take the mentioning of gender out of the birth certificates and passports, as was done for somebody's religion, since anyway these concepts are irrelevant – everything can get married to everything – and can only be used for discrimination.

The book also talks about thought crime. That not only someone's *actions* are punishable by law, but also what someone *thinks*. Recently in The Netherlands people were convicted for having on-line sex chats with a computer program. This because, so the reasoning went, they were *thinking* they had sex chats with minors. Well, without (literally) being the advocate of the devil, this is an example of the Orwellian organization of our society.

Another issue is propaganda. A good example of this in modern society is the alleged climate problem. This problem is fed with a spoon to the people. (There is no scientific basis for the idea of man-made climate changes). This happens through propaganda agencies. An example is the article of Eraut and Segnit, *Warm Words. How we are telling the climate story and can we tell it better?* from 2006. As they write themselves, "This report was commissioned by the Institute for Public Policy Research (IPPR) as part of its project on how to stimulate climate-friendly behaviour in the UK". Place it half a century back in time and a little to the East and we get "This report

is written by order of the Department of Agitation and Propaganda (*Otdel Agitatsii i Propagandy*) with the aim to stimulate Soviet thinking". Or some more decennia back and further to the West: "This report was commissioned by the Reichsministerium für Volksaufklärung und Propaganda (of Minister Goebbels) to stimulate the national socialism". Two passages of the said article:
"Ultimately, positive climate behaviours need to be approached in the same way as marketeers approach acts of buying and consuming. This is the relevant context for climate change communications in the UK today – not the increasingly residual models of public service or campaigning communications. It amounts to treating climate-friendly activity as a brand that can be sold. This is, we believe, the route to mass behaviour change.",
"[...] interested agencies now need to treat the argument as having been won, at least for popular communications. This means simply behaving as if climate change exists and is real, and that individual actions are effective. The 'facts' need to be treated as being so taken-for-granted that they need not be spoken."

The idea of making thoughts punishable by law, the imposing of thoughts through language restrictions, and the imposing of thoughts through propaganda. Together with the centralized economical model, we have now become what we feared, the centrally governed totalitarian state of the former East Block. The book 1984 of Orwell should again be obligatory reading in schools, as it was in my class '84, but this time as an introspective to our own society and not a criticism on a foreign one.

Chapter 6

Karl Marx; Communism

> "When I gave food to the poor, they called me a saint. When I asked them why there are poor, they called me a communist."
>
> – Dom Hélder Pessoa Câmara

How did Marx see all this? Although he used different words and definitions, it boiled down to the same thing. Either way, the result is the same. He analyzed the society in a scientifically impressive conscientious way. One of the reasons why according to the latest standings, Marx is the most-influential scientist of all times (see the magazine Nature; Google on "Who is the greatest of them all?"). His impressive and detailed analysis does not have to be completely repeated here, but it is important to mention that Marx did have a scientific thesis (or 'hypothesis', a scientific model that can be tested, or falsified as it is called), but was not able to test the hypothesis himself. He basically did only half of the scientific work, probably due to lack of data at the time he wrote *Das Kapital*. Recently, Thomas Piketty did the other half of the scientific work and tested the hypothesis. His conclusion was that Marx was right. That is to say that even upon intensive scrutiny he could not reject them – since in science you cannot prove anything correct, you can only prove things to be wrong. All data that Piketty analyzed hint at a correctness of the theories of Marx.

Picture 9: Karl Heinrich Marx (1818 - 1883)

Marx (Picture 9) analyzed the society and came to the conclusion that a society can be organized in not more than five different ways when it comes to production and these are stages of evolution of civilization:

Tribalism (primitive communism)
Slavery
Feudalism
Capitalism
Socialism
Communism

The difference lies in the fact how labor is organized and how the

added value that is generated is being distributed. In tribalism everybody is a free man at the service of the tribe. Nobody had any possessions and everything was being organized by and for the tribe. In a system of slavery a person belongs to his owner, who also owns the things being produced by the slave. The slave or chattel is thus a piece of capital in the eyes of the owner. In feudalism only the production befalls to the owner, the feudal lord, while the person himself is free. In capitalism the person offers his labor on the free market. He is a free man, but the produced goods belong to the buyer of the labor, after payment of wages, the amount of which is established on the free market. Socialism is a form of capitalism, in which the government confiscates and redistributes wealth. In communism labor and the distribution of the added value created by that labor are being governed by the whole, the commune.

One remark has to be made here. It is assumed here that workers produce *with the help of capital*, while in the previous chapter the assumption was made that things are produced by labor *and* capital, possibly in conjunction. The difference is in the then following possibly emotional humano-centric definition of 'added value'. If, for instance, in a factory a robot makes cars and a factory worker has to press a button early in the morning to get the robot started, then the worker produces the car with the help of the robot. All cars are thus produced by him and if the wages of the worker are less than that necessary to buy all the produced cars, then he is being skimmed. In another, more capitalistic, vision of production the cars are made by the worker and robot together and the wages/profit are distributed according to free market principles. "If you don't like it, then you can go and look for a job elsewhere", or, "If you find me too expensive, then hire somebody else. I quit!" In other words, the rewards are per definition 'fair', because they are established on the free market and as we have seen in the definition of trade (page 12), a trade is always fair because both parties involved in the trade are always satisfied. Here equating 'satisfied' and 'fair'. (We do not do any emotional analysis and do not take moral conclusions; this is not a book about psychology or ethics). A non-emotional definition of 'added value' can easily be made, namely simply how much more is being made when element X (for example labor or capital) is being added to the production process (for labor and capital it is p_{n} and p_{k}, respectively). Also we can readily compare

this added value of labor and capital with how much they get paid for it on the free market in terms of consumption rights.

The central question that Marx asked is the following:

> Workers produce things and consume things. Workers produce more than they get rights to consumption. Where does this difference go to?

In capitalism the difference goes to the capital. First of all, the statement that workers produce more than they (can) consume is trivial. Because it is not the worker that decides if production is done or not, but the (owner of the) capital, this worker will only be hired, his labor bought on the free market, if the capital is happy in this trade. Since capital has but a single objective – barring philanthropy, it is making profit – the business will only be concluded, the trade being made, if the labor costs less than it produces. Full stop. The difference between what is paid to workers and what they (can) consume is either directly new means of production made, or a stock of goods, or money. Any of those are forms of new capital.

This if society is organized around capital – 'capitalism' – where decisions are uniquely made by the capital. Marx put it in his famous 'equation', which is more like a time sequence. A production step consists of, from left to right:

$$\text{M} - \text{C}\{\text{MoP, LP}\} - \text{P} - \text{C'} - \text{M'}$$

Capital, or specifically money (M) to make the reasoning simpler, is being used to buy certain commodities on the free market, namely natural resources, or generally speaking means of production (MoP) and labor power (LP). This qualifies the system, that labor is offered on the free market. Everything that can be bought and sold on the free market we call commodities (C). With the acquired commodities production (P) is done and new sellable commodities (C') are manufactured. The selling of these commodities results in new money (M') that is used in a new step of production.

This is an eternal cycle in which labor is being skimmed because the contribution of labor to M'−M is more than the cost of that labor on the market. (Even worse, if we consider in this step that humans

are, or should be, in control of society and the production, the labor should morally get the full M'−M, as discussed above). But because all commodities are bought on the free market they all get exactly what they are entitled too, for sure *less* than their added value, otherwise they would not be bought and used in production. The worker gets less than what he makes. He makes ten breads per day and can eat eight or nine.

Without attaching any moral value to the conclusion, it is clear that the system accumulates capital, as we have seen before. In terms of the Marxian equation, capital can only increase, because in liberalism (that includes freedom of manufacturing) capital (that makes the decisions in capitalism) will only do a production step if M' > M. Full stop. Nobody will produce to make a loss. (Ignoring philanthropy, which is irrelevant anyway).

In fact, not even playboy behavior of the super-wealthy, squandering away entire family fortunes, will stop the accumulation of wealth. That is because at *every* step on the market profit is made, or the step is not executed. So, if one family buys a Rolls Royce every week and stores it in its garage, this lowers the capital of that family – a Rolls Royce is wealth, but not capital, unless it is used as car rental for weddings, or something like that – but it is increasing the capital of the Rolls Royce factory owner, who makes the Rolls Royce on a for-profit basis. Thus, even in this extreme case, the capital concentrates. The playboy slides into poverty where the Rolls Royce factory owner gets ever richer, until it has *all* the capital, whence it will stop production.

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One could now think that an entrepreneur would *like* that M' is bigger than M but that this is not always the case. That sometimes M' is larger and sometimes smaller. And thus no *guaranteed* accumulation of capital occurs. That is indeed a way how to make it mathematically work, for instance through bankruptcies (−100% profit), with an average profit of M'−M = 0. Also Nassim Taleb, in his book *The Black Swan*, mentions that bankruptcies are a way to make money and wealth flow back into society. In view of this it is unfortunate that there is a strong stigma on bankruptcies and, moreover, capital has nowadays organized itself in a way that big capital is not allowed to go bankrupt (remember for instance the words "Too big to fail").

In nearly all cases larger companies are kept afloat, see for example the case of NedCar on page 52, where a company was kept alive by state support. In other words, laborers are skimmed even more, this time also by the state. Everything to make sure that M' > M, even if money has to be sluiced from the wages of the workers to the coffers of the company, if not possible directly by lowering of salary. This is enabled by capital-controlled agents in government, just like Cain in the story before it is constructing infrastructures to protect its interests. Why they do this? Why does a dog lick his balls? It is a rhetorical question. Is it corrupt, immoral, or unethical in general? That is a political question that will not be answered here. We can continue the analysis even as if this phenomenon does not occur, and companies can go bankrupt if they become inviable.

Secondly, according to Thomas Piketty, the capital has in *practice* an average profit margin of about 5% (already corrected for capital write-off and maintenance), and this number is rather constant through the ages, so we can consider it an empirical market constant. That means that in practice for the entire system the reasoning for sure is correct. If somewhere there is a bankruptcy (a ROI of -100%), than somewhere else there is a larger-than-5% margin to compensate. In the chapter on liberalism, on page 45, we used a number of 20%, something that is probably not far from the truth in the 'healthy' part of the economy.

We should also not forget the psychology of the entrepreneur, which is well described in the book of Nobel laureate Daniel Kahneman, *Thinking, fast and slow*. It is about what people think when they decide about taking on a risk. Just think yourself: If you have a chance of going bankrupt and thus lose everything, you want to be compensated by a larger chance to make profit, don't you? Think for yourself, with what outcomes and probabilities would you start a company yourself or invest your money somewhere? Don't forget that *not* investing gives you 100% certainty on 0% profit. Don't assume that others think substantially differently. In practice, people come into action when they have a bigger chance of winning than losing, if their *expectation* value of profit is positive. How positive, depends on the risk. See Picture 10. Imagine like this: with a 1% profit, but no-risk 100% guaranteed, you'd probably invest. When risk is involved, you want an expectation value of profit that is higher. As in 50% of losing 4% and 50% of winning

10%, with an average of 3% profit. We can see the set of outcomes and probabilities as an 'economical environment'. If the economy is doing well, and the probabilities of winning are good, everybody is investing and we have a boom in economy. If the tendency is down, with higher probabilities for lower earnings, people that are free to do what they want stop investing (producing) and the economy stalls. This is what we call a crisis. To have a working economy a certain average profit margin is established that is *necessarily* non-zero. Capitalism is based on it.

In conclusion, in practice the average profit margin has always been around 5% and we cannot expect that it will be much lower in the future because of the psyche of the entrepreneur. We can see it as an economical-psychological law of the market. The result is that the average capitalist sees his fortune grow 5% per year. It actually means that he who has saved 20 years of salary never has to work again in his life. (Note that inflation is not factored in yet; inflation is a modern invention caused by the modern money system. When money is based on gold, there is no inflation. This will be treated in forthcoming chapters).

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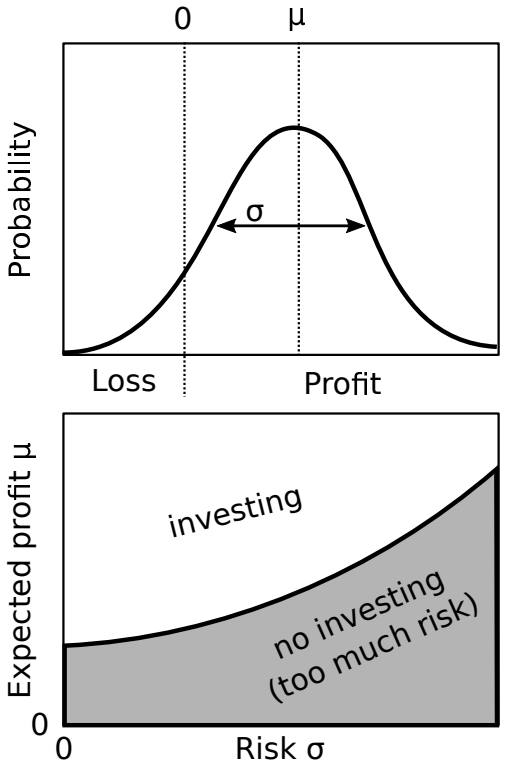
We do have a problem now. A mathematical problem. Produced things either are consumed or they are new capital. If not everything is consumed, capital will build up. But in a capitalist society it *cannot* be that everything is consumed, because that would imply that labor is fully and uniquely contributing to production, with the contribution of capital zero ($p_{\mathrm{k}} = 0$ or $K = 0$), and, moreover, that the workers are not skimmed at all, but instead get wages in the form of consumption rights equal to what they make. That is, labor gets paid 100%, and $C = P$. This is a capitalless hunter-gatherer society like that of the manna-gathering brothers Cain and Abel ... before they found a machine ($K = 0$) or with useless machines ($p_{\mathrm{k}} = 0$), the latter normally called 'objects of art'.

If on the other hand not everything is consumed, then part of the production is new capital and capital thus increases and gets an ever-growing weight in production and an ever-growing share of the profit. (see Picture 8). In the limit (mostly) the capital only makes new capital and barely anything is being consumed. Like in the case of

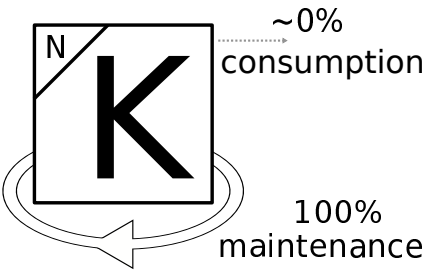


Picture 10: Top: When entering business, an entrepreneur makes an estimation of the probability of making profit. It can be parametrized as an expected profit (μ) and a risk, which is the spread of the profit probability (σ). With increased risk, even a loss can be made. On the other hand, if the spread goes to zero, the profit is guaranteed. Bottom: On basis of this, an entrepreneur makes a decision to enter a business or not. If the risk is low, a small profit is enough to make the decision to enter. If the risk is high, for instance because of uncertainty (lack of information?) the expected profit needs to be higher before the entrepreneur decides to enter the business

Cain and Abel. Abel still continues with his meager income (the same little manna produced), which is completely irrelevant in comparison with the production of the machine-producing machines of Cain. The system accumulates capital and builds up an arsenal of ever-more-useless means of production.

This is especially the case if capital and labor (can) make the same things and directly compete with each other on the free market. If we consider it in an energetic analogy, a human uses about 100 watt of energy. That may perhaps be produced with a 10% efficiency, so that the economical production apparatus must spend a kilowatt in consumption goods ('manna') for every human to keep him alive. If at a certain point this is 1% of total production, then the entire apparatus spends in total 100 kilowatt per inhabitant of this planet. Since the fraction of consumption (the 1 kW in absolute terms) is relatively shrinking, the total amount of energy spent is increasing. It is clear that, considering the fact that the Earth has limited resources, there must be an end to this growth. Both capital and humans have to reign in their energy consumption. Both have to reduce percentage-wise the same way, since that is established on the free market of commodities and labor and capital-work still are interchangeable. For capital it means eventually a marginal profit of 0%. Long before it happens, the consumption drops below 100 watt and the human dies. In any case, also capital will stop producing, when the profit margin drops significantly below 5% as we have seen before. In conclusion, it eventually winds up in poverty and crisis. Capital is digging its own grave. Picture 11 depicts the situation.

In the other extreme, if capital and labor are not competing on the free market and labor is essential for the production process, such that labor can demand high compensation being in a key position, then the production will only be done if (5%) profit is being made on that labor; however high the wages may be, the selling price of the product *must* be higher, to compensate for it. After all, capital is making the decisions of production and not labor. The *only* goal of capital is making profit and this defines capitalism. In this way, once again, labor is getting paid less than what it produces and the difference is stored into new capital, be it money, means of production, stock, or whatever. Note that this phenomenon is even present when the natural limit of what our planet can sustain is reached. Capital K *must*



Picture 11: Final situation of the cycle of capitalism. Capital only makes things to maintain the capital. The profit margin is zero, $\Delta K = 0$, and also nearly no consumption goods are being made, $C = 0$. A useless arsenal of means of production

grow, or the machinery stops (crisis). It means that the destruction (overexploitation) of the planet is an essential ingredient of capitalism. When the limit is reached, the total saturates, and if the capital is growing, it means that labor (humans, N) is shrinking. People will die. One way or another, poverty and misery are unavoidable. We see for instance recently in the news that factories of cars stop production, which they say is temporarily. The calculation of this is placed here in an intermezzo.

Intermezzo: Consumption in saturation

In an equation, to show it better, we repeat Equations (4) with production equal to consumption and new capital, in a production step, when the limits are reached and production is constant, we have

$$\text{(constant) } P = p_{\mathrm{n}} N + p_{\mathrm{k}} K = C + \Delta K. \qquad (11)$$

We assume that the amount of laborers (N), productivity of labor (p_{n}) and capital (p_{k}) do not change, and that labor gets rewarded proportionally to its contribution to production, let's say $\alpha = 90\%$ of its production is paid in the form of consumption rights (and

because there is no saving, it is consumption C), so

$$C = (1 - \alpha) p_{\mathrm{n}} N. \tag{12}$$

It then necessarily means that this skimming is compensated by an overpaid capital (as a whole),

$$\Delta K = (1 + \beta) p_{\mathrm{k}} K. \tag{13}$$

α and β are variable and interdependent, but both are necessarily larger than zero. Labor *has* to be skimmed and then capital *must* get bigger. As we have seen, the law of the capitalist market is that $\Delta K/K$ is equal to 5%.

If we now substitute this into the equation for consumption (Eq. (12)), multiplying it by total production P and dividing by its equivalent, (Eq. (11)), we find that

$$C = (1 - \alpha) \times \frac{p_{\mathrm{n}} \times N}{p_{\mathrm{n}} N + p_{\mathrm{k}} K} \times P \tag{14}$$

We see that *if* P is constant, as in saturation, *and* capital still decides to produce (because there is profit, $\Delta K > 0$), then consumption *must* decline, because K is constantly growing. Capital is eating away the consumption meant for humans.

If people are dying, N is declining and we wind up with a situation described by the equation that follows from Equation (11):

$$P = p_{\mathrm{k}} K = \Delta K. \tag{15}$$

I.e., the system is winding up in a state of self-amplifying machinery. Actually, the net production will fall, because all production will be used for maintenance and not for growth $\Delta K = 0$, and we have a set of self-maintaining machinery. In the eyes of the humans this

is a set of useless machinery, but that is an emotional humano-centric point of view that cannot be put into equations; the maintenance of the machines is very useful for the machines. We just must conclude that if the capital is making the decisions – that is capitalism – the capital will survive, which somehow makes sense; "What did you expect, duh!".

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Thomas Piketty adds something else to this, or he says it in a rather different way. He names the following essential to the above mentioned divergence: If yield on capital (r) is bigger than economical growth, g, then the share of capital in the economy is growing. It is nearly a circular definition. Assume, for instance, that the economy is not growing, $g = 0$, and the yield on capital is 5%, then capital *must* grow relatively to labor. In the introduction chapter, around Equation (1), we have seen that to keep the system financed and running, we needed economical growth ($g > 0$) and now we see that this growth should at least be 5% to keep the system stable. Yet again, 5% growth is only possible in days just after a catastrophic event and economy is recovering, building up capital in the form of means of production. For instance after a world war, of a bankruptcy. As an example, Russia managed to get economical growth figures in the order of 15% in the year after its bankruptcy in 1998. If the economy is growing slower that the yield on capital, then the worker loses out and starts getting a smaller share of the pie. We see that the economy *must* grow, *coûte que coûte*, or humanity is doomed. There is no such thing as a 'steady state'. Either advance or die. We must exhaust the planet in an accelerated way. Not only because of financial-technical aspects, but also because of the necessity inherent to capitalism.

We might have hoped that there is some sort of natural market mechanism, a feedback of the type of Say in the system – every product creates its own demand; prices of unsold products are dropping until they are sold – in which the yield on capital will drop to zero. In reality this effect is absent, according to Piketty, possibly because the lower prices of products (deflation) is immediately factored in the

wages of the workers, or it causes an even larger incentive of substituting humans by machines. It'd also imply an end to the system; if the yield is zero, nobody will invest and produce. The reality that everything has become unaffordable, an effect that was mentioned in the introductory chapter, proves that Say is wrong.

Summary of capitalism.

Every employee, from low to high, meaning that the director of the factory is included, gets paid in the form of consumption rights that are *always* lower than the added value that he or she produces. (Even those overpaid bank directors are underpaid!) If this were not the case, the person would not be hired and not do that specific production step. Full stop. The skimming (added value produced minus consumption rights paid) depends on the risk but on average the capital is winning 5% per year.

Nobody is doing investments if the expected yield is less than this 5%. If it drops below this 5%, production stops and we have a crisis of overproduction, named after the fact that we have infrastructures to produce and consumers to consume but still the economy stalls.

If the limits to growth are reached because the planet cannot take more, the total production is constant. Because the capital must still grow, it means that the consumption must go down. The system winds up in a situation in which only useless capital is made and humans perish, and finally in a system where this capital is just maintained, nothing more. Endlessly resources are spent for a useless cause.

An outlook that is more gloomy than this is sheer impossible. The moment the system stops growing it runs itself into the ground. That is what Marx concluded in the last words of his book *Manifest*: "What the bourgeoisie therefore produces, above all, are its own gravediggers".

(For 'bourgeoisie' we should read 'capital' [owners], where the workers were called 'the proletariat', and a constant struggle of these classes exists). The capitalist system must grow. For instance, countries must be added to it, either by conquering, or by forced regime changes. The reason why the United States is waging wars all over our planet has much less to do with the welfare of people then it has to do with physically augmenting the size of the capitalistic system, in order to save it from auto-destruction. Grow or die. The European Union now suffers from this same effect.

In my opinion there are basically five outcomes, or continuations, of this system, with the sixth one (exponential growth) stops. These are the six ways:

- **Exponential growth**. As long as the system grows, it runs very smoothly and the exponential character of the system – capital (means of production) makes new capital – means it is the fastest road to wealth. New markets thus have to be explored and conquered. Yet, given the physical limits of our planet, this is not a permanent solution, as already discussed in the first chapter. What happens if all the markets are conquered and the planet reaches saturation in production? One of the other five scenarios will kick in.

- **War**. As said before, war destroys capital, so that it can be constructed again. Like Sisyphus. This character from Greek mythology was condemned to eternally rolling a stone up the mountain. Every time he managed to reach the top of the mountain, it rolled down the hill and he had to start all over again. This is also a solution for our economical system and actually what has happened many times in history. Sisyphus would be very proud of our behavior.

- **Crisis**. If nothing is done, we will be in eternal crisis. Saturation is reached, production is stalled, or only means of production are made. In either case, it means misery for the people. Politicians on the liberal side of the political spectrum think that lowering the salaries will solve the problems, for instance by enabling exports. First of all, this reasoning is faulty because exportations

will export the problem (see the importing and exporting countries as one whole and you will readily understand that there is no magic global crisis-solution through exporting. At best one country exports – offloads – the crisis to another). Moreover, who has understood all of the above, high salaries were not the cause of the problem, the problem was that the salaries are always lower than the added value. That means that if salaries are lowered, workers will have even less consumption rights (C) and more capital (ΔK) is made. It might (initially) save the economy, by increasing the profit margin back to the needed 5% to avoid stalling the economy – we will see a lot of economical activity – but for sure it entails an increase in poverty and misery. Poverty and misery are often fertile ground for one of the other outcomes mentioned here.

- **Socialism**. By democratically deciding to blindly take away – tax away – the wealth of the rich and give it to the poor without demanding *anything* in exchange, the economy can be resurrected and peace can be insured, just like in our virtual story of Cain and Abel. Note that the taxation has to be done on *wealth* and not on *activity*, neither activity of labor, nor of capital (corporate activity). The former is obvious, because it takes away even further the power of consumption of the workers, something that caused the crisis in the first place. The second is less obvious, but if corporate activity is taxed, it runs the risk of having a profit margin dropping below the necessary 5% mark and activity will stop.

- **Revolution**. Confiscate capital. Marx proposed this and it will be discussed below. Mathematically it works; if the humans decide about things, humans will come out as survivors. In practice it might not work, but it has not been tested anywhere yet in reality. Also note that a revolution is difficult to distinguish from a war. A revolution is like an internal war and often also a lot of capital is being destroyed. This resurrects the economy as well.

- **Borrowing**. It is possible to eternally lend money to the consumers to buy products in order that a substantial part of production can be non-new-capital. Giving money to people and

then industry subsequently doing its best to win it back. It is like a waterfall, pumping water from low to high and then let it fall back, or in the case of money, pump (lend) the money from capital to consumers that can spend it. Note that people should then be allowed to live beyond their means. In fact, living beyond one's means is a heroic act in terms of saving the economy. But how do we organize this? How is it done, that eternal lending? This will be treated in the next chapter, when we go back to the core subject of this book, money. More precisely, fractional reserve banking. It can be said here already that this system has its own problems, which means that we are solving a problem with an even bigger problem.

Marx, in his book Manifest saw a solution in confiscation of the means of production through a revolution, and stop organizing the economy around capital, but instead organize it around labor in so-called communism. Mathematically this is a solution. By definition there cannot be a problem; any time a problem surges, workers and not capital take decisions to produce. Any problem is organized away with the stroke of a pen (an order from the party leader). Exhaustion of the planet cannot occur, because production will be adjusted by decree, this is sharp contrast to liberalism/capitalism, where there is a free race to the limited resources, similar to how nature is organized.

However, as history has shown, communism is also no solution, something we know since the Soviet Experiment. The Bolsheviks confiscated all the capital of the rich. This will actually not change anything, if the *system* does not change; it only implies a transfer of the owners of the means of production, who then continue to treat it in a capitalist way, namely based on a goal of profit. (We basically stick to Picture 8). The capital is now theoretically in the hands of everybody, but in practice it is still in the hands of a new small select group, the party leaders. "We are all equal, but some of us are more equal than others". Initially it might still go well, when the capital that was destroyed in the revolution has to be replaced, but then the system enters the same saturation as described before. The same we have seen with other revolutions. For instance the French revolution of 1789 in which the *ancient riche* that had accumulated all the wealth had been thrown over. The initial euphoria of *liberté, égalité et frater-*

nité, freedom equality and brotherhood, rapidly ebbed away and was replaced by pandemic disappointment because basically nothing had changed; capital was just in the hands of new people that soon became the *nouveau riche*. This phenomenon inspired Marx to make his analysis about capitalism and he saw the solution in a confiscation of the means of production and bring it under control of the laborers. The abolishment of private ownership; everything belongs to everybody. In practice this also did not work. In Russia the system actually failed because a system with state-controlled production leads to a lack of incentives of innovation; it basically ran out of ideas and a hunger for capitalism further undermined the moral.

Moreover, or maybe even more important, if the means of production are in the hands of everybody and everybody gets his share, then there is no incentive for anybody to actually work. The consumption rights that a person gets namely depends on what *others* are doing, and not so much on what the person is doing. Slowly productivity will drop until the system winds up in pandemic poverty and misery. Especially compared to other economies, Russia was doing very bad. This is also caused by the fact that the contemporary economies of Europe were all coming out of two devastating world wars and, as we have seen, in such an environment capitalism is the perfect economical system.

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A bigger problem, that also affects modern Western economies, is the fact that large and centrally-led economies like that of the former Soviet Union, but also that of the United States and the European Union, is that they are what Nassim Taleb calls 'fragile'.

Nassim Taleb (Picture 12) nicely explains that in his book *Antifragile: Things that gain from disorder*. A thing can be fragile if it cannot take a beating. Opposite to fragile is not the concept of 'robust', what one would expect, but 'antifragile'. Taleb explains it with the analogy of a package sent by mail. If I send a package with glass cups to Australia, I'd better write on the box 'fragile', in order for the mailman to be extra careful with my parcel so that nothing will break. On the other hand, if something is robust (like, for example, a book), then I do not have to write anything on the package, because it does not matter if the mailman treats it careful or not. Opposing fragile,

Picture 12: Nassim Nicholas Taleb

Taleb places 'antifragile', what means that it would be good for the package to shake it every now and then. "Please, Mr. mailman, drop this package whenever you can".

A centrally-led economy is fragile. That is because at many places there will exist mono-culture. Diversity is contained and eradicated because it is inefficient. Once an optimal situation is discovered somewhere, this idea has to be implemented everywhere if society is aiming for high efficiency. We see, for example, that the European Union strifes to make all the rules equal in all member states. We basically all have to be copies of one another and of the German economy that serves as ideal. Such mono-cultures are susceptible for illnesses. The problem is that if one region gets ill – a 'crisis' we call it in economy – this spreads rapidly to each and every corner of the continent. There is no resistance whatsoever built into the system.

The solution of the central government is to attempt to make the economy robust. This implies that we see the economy as some kind of machine with a lot of buttons; if we need to intervene, we just turn some knobs and tune the system back to perfection. The economy is like a washing machine, and if something breaks down, or if we are not

happy with the end-result, we have to intervene, for instance change the ball bearings. The economy is seen as a similar piece of machinery, albeit very complex (hence the occasional crisis that demonstrates our, as of yet, insufficient knowledge, but from which we can learn a lot to avoid them in the future), and with economical theory of wise men that design financial and economical technological tools – recipes – we can mange to optimize it and in the future we will live happily ever after. This we call 'Financial Engineering'.

The master of this philosophy of financial engineering is John Maynard Keynes. He summarized it in a dozen parameters and equations that were related. Savings, investments, production, state spending, etc. This way he could show that, if there is a crisis, the solution is increased government spending. In other words, he 'proved' that an anti-cyclic government policy could prevent a crisis. Anti-cyclic means spending more when the economy stalls or shrinks. Exactly the opposite of our modern Austerity measures that endorse cutting state spending in times of crisis. That is inspired by other economists that saw the washing machine of the economy in a different way. An example is Milton Friedman that advocated cyclic government policies.

The difference between Keynes and Friedman is that they used different assumptions about how long it takes before the measures of the government have effect. Imagine the economy shrinks. Should we intervene? Imagine we do this and inject vast sums of money into the economy in order to stimulate it back to life. If the measures have immediate effect, then the economy will indeed grow. But what if the effects take a couple of years to materialize. The economy maybe recovers just by itself, maybe because of some periodic behavior of economy. The measures that were taken then have effect just when the economy is growing and the measures thus cause an overheating of the economy. This makes us decide to cut spending ... something that will have a delayed effect and hits full force in the middle of the next crisis. It would seem more adequate to start earlier with the measures of money injection, for instance when we are at a deceleration of growth. Or maybe even earlier, when we are at a peak of economical activity. This is the difference between Keynes and Friedman. It is basically the same philosophy of seeing the economy as a tunable system, but the (supposed) functionality of the knobs and gears is different.

Both see the economy as a machine that has to be made robust

by every now and then making interventions and in the meantime studying the system and discovering what are the gears and how they work. Both are seeing it wrong, according to Taleb, because both turn the system fragile. He calls a country that constantly smooths out any imperfections Extremistan. By constantly solving tiny problems of the system you create a pseudo-stability. That because suddenly you will see yourself faced with an intractable problem. Contrasting this is Mediocristan that is constantly pestered by small random problems. By not directly and immediately intervening, the system gets stronger and resistant to larger variations. It is important to make the system antifragile instead of robust.

To accomplish antifragility we should expose the system constantly to as much stress as possible. In an analogy Taleb describes how our body works. Modern science (technology) sees the solution of illnesses and ailments often in interventions in the body by prescribing antibiotics and other medicine if not trying to avoid exposure to the illnesses altogether. However, best for our body is exposing it to stress, for instance by vaccinations. Small illnesses. But also heavily loading the body every now and then. His own philosophy is to walk a lot and every now and then, let's say once a week, force the body into giving it all and loading it to the maximum. That makes the body stronger. As the saying goes, "What does not kill you, makes you stronger".

The same is with the economy. All centrally-led economies are fragile, because they are seen as a machine where interventions are required. The politics in Brussels are a good example. Banks are kept alive – too big to fail – but that means that inviable things are kept alive. Thus there is no way for the system to build up resistance, that is, to become robust. Exactly the opposite is achieved, namely making the system fragile.

A good system is antifragile. That is a system that benefits from bankruptcies of banks and businesses. Moreover, the system would benefit from decentralization because it allows for diversity. That will cause a variety in the economy DNA and if then unexpectedly a problem arises, the system is getting even stronger. This is antifragility, in which the system benefits if it is shaken every now and then; the package will contain anti-breakable material.

To give an example, Portugal is characterized by chaos. An unorganized mess. The Romans said about the Portuguese, "A tribe that

doesn't know how to govern itself and does not want to be governed". The result of this chaos is that it is one of the oldest and most stable countries of the world. The borders of Portugal are about 700 years old. Eat your heart out. The stability is exactly the result of decentralization (non-government). The country is so robust that it unthinkingly accepts the crises and Austerity. "We'll survive that too". There where hell would break loose in other countries.

A combination of decentralization and not covering up of stress. This is ultra-liberalism. But that, as we have seen in the previous chapter, also does not work. We are rather in a deadlock. In the meantime our governments are doing exactly the opposite. The solution is seen in centralization, avoiding stress, and the protection of the interests of the capital, following the motto "stability before everything" and "what is good for the capital is good for the citizens".

Take the example of banks. A mathematical-statistical analysis shows very well what happens: Imagine we have 100 banks that each have a chance of 10% per year to go bankrupt. That is a system that is constantly in turmoil and every bank constantly runs the risk of going down. On average, a bank has a lifetime of ten years; every year one out of ten banks doesn't survive. But the entire system will never go down integrally. Chances of this happening are as good as zero, namely 0.1^{100}. That is $0.000\ldots$(here a total of 99 zeros)$\ldots 1$. The (expected) lifetime of the entire system is longer than the age of the universe, by about a factor 10^{90}. Who waits for a bank-system failure better not hold his breath. However, for every banker the risk is quite high. That is why they convene and agree to form a banking union in order to make the system "stable and robust". The agreement is that they will lend each other the helping hand in case one of them faces problems. The chances for an individual bankruptcy are much smaller now, say 1% per year. But now we talk about a system wide collapse. That is once every 100 years, 10^{98} shorter lifetime for the banking *system*. That while the idea was to make the system robust, the opposite happens. Pure mathematics, without knowing a thing about banking. Yet, this *is* the reason why we have a bank crisis (because they are centrally led) and not, for instance, a restaurant crisis. The restaurant sector is antifragile; every time one of them goes bankrupt, the others serve better food.

In conclusion, centralization and the urge to make the system 'ro-

bust' unavoidably lead to large problems by in fact making it fragile.

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This concludes the chapter on Marx and communism. We have seen that capitalism leads to severe problems when the system enters into saturation. Poverty and misery, a lowering of consumption, are unavoidable. We have also seen that centrally led societies are also not good solution. We had to delve into some politics to discuss this, but in any case, this book is not about solutions or politics in general. A summary was made about possible outcomes of the system: War, eternal crisis, socialism, revolution or money lending. For the latter we have to return to the core subject of this book, money.

Chapter 7

Fractional-reserve banking (FRB)

New York artist creates 'art' that is invisible and collectors are paying millions.

27-year-old artist Lana Newstrom says she is the first artist in the world to create invisible "art."

"Just because you can't see anything, doesn't mean I didn't put hours of work into creating a particular piece" – Lana Newstrom, Artist

"Art is about imagination and that is what my work demands of the people interacting with it. You have to imagine a painting or sculpture is in front of you," says Newstrom.
Paul Rooney, Lana's agent, believes she might be the greatest artist alive working today: "When she describes what you can't see, you begin to realize why one of her invisible works can fetch upwards of a million dollars." said Rooney.

Tuesday September 23, 2014, CBC Radio

In Chapter 2 we saw how money evolved naturally and we left the readers with a cliff hanger. The money, any goods that can serve as means of payment (for example gold), winds up in safes from where it

is lent. The problem is that everyone in this game is being rewarded while it is a zero-sum game. The amount of gold in the world is more or less constant, but the depositor of it, as well as the banker and the borrower (entrepreneur) expect to make profit in terms of gold. *Somewhere* something must go wrong. You do not need to be professor in mathematics to understand that.

What is going on here? Why the system does not crash? The answer is that modern banking not only has the function of storing gold or money, but also and foremost the function of money *creation*. Most people think that banks receive money from people who saved it and subsequently lend it to third parties. That that is their core-business. That is not true. It is probably one of the biggest myths about money that haunt society. In principle banks create their own money.

Intermezzo: Bank bought with money from the bank itself

In 2008 BPN (Banco Português de Negócios) was nationalized as a result of the international financial crisis. The Portuguese state injected about 600 million euro into the bank (equal to all holiday allowances of all public servants for two years, money that was indeed withheld from these state employees, but rather permanently instead of temporarily). After the recapitalization the bank was bought by the Angolan bank BIC for the sum of ... 40 million euro. That is thus a swindle of at least 560 million euro. To make things worse, the bank seems to have been bought with money from the bank itself! 40 million credit from BPN was supplied to four key persons, with which they paid the required sum to the state. To make it even worse, some months later Portugal itself was in trouble and was technically bankrupt (insolvent) and had to ask financial assistance from the so-called Troika. While that immediately cost Portugal the hefty sum of 600 million euro – as if you give a concrete life vest to a drowning man – the responsible

persons were promoted to vice president of European Central Bank (Vïtor Constâncio, former president of the Portuguese Central Bank) or could remain as president of the country (Aníbal Cavaco Silva), in spite of the fact that the latter had dubious connections with the former CEO of BPN, José Oliveira e Costa. (I urge the readers to do a search on Google: *BIC comprou BPN com crédito do próprio banco*).

To explain how that works, we first have to understand how bookkeeping works. More precisely, how double-entry bookkeeping (DEB) works. Thus we have to resume our historical analysis and go back in time to where we left it off.

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The banker was receiving gold from the depositors and lending it out. This in full knowledge of the depositors, although initially it probably was being done stealthily. Initially infuriated, the depositors were pacified when they also got a piece of the action in the form of interest.

An important side effect was that the bank safes were very safe – hence the name. So safe that most people never came to claim their gold. When a payment had to be made, especially when large sums were involved, instead of collecting the gold, walk with it through the city and go and pay his bills to a client in another part of the city, who had then go all through the city to the bank and redeposit it, both the owner and the receiver of the gold in the transaction preferred to conclude the business in the office of the bank. Both parties met and while the banker updated his books (the ledger), adding an amount to one client and subtracting from another, the two businessmen finalized their business. Curiously, both parties did not even need to physically see the gold.

Somewhere around that time, also proofs of deposit of gold were starting to be used. Because, trusting the banker is one thing, having a proof is something better. Trust is good, proof is better. Thus, the banker handed over proofs of deposit when someone deposited gold in his bank. On it was written something like, "This note can be

exchanged for 1 kilo of gold at MyBank", signed by the owner of the bank. Still today 'banknotes' come signed and all.

It is of *utmost* importance to realize at this moment that the banknotes are connected to the specific bank. Not to another bank, nor to the state, nor to the king. At the note is written "Exchangeable to gold at *MyBank*" and not "Exchangeable for gold or goods at anyone in society", or "... at the state", or "... at any bank". Only at the bank and only the specific bank that issued it. Nothing more and nothing less. The bank has namely nothing to say about the rest of society or about the government or about other banks. Today it seems we can take money from one bank and deposit it in another, but this is a superficial illusion. It doesn't work like that. We'll get back to that later. Let's get on with the story.

Proofs of deposit were thus circulating in society, 'banknotes', that guaranteed a certain amount of gold. To conclude business, one did not even have to set foot in a bank anymore, especially when the banks were considered trustworthy. The banknotes could be directly exchanged for goods, because the seller of the goods has full faith that, once gold was needed, the banknote could be exchanged for gold anytime he wanted. A banknote is just as good as the gold – or nearly as good – and the risk of having a worthless note does not outweigh the trouble that has to be taken to go to the bank and conclude the business in person and in the presence of the banker, where anyway the gold will not even be touched and most often not even seen. Imagine somebody living far away from the particular bank. The trusting and accepting of banknotes is a deliberate risk taken by the entrepreneurs. Of course it depended to a very large extent on the trustworthiness the bank radiated. Trust is *everything* in banking.

In the meantime the banker was counting flies in his office. Nobody came to visit him anymore. Nobody did business in his office anymore. He still lent out gold and got his premium for that. His job consisted of estimating the trustworthiness of the borrower and calculate the demanded interest. Often the gold was not even lend out in a physical shape, but in notes indistinguishable from the notes given to the depositors of the gold.

One day he realized that there was no limitation whatsoever in lending out more 'gold' – issuing more banknotes – than he had physical gold in the safe. Since the gold never left the safes, he could easily

Table I: Concepts of Venetian bookkeeping

Concept	**Meaning**
Assets	Everything that is mine and that represents value
Liabilities	Everything I owe to others
Equity	Assets minus liabilities ($E = A - L$)
Solvent	Credit worthy $E > 0$
Insolvent	Technically bankrupt $E < 0$
Liquidity	Amount of money in cash readily available for current payments

issue more banknotes, more promises to gold than he had stored. However, he felt that it was rather immoral to promise more than he could deliver. I am not a politician!, he was thinking to himself. He was thinking for a long time about it. Three seconds later he went ahead with the scheme.

Fractional reserve banking (FRB) was born. FRB implies that the bank issues more banknotes than it has reserves in the safe. The banknotes are only partly backed up by gold. The technique that is being used for that is called double-entry bookkeeping. This is the bookkeeping that, if a sum of money is lent out, it appears twice in the ledger, once at the 'assets' (things the world owes to us) and once at the 'liabilities' (what we owe the rest of the world). This way of doing bookkeeping is also called the Venetian Method, named after the 15th century Venetian mathematician Fra Luca Pacioli, 'the father of bookkeeping'. Specifically his book *Summa de Arithmetica* with therein the *Particularis de Computis et Scripturis*. It works as follows:

In double-entry bookkeeping all our possessions are put on the left side of the ledger, at 'Assets' and all our things we owe to other on the right side at 'Liabilities'. Imagine I have a house worth 100 thousand euro. I put it at my assets. But, maybe I still have a mortgage to pay 50 thousand euro. I'll put that at liabilities, because I owe it to someone, the bank in this case. My car is evaluated to be worth 10 thousand, so that is a possession that I'll put on the left at assets. I still have a debt of 5 thousand on a credit card. That appears on the

right side at liabilities, because somebody can claim this money on me. Apart from that, I still have 5,000 euro in the bank and 200 euro in my wallet. Assets. All relevant concepts of double-entry bookkeeping are explained in Table I.

Now, the total amount of assets may be different from the total amount of liabilities. The difference is called 'Equity'. If this is positive, it means that I have a net positive value and I am not bankrupt (yet). The trick in bookkeeping is to add the equity on the *right* side, at the liabilities, which may seem counterintuitive, since if my equity is positive, I have assets. However, this is done to make the ledger balanced. This way, the sum of assets are always equal to the sum of liabilities. If not, we have done something wrong in our bookkeeping. The books *must* be balanced. The equity is placed at the bottom right of the balance sheet and is that value that makes the sheet balanced. Here is an example of my balance sheet based on the above numbers:

Assets	Liabilities
House: 100k euro	Mortgage: 50k euro
Car: 10k euro	Credit card: 5k euro
Bank saldo: 5k euro	
Cash: 200 euro	
	Equity: 60,200 euro
115,200 euro	115,200 euro

Imagine I now wreck my car. Immediately and automatically my equity changes with it and my balance sheet becomes:

Assets	Liabilities
House: 100k euro	Mortgage: 50k euro
Bank saldo: 5k euro	Credit card: 5k euro
Cash: 200 euro	
	Equity: 50,200 euro
105,200 euro	105,200 euro

It is interesting to note that if my equity is negative then I am technically bankrupt. It may be that no judge has declared it yet, maybe because nobody has noticed it yet, but in principle there is no sense in continuing my company and it is better to ask for legal bankruptcy to get my creditors off my back. A technical bankruptcy

– when the equity is negative – is called 'insolvency'. As long as my equity is positive, I am solvent, if not, I am insolvent. At that moment it is better to close shop; new investments are basically throwing money into a bottomless pit. It is much better to start a new company, with an equity of zero because it would be immediately solvent.

Sometimes companies *seem* to be insolvent, but don't forget that they can have something what is called 'goodwill' in the books. A football club like Real Madrid might seem insolvent if they cannot pay their current running costs, but the brand of Real Madrid is also worth a lot (except in the eyes of fans of Barcelona, of course). This value is known as goodwill and represents the possibility to generate profit in the future. Even if Real Madrid has more debt than the worth of all their infrastructures and players – according to the fans of Barcelona this happens quite fast – then still there is hope for the future of Real Madrid. The brand of the club is therefore an asset in the books. Real Madrid could go to the bank and ask for a bridging loan in order to keep exploiting the brand. Imagine like this. If FC Real Madrid were to stop, a rich oil sheik would buy the brand name at the foreclosure auction and put the football club Real Madrid back on the map. The name Real Madrid therefore represents value and is added on the balance sheet as an asset called goodwill.

Another concept is 'liquidity'. A company has problems with liquidity if the equity is positive, and therefore the company is solvent, but has acute problems of paying the current accounts. It is like having no money in your wallet, but have invested a lot of money in the stock market, and you have to pay for your lunch at the local restaurant. We have all been in situations like this. Normally family or friends help out by lending us some money. Companies in similar situations are in principle healthy, but only maybe rather poorly managed. Credit to solve problems with liquidity is normally costly.

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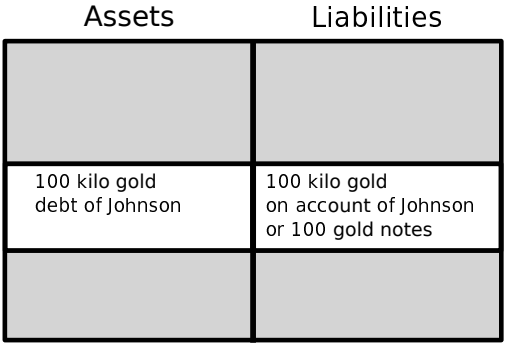
After having introduced the Venetian method of double-entry bookkeeping we can continue the narrative of bookkeeping at banks and see how this enables the creation of money out of thin air. Fractional reserve banking makes use of double-entry bookkeeping.

A bank can, in principle, start with absolutely nothing and create money out of thin air. This is done with double-entry bookkeeping

by adding on the left and right side of the balance sheet, at assets and liabilities, the same amount. At the assets an entry will be added with the amount of money that client X owes to the bank (what the client still has to pay to the bank) and at the liabilities will be added an item with the same amount promised to the client (what the bank still has to pay to the client; spendable by the client). See Picture 13. If gold is lent to Mr. Johnson, it is added to the account of Johnson or given in the form of banknotes (the two being fully equivalent, but it is easier to talk about banknotes, which we will do from now on) and simultaneously added to the liabilities, a debt to Johnson (or to bearer of the note if it were banknotes). Either Johnson or the bearer of the banknotes can go to the bank and claim gold. The notes or the account entry are a promise that gold *can* be retrieved from the bank; no need for gold to physically leave the bank. Important to remember that these banknotes or account entries are money in the sense of the definition we used, namely that products can be bought with them if so wanted (see the definition of money on p. 14). If the market has enough trust in that exchange for gold can be done if needed, the market will accept these banknotes or numbers on the accounts as if they were gold, and therefore they are as good as gold and can serve as means of payment for goods and services. Hence, money.

Note that the bank did not even have a grain of gold to lend, and creates money – promises of gold – out of nothing. Those of you who start protesting – most people I know at this point immediately entered a phase of denial – it *really* is like that. Think like this: We have seen with the gold bank that it could and did happen. Where in history has it become impossible, for instance by the introduction of a law forbidding it, or by it turning non lucrative? If it is not impossible and it is obviously lucrative, a bank will do it. Why? Why does a dog lick his balls? Banks create money out of thin air because they can. To remove the last shred of doubt, Richard A. Werner of the University of Southhampton performed a small empirical test to see if new money was created when a loan was given to a client. His conclusion: "The money supply is created as 'fairy dust' produced by the banks individually, 'out of thin air'" (See Int. Rev. Fin. Anal. vol. 36, p. 1-19 (2014)). As Sofocles said, "The truth is always the strongest argument".

The money that is created is not real gold – no gold is created out



Picture 13: Creation of gold notes – money – by adding two entries on the balance sheet. If gold is lent to Mr. Johnson, it is added to his account and an entry at the liabilities is created, namely a debt to Johnson. Simultaneously, an asset is created, namely a debt of Johnson, an obligation for Johnson to pay to the bank

of thin air, that is impossible for a bank, considering the fact that it is not a gold mine, other than metaphorically – but promises thereof. The bank promises that the bearer of the notes can exchange them at any moment for gold. The client, on the other hand, promises to pay 'back' the gold, gold that he never received in the first place. So he just promises to give the gold.

Note that the situation is symmetric. The bank promises the bearer of the banknotes a certain amount of gold and Johnson also promised an equal amount of gold. Neither have it. No gold has exchanged hands, and only contracts (promises) have been exchanged. A signed bill of Johnson was given to the bank and signed bank-contract notes were issued by the bank. (In 2016 there are still signatures of the president of the bank on the banknotes. That is the signing of the promise).

How far can one go with this game of empty promises? In principle infinitely. 1 kilo of gold can be promised an infinite number of times. An infinite number of notes promising "1 kilo gold" can be issued. In practice there is a limit, because people will start doubting about the exchangeability of the banknotes. If I tell people that I have one bil-

lion kilos of gold in my attic and promise that on paper notes, then there will be a lot of people that will not believe me and the market value of my banknotes will drop. There is therefore a natural limit to the issuing of banknotes. The *seemingly* stronger banks will be able to push it further than weaker ones. But in principle it is a matter of how far a bank dares to bluff. That limit, that sometimes is anchored in the law, is called the 'reserve ratio', RR.

Intermezzo. Four scenarios of gold banking

For the purposes of working out the definition of money of page 14, namely as a means of payment, let's take a look at how much money banks can create on basis of 1,000 lumps of gold.

Scenario 1:
Imagine client A (Anton) brings 1,000 lumps of gold (short: 'gold') to the bank. He gets for them a proof of deposit, a 'note'. Imagine, client B (Bernhard) comes to the bank and wants to take out a loan of 900 gold. In scenario 1 we'll do banking as the public at large thinks it is done: The 900 gold disappears from the safe and B pays, for instance, a car with it. That gold is money, because it can be used as payment. Client A has no access to his gold. He has handed it over to the bank and temporarily has no access to it for a previously agreed amount of time. No gold has been created, nor, as a matter of fact, money. No more means of payment exist on the market. Even worse, in the definition of money, 100 gold that remained in the safe of the bank has disappeared, because nothing can be bought with it.

It is obvious that there is no problem whatsoever with lending 100% of the gold – 1,000 gold – because there is nobody that can make a claim to it (until the end of the period agreed at the time of deposit by A). A bank run is not possible. The notes that A has do not

give immediate rights to gold. They are just proofs of deposit.

This is the type of banking that we associate with a mortgage lender. Such a lender gets money from depositors and lends it out. A bank run at a mortgage lender is not possible, because their contract notes issued to A are not convertible back to gold until B brings back the gold and the period of lending written on the contract is over. If B, on the other hand, does not bring back the gold, A stays behind with a claim to the gold that the mortgage lender does not have. The latter will go bankrupt because A files for its bankruptcy.

Scenario 2:
Client A brings 1,000 gold to the bank and gets in return banknotes that can be converted *at any time* back to gold at the bank *by anybody* – on them is written "bearer" and not "Anton". Client B arrives at the bank and takes out a loan of 900 gold to buy things. The gold physically leaves the bank.

Because of the easy convertibility of the banknotes they are accepted in the market – A can buy a car with them – and they are therefore money. Also the gold of B is money because also B can buy things with it. The bank has thus created money. There are now 1,900 gold equivalents circulating. (900 gold and 1,000 banknotes; before it was only 1,000 gold). Note that the bank did not create gold, but only means of payment in the form of banknotes. Money of their own denomination.

Summary scenario 2:

1: A has a claim of 1,000 gold on the bank
2: The bank has 100 gold in its safe, 'cash'
3: B has 900 gold in his hands
4: The bank has a claim of 900 gold on B

Bank balance sheet:

Assets	Liabilities
100 cash (2)	1,000 A→bank (1)
900 bank→B (4)	
1,000	1,000

('→' means 'claim on'). The FRB ratio is 10:1. For every lump of gold in cash (2), there exist 10 claims to it (1). A bank run is possible, because there are more claims circulating than there is gold in the safe in the bank.

Scenario 3:
Client A brings 1,000 gold to the bank and gets 1,000 banknotes in return that are at any time and by anybody convertible back to gold. Client B goes to the bank and takes out a loan of 9,000 gold, which he gets in the form of 9,000 banknotes that are convertible at any time by anybody. Total amount of money (means of payment) circulating: 10,000 banknotes. The bank has created money. No gold has left the bank. This is type I FRB, in which a good (gold) is converted into promises thereof.

Summary scenario 3:

1: A has a claim of 1,000 gold on the bank
2: B has a claim of 9,000 gold on the bank
3: The bank has 1,000 gold in cash
4: The bank has a claim of 9,000 gold on B

Bank balance sheet:

Assets	Liabilities
1,000 cash (3)	1,000 A→bank (1)
9,000 bank→B (4)	9,000 B→bank (2)
10,000	10,000

The FRB ratio is 10:1. For every lump of gold in cash (3) there are 10 claims to it (1+2). A bank run is therefore possible because there are more claims circulating then there is gold in cash.

This third scenario creates more money than scenario 2 and is therefore more lucrative for the bank. Note also that scenario 3 cannot be distinguished from scenario 2 through an analysis of the bank balance sheet. Effectively both sides of the balance, assets and liabilities have been multiplied by a factor of 10.

Also note that now of all the money that is circulating, 90% is debt; All the gold is in the safe (is not circulating) and there are 10,000 banknotes circulating, of which A has 1,000 that are not debt, and B has 9,000 that are debt.

Scenario 4:
In this scenario money that came out of the bank above (let's call that the '1-bank'), namely 10,000 banknotes (let's call them '1-notes') and that were used by both clients A and B for buying cars of client C that subsequently brings it to another bank, the 2-bank. A deposit of 10,000 1-notes of 1-bank disappears in the safe of 2-bank and 10,000 1-notes is added to the account of C at 2-bank.

Summary scenario 4a:
1: C has a a claim of 10,000 1-notes on 2-bank
2: 2-bank has 10,000 1-notes in cash

2-Bank balance sheet:

Assets	Liabilities
10,000 1-notes cash(2)	10,000 1-notes C→2-bank(1)
10,000 1-notes	10,000 1-notes

Now, intrinsically, the banknotes of 1-bank represent gold. After all, they are readily convertible into gold and also on the market they are worth the same as gold. In all respects these 1-notes of 1-bank are equivalent to gold. Hey, wait a second, 2-bank thinks. Let's multiply it with our FRB machine!

2-bank could leave all those 10,000 1-notes in its safe and promise 10 times more of them (or gold, since it is equivalent) by issuing 2-notes, as described in scenario 3 above. This game would thus create an infinite amount of money, even with a finite FRB ratio; 10,000 money turns into 100,000 money that turns into 1,000,000 money, etc. Partly because of this, it is often not permitted by law. Banknotes should either be directly backed up by gold, or they are not allowed to be entirely FRB-multiplied. They can be lend out, but only partly (with the reserve ratio) as in scenario 2. In this case, a tenth of the 1-notes should stay behind in cash and 90% can be lend out, which are now called 2-notes. In this case, 1,000 1-notes stay in cash and 9,000 leave the bank, which are also called 2-notes, the two being completely equivalent because they both promise gold. If client D takes out a loan, the situation looks as follows. Here we equate the banknotes of the various banks and all call them 'claims to gold', what they in fact are.

Summary scenario 4b:

1: C has 10,000 gold claims on 2-bank
2: 2-bank has 1,000 1-bank-gold claims in cash
3: 2-bank has a claim of 9,000 gold on D
4: D has 9,000 gold claims on 1-bank
5: 1-bank has 9,000 gold claims on B
6: 1-bank has 1,000 gold in cash
7: A+B have a car

1-Bank balance sheet:

Assets	Liabilities
1,000 gold cash (6)	9,000 D→1-bank (4)
9,000 1-bank→B (5)	1,000 2-bank→1-bank (2)
10,000	10,000

2-Bank balance sheet:

Assets	Liabilities
1,000 cash (2)	10,000 C→2-bank (1)
9,000 2-bank→D (3)	
10,000	10,000

This is type II FRB, in which a promise to something (in this case gold) is being used to create more promises of that same thing.

Note that in neither of the two types of FRB (and actually in no scenario presented here) the underlying good (gold) is being made. Only *promises* to it are being printed. Those promises are accepted as means of payment in the market *as if* they were the real thing and is thus per definition money (page 14). In type I FRB (qualitatively) gold is being converted into gold promises, a change in quality. In type II FRB promises to gold are multiplied into more promises of gold; a change in quantity.

Summarizing: 1,000 gold is in the first stage used for creating 1,000 + 9,000 money (of which 9,000 is debt). Second-order FRB creates another 9,000 money in a second bank. With which 8,100 is made in a third

bank, etc. This series leads to a maximum of 1,000 + 9,000 + 9,000 + 8,100 + 7,290 + 6,561 + ... = 100,000 gold promises on basis of 1,000 gold. A rumor that things are running amok immediately causes a bank run.

Every step creates money that is lend out for buying goods on the market. A total of 100,000 new money is made on basis of the 1,000 gold; 99,000 of it is debt. In other words, 99% of all the money in circulation is debt. Of course, not everybody is using a loan for doing payments, but *somebody somewhere* has borrowed that money that is now on your account. At least 99% of it.

Note that the series is limited if the reserve ratio (RR) is limited. Namely $1/RR$ for the first step, from gold to money and $1/RR$ in the second step from money to money. A fraction $1-RR^2$ (almost 100%) is borrowed money. See Appendix D for a complete calculation of money creation with FRB.

For a bank it is lucrative to be able to do as much FRB money creation as possible. That is easy to understand. Imagine a bank gets hold of 1 kilo of gold. If it can lend it effectively 100 times and asks 1% interest and everybody pays back nicely the loan plus interest, then the bank does not have 1% profit, but 100%. Every client, namely has to pay 1.01 kilos of gold to cancel the debt. 1.00 kilo is that banknote and the client had to somehow arrange the remaining 10 grams on the market. With 1 kilo of investment, the bank will have $100\times$(10 g) = 1 kilo profit. As such, the banks will always try to maximize the FRB game and look for the limits of risk. A natural limit is a reserve ratio of something between 30 and 40, depending on the 'solidness' of the bank (meaning how well the insolidity of non-gold-backed banknotes is hidden from the outside world). The intermezzo above showed a calculation based on a RR of 10. With a RR equal to 40, the share of non-gold-backed money-equals-debt would be 99.94%, which is very close to the truth, as will be shown later.

Intermezzo. "Who Creates Money?" (Excerpt from *Modern Money Mechanics A Workbook on Bank Reserves and Deposit Expansion* by the Federal Reserve Bank of Chicago):

Changes in the quantity of money may originate with actions of the Federal Reserve System (the central bank), depository institutions (principally commercial banks), or the public. The major control, however, rests with the central bank.

The actual process of money creation takes place primarily in banks. As noted earlier, checkable liabilities of banks are money. These liabilities are customers' accounts. They increase when customers deposit currency and checks and when the proceeds of loans made by the banks are credited to borrowers' accounts.

In the absence of legal reserve requirements, banks can build up deposits by increasing loans and investments so long as they keep enough currency on hand to redeem whatever amounts the holders of deposits want to convert into currency. This unique attribute of the banking business was discovered many centuries ago.

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While the game of money lending from bank to client is symmetric, the promissory notes of the bank are usually worth more than the corresponding notes of the client. That is because the market normally has more trust that the bank will meet its promises than the client. But also because the bank still has a minute amount of gold in cash, there where the borrower usually does not have anything whatsoever to back up the promise. Zero point zero. (So, before you start complaining about the system, you do exactly the same. "He that hath a head of wax must not walk in the sun"). The fact that banks are more reliable means that they want to be compensated for that. A bank is not a philanthropic institute and will want to have something for it in return.

Let me put it in another way. Imagine I want to buy a car and go to a car dealer. I tell him I want a new Peugeot 308 because I saw a nice black one through the window of the showroom. (As Ford used to say, we have cars in all colors, as long as it is black). To the salesman I say "Give me the car. I promise to pay 20 thousand euro for it. I sign here a promise". He'd probably say, "No way! I don't trust your promises. I want promises from a reliable institute, like a bank, where I can convert the promises at any time into money". "But", I protest, "my promises can also be converted at any moment into money". He retorts, "I don't believe any of that. Why don't you go nicely to a bank and arrange me some promises from them!"

This way I am forced to go to a bank and exchange promises with them, the promises of the bank I can use to exchange for a car. The bank says, "OK, I'll give you our promises, if you sign this paper with your promise. Moreover, we want a premium; I want you to promise us more than we promise you. After all, you came to us!" (Note that this is not always the case. On which more later). This way I could for instance sign a promise for 21 thousand euro to be given next year for a promise of 20 thousand euro from the bank, to be paid any time the bearer of the promise wants.

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Sometimes it happened that people suddenly lost their trust in a bank and long lines built up in front of it. All wanting to execute their conversion rights and get their gold. A bank run. They did not believe it anymore that the bank would be able to pay out all the gold. And rightly so; no bank can do that. It thus immediately became a self-fulfilling prophecy. No bank whatsoever, anywhere in the world, can convert all the gold-promises into gold. The only things – assets – the bank has in its safes are promises to gold of clients. Well, as we have seen above, these have little value. The people banging on the doors of the bank do not want promises of their colleagues. They want gold!

Thus, the moment the market loses trust in the bank the bank is technically bankrupt. We have seen this happening a lot of times in history, for instance the DS Bank in The Netherlands. A rumor spreads on Friday, probably a journalist saying something like, "Well, if *I* were a client, I'd pull out all my money". In the weekend the rumor

spreads. Monday morning all clients try to take out all their money. Monday afternoon the bank is bankrupt. Because a bank's functioning is solely built on trust, the moment trust disappears, the bank is bust. It can go very fast indeed, because lack of trust is amplified by a feedback effect that reduces the trust even more.

To avoid this effect, banks joined forces and created central banks to support each other when the market loses trust in a specific member bank. If a line of angry clients builds up in front of a bank, a car with gold from the central bank will drive up to the bank and fills its safe with fresh shining gold. Often the view of shining gold is enough to pacify the angry mob. The central bank is thus a so-called 'lender of last resort'; if everything fails, the central bank helps out. This reduces the risk of bank runs and bankruptcies of individual banks (but increases the risk of systemic crashing of banking in general, as discussed in the previous chapter).

Very important to note, a central bank is *not* a government institution, whatever you may think. (As an example, the New York Federal Reserve's biggest shareholders are from largest to smallest as of 1983: Citibank, Chase Manhattan, Morgan Guaranty Trust, Chemical Bank, Manufacturers Hanover Trust, Bankers Trust Company, National Bank of North America, and the Bank of New York). Even worse, a central bank is a bank *cartel*. A bundling of power used to protect each other and to make price fixing possible and to guarantee a monopoly. There where cartels are forbidden in other sectors of the economy, they are sanctioned by government in the financial sector. Remarkable but true. In some countries the power goes even further and an entanglement of central banks and government is very far implemented. Even in these cases, the central banks remain independent. Alan Greenspan, ex president of the Central Bank of the United States – the Federal Reserve – "The Federal Reserve is an independent agency, and that means, basically, that there is no other agency of government which can overrule actions that we take".

Intermezzo: Louis McFadden, Chairman of the House Banking and Currency Committee in the 1930s:

"Some people think that the Federal Reserve Banks

> are United States Government institutions. They are private monopolies which prey upon the people of these United States for the benefit of themselves and their foreign customers; foreign and domestic speculators and swindlers; and rich and predatory money lenders."

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The banks bundle their power and, in case one of them is under attack of a journalist or anybody else, any bank can borrow gold (or money in 2016) quickly from other banks and pay out their clients. The storm will settle soon and the gold will flow back to their safes.

This was done by depositing the gold at the central bank, which gave depository notes in return. In the 21st century this is still the only remaining paper money in most countries. All the paper money of all individual banks has disappeared. In fact, if we think about 'money', we think about those paper notes of the central bank. These banknotes are coming solely from the central bank but have exactly the same meaning as banknotes from individual banks. They are (or were originally) promissory notes of convertibility of them into gold at (exclusively) the bank that issued them, i.e., the central bank. In the point of view of many people, these banknotes represent *the* money of a country. Yet, they are just promissory notes of a bank of that country. The real money is what these notes *promise*. How much? Well, we'll come to that later. Lifting a tip of the veil: the word 'swindle' will be used. (If impatient, you can already look at a banknote; on it is written how much it promises, right next to the signature of the president of the central bank).

Apart from paper money ('banknotes') the central bank also has accounts, just like normal banks. In these accounts are written how many rights to gold any specific bank has. A private individual cannot, as far as I know, open an account at the central bank. A balance of a client at the central bank – an individual bank – is the amount of paper money to which the bank has right, which in turn promises gold. The illusion is thus now second order that money on a bank actually represents gold. Bank money promises central bank money that promises gold.

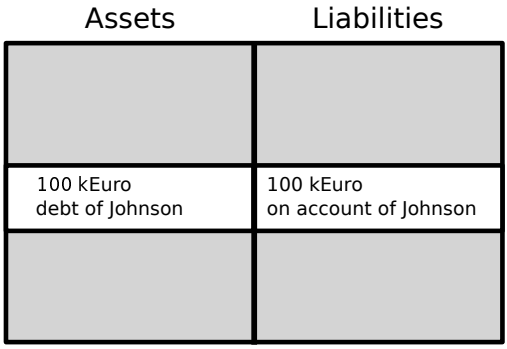
Intermezzo: Transferring money

If client Anton of Amsterdam Bank transfers money to Bernhard, a client of Best Bank, for instance for the payment of a product, it'll go in the following steps:

1. Amsterdam Bank cancels the amount on the account of Anton at this bank.
2. Amsterdam Bank informs the Central Bank that money should be transfered from its account to the account of Best Bank, both at the Central Bank. Note that the combination of this and the previous step does not change the equity on the balance sheet of Amsterdam Bank; on the left side an asset is deleted (money at the central bank) and on the right side a liability is deleted (money owed to Anton).
3. Amsterdam Bank informs Best Bank how much money is transfered to Best Bank at the Central Bank and for which client of Best Bank this is meant, namely Bernhard.
4. Best Bank adds the amount to the account of Bernhard. On their own balance sheet a liability item is created (a claim of Bernhard on the bank) as well as a new asset (a claim of Best Bank on the Central Bank). Once again, an equity-neutral operation.

Most people probably asked themselves why transferring money to others took always so long time. And, often the money was subtracted on their accounts long before it was added to the accounts of the receivers. The above explains this. Especially in a time before informatics and telecommunications, the process took a lot of time.

Also the central bank used FRB to create more money with the gold as security. The only difference is that the central bank enjoyed



Picture 14: Creation of money. If money is lent to Johnson, it is added to his account and a liability is created on the balance sheet of the bank, namely a claim of Johnson on the bank. Also an assets item is added, namely a debt of Johnson to the bank. 100 thousand euro of freshly 'printed' money is entering circulation; Johnson can and will go and spend the money to buy a house

a larger trust and could thus drive it a little further than individual banks. Why they did this? Well, what was that once again with the *genitalibus canes*? A central bank is a commercial institute, like the normal member banks. FRB increases the profit. The gold-to-banknotes FRB game now no longer takes place in the individual banks, but at the central bank instead.

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It gets even worse.

That paper money of the central bank, or balances at the central bank, were not nicely kept in cash or possibly lent to clients. No, that would be too simple. Banks are banks. Everything they own can be FRB multiplied and promised many times. Also the banknotes of the central bank. How do they do that? Exactly the same way as they multiplied gold (see the intermezzo about the four FRB scenarios on page 102). They promise the banknotes of the central bank, without actually owning them or having them in their safes. FRB 2.0. If Johnson takes out a loan of 100 thousand euro, no 100 thousand cash is taken out of the safe and given to Johnson. No, simply two entries

are created on the balance sheet of the bank, see Picture 14. Later we will see that also other things, like shares of companies, can be used to create money. This is called 'leverage'. If a share of a company is worth 1 euro on the market, 30 euro of money can be created. Note that the share of money is then expressed in euros and euros are expressed in – backed up by – shares; a self-referential floating system that is not anchored to anything. As long as nobody exchanges the promises into 'real' central-bank money there is no problem. As long as everybody believes that it is actually based on something, the system works. Money in a bank account is promises to promises of gold. As long as people believe this chain actually can be followed and we will wind up with gold – or something tangible – in our hand, the system works and the things (numbers on an account) are actual means of payment, and thus money according to our definition of money of page 14.

Note also that we have here the same problem as we have already seen with gold and gold lending. If something is lent out, in this case promises to something, then the bank, or the system in its entirety, wants more of that thing back than it has issued. If a bank lends out 100 thousand notes of promises, it wants 100 thousand promises back at the end of the term, *plus* interest. That is impossible, because these promises do not exist in the world. If everybody were to try to pay back his or her original debt, and handed over all the money in the world, still some debt would remain. Promises can only be kept by issuing new promises.

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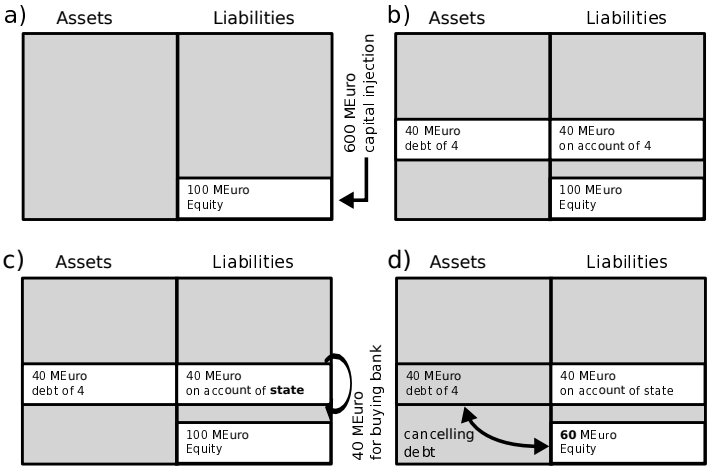
Banks no longer issued their own paper money. That is not to say they do not have their own currency. *All* money on accounts of clients is money of their own denomination. It is *not* money of the central bank, but just promises thereof. Money is normally just a computer bit in a computer somewhere, an electronic ledger. This way a bank could be bought with money from the bank itself. How that was done is shown in Picture 15.

Note also at this point that nobody signs a contract anymore. That bit in the computer is not signed by the president of the bank. If a bank goes bust, it is therefore the clients that miss out as one of the first, because they factually never had anything, not even promises, because they were not signed. Other creditors, those that did get



Picture 15: Buying a bank with money from the bank itself, in this case if BPN by BIC (see p. 94). The bank was as good as bankrupt, was nationalized and the state injected 600 million euro, after which the bank had an equity of 100 million (a). Four investors took out a loan at the bank (b). That money was transferred to the state in exchange for the bank (c). After this, the new owners pardoned their own debt to the bank, which also lowered the equity (d)

a signed contract, will be the first in line when the contents of the bank are distributed; they can show a signed contract and claim at a bankruptcy judge.

However, the central bank (or state) does guarantee the money. A bank is only allowed to engage in banking if it signs a contract with the central bank, a contract in which it also promises to not take the game of FRB too far; for instance a reserve ratio of at least 1:30, that is, backing up 3.3% of the promises by money. A client had better deposit his or her money in a bank that is registered at the central bank. In that case this central bank will be helping out if things seem to be going bad. Airplanes full of paper money will be flown in, like was done in the case of systemic problems in Cyprus. This way the trust in the banks can be restored and the game can continue. Problem solved. Cyprus is back in business.

This way the bank sector is effectively working as a single big bank. It changes nothing of the central concept that banking is based on trust. If people lose their trust in the banking system, that is, the central bank, it will go bust and will drag all the member banks with it.

A banking system that everyone trusts is essential for the economy. In turn, every government has every interest in guaranteeing the central banks, just like the central bank is guaranteeing the member banks. This all in order to make the financial sector 'robust'. But, as we have seen in the previous chapter, trying to make the system robust is winding up making it fragile. By protecting and guaranteeing banks, the banking system becomes fragile. Rather by allowing bankruptcies the system would become antifragile and would withstand problems. By averting tiny problems, we are heading for gigantic problems.

And problems exist. O, yes. Did we see in Chapter 2 that in a banking game that was based on gold everybody made profit in a zero-sum-game – a mathematical impossibility – the same is true for a banking system that is based in central-bank money (those banknotes in your wallet). Clients deposit CB-money, banks lend it out to entrepreneurs. The depositors get interest from the bank, the bank gets (more) interest from the entrepreneurs and the entrepreneurs make (more) profit on business. This cannot end well.

Or look at it in a different way. A bank, or the entire banking system, issues promises of money. Those promises and that money are nowadays seen as equivalent. (Actually, most people are probably under the misapprehension that they have money on their accounts). Almost all money in circulation is virtual money. First of all, there is a leverage factor of about 30 on money. That means that a bank lends out 30 times more than it received in hard currency of the central bank. Also, the 'hard' currency is rather soft. The central bank has multiplied the deposited gold by a factor 30 itself by FRB techniques. All in all, there is a factor of 900 between what people think that money is worth – what is promised – and what it is factually backed by. Wow, 99.9% is air.

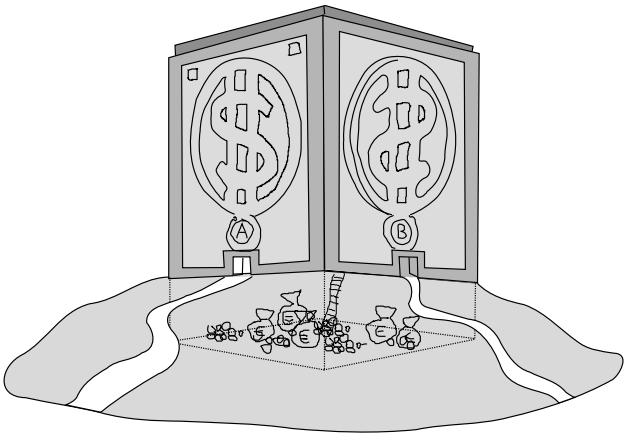
Worse than this is not possible. O yes, it is! We are not done, yet.

Chapter 8

The gold standard; The role of central banks

> "Let me issue and control a nation's money and I care not who writes the laws."
>
> – Mayer Amschel Rothschild

In the previous chapter we have seen how the worryingly sick game of gold banking and fractional-reserve banking was made worse by the central banks that converted it into money banking, a worryingly sick game to the second power. Nassim Taleb, in his book *Antifragile*, warns against any form of centralization because that does not make the system robust, but rather fragile by not exposing it to enough stress. Taleb does not talk about stress tests of banks, because they are nonsense (see Picture 16 for how those might be done), but real-life tests. Every now and then small banks should go bankrupt in order to make the entire system healthy and robust. Not allowing bankruptcies is unhealthy and will unavoidably cause a systemic failure of the banking system. Also that is a mathematical law. Those of you who followed the reasoning until now already got the point that in a zero-sum game things have to go bankrupt every now and then to



Picture 16: Four banks (A, B, C and D) get in turn visits by the European Central Bank and must demonstrate that they have sufficient reserves. Every bank shows a vault with sizable reserves

compensate for the profit of the rest; the average or sum profit *must* be zero, because that is the game. (Now, a thought in between, what will happen if part of society is *guaranteed* profit . . . ?)

Therefore, the system would benefit from constant exposure to stress. And I am not talking about those silly fake stress-tests of the European Union or European Central Bank. I actually wonder if there is anybody in the world that trusts these tests. The outcome of these tests can namely only be positive, so it is already known in advance. If word were to come out that a certain bank did not pass the test, the doors of that bank might as well be closed immediately; a bank run is inevitable. Trust is everything and therefore, the only outcome can be that everything is under control and we should increase our trust. A good example is the bank Banco Espirito Santo in Portugal. One day the government communicated that the bank was 'solid'. A week later it was bankrupt. Because the outcomes of the tests are known beforehand, they might as well not be done at all, because they supply no information whatsoever. Money can be saved by not doing them, since they are quite costly.

Coming back to the narrative, worse than a quadratically sick game

is not possible, is it? O yes, it is. Namely by abolishing the gold standard. Because, if central-bank money can no longer be converted into gold, then the idea of a (pecuniary) zero-sum-game can be thrown overboard.

The core problem of banking is namely the following, something we already discovered in the opening chapter of this book:

> Money is being lent to society and from society it is requested that they give *more* of it back than they got. But society cannot make money itself. Where will it get that money?!

Lenders want money back. Not potatoes, or oil, or computers or whatever new gadget that may have been developed with the help of money. They want money! Money that does not exist. Note that with gold at least it was possible to dig for gold somewhere and pay the debt plus interest. Not with money. Nobody can dig for money. Not even the wisest entrepreneur, or the luckiest politician. The money cannot be made and yet somehow has to be given at the end of the year. Yet, bankruptcies are not tolerated. More specifically, states are not allowed to go bankrupt, which would solve the problem. Most states in Europe are technically bankrupt (insolvent; they have a negative equity, with their assets worth less than their liabilities), but are not allowed to default on their loans. Flagrant examples are Greece or Portugal. Both of them hopeless basket cases without even a shred of hope to ever exit the crisis. When Argentina defaulted, the money sharks put the country in (their own) court in New York, and won. Argentina is on its knees. But if Argentina is forced to pay back its loan plus interest, somebody else, for sure, without any form of doubt, cannot keep their promises and cannot pay back the borrowed money. We have seen that more than 99% of all the money in the world is debt (promises to things rather than the things themselves). Add 3% interest to it and we see that the amount to be paid back is more than there exists in the world.

We can compare this to a physics analogy of electrons and positrons. These are complementary particles, which means that if they meet, they can recombine and disappear. Or the opposite can happen. Out of nothing electron-positron pairs can be created, in which one ex-

ists at the expense of the other. The same is with money and loans. Money is created through and by debt. Money *is* debt. At least 99.9% of it, as seen in the previous chapter. It is created out of nothing and disappears into nothing if the debt is paid.

However, where in the electron-positron-pair system the thing is completely neutral – the number of electrons created is equal to the number of positrons – with money that is not the case. More debt is created than money. A bank issues 1,000 euro of its own coinage and, assuming 5% interest, wants 1,050 euro back the next year. Those euros do not exist; only 1,000 euro is circulating in society.

Unless they are freshly made somewhere. After a year the borrower could go to the bank and ask, "Can you not lend me this money again?" Refinancing. Those 1,050 euro does not have to be paid back, but is refinanced instead. Next year 1,102.50 euro has to be given back (1,050 euro plus 5% interest). Everybody happy. However, that is only delaying the problem. And there is a natural limit to this pyramid game, namely a factor of about 900, as we have seen. At the end, money is connected to gold and if too much gold is promised – too much money is printed – people start losing their trust in the game and start picking up their promised gold at the central bank. I would do that.

The solution is thus removing the link between money and gold. Canceling the gold standard; money from the central bank can no longer be converted into gold. (Money from member banks continue to be convertible into central-bank money). The promise of the central bank, that banknote with a beautiful signature of the president, is thus a promise to ... well ... essentially nothing. Or rather the money promises the money itself. The piece of paper has no other value than the value of the paper itself. It is called 'fiat money', what means so much as that the value of it is determined by decree and it is worth what people *believe* it is worth and how much they trust it. But even this decree is an empty statement. Look at a modern banknote. Take a 10-euro note. One can easily find the signature of Mr. Draghi, the current president of the European Central Bank. But it does not say anything about *what* Mr. Draghi promises. A swindle; It is an empty contract. It is chicanery because the owners of the printing press can print as much money as they want and that money *does* have buying power (see the speech of Godfrey Bloom here below in the intermezzo).

Out of emptiness money can be created with which they can go and buy anything they want, where you and I have to work very hard for these same things. (Wouldn't you want to be in their position?). As such, the signature is fully redundant and serves just as decoration, as a nostalgic reminder of the good ol' days. 'Fiat' or 'by decree' means something like "let it be so". And they never actually specify what 'it' is. The signature can and will be later used in a criminal court, since with it Mr. Draghi testifies against himself; it is a signed statement of admitting his own guilt of emitting empty promises.

Godfrey Bloom, MEP. Speech at European Parliament. Strasbourg, 21 May 2013

"Commissioner, Mr. President, I rise again, I am afraid, to make the same old hoary speech that I have been making here for several years. That is: it is my opinion that you do not really understand the concept of banking.

All the banks are broke. Bank Santander, Deutsche Bank, Royal Bank of Scotland: they are all broke. And why are they broke? It is not an act of God; it is not some sort of tsunami. They are broke because we have a system called fractional reserve banking, which means that banks can lend money that they do not actually have.

It is a criminal scandal and it has been going on for too long. To add to that problem you have moral hazard – a very significant moral hazard – from the political sphere, and most of the problems start in politics and Central Banks, which are part of the same political system.

We have counterfeiting, sometimes called Quantitative Easing, but counterfeiting by any other name – the artificial printing of money for which, if any ordinary person did it, they would be sent to prison for a very long time. Yet governments and Central Banks do it all the time. Central Banks repress the

amount of interest rates so we do not have the real cost of money, and yet we blame the retail banks for manipulating the LIBOR.

The sheer effrontery of this is quite astonishing. It is Central Banks that manipulate interest rates, Commissioner. Plus, underneath all this, we talk loosely – in a rather cavalier fashion, do we not – about deposit guarantees. So when banks go broke through their own incompetence and chicanery, the taxpayer picks up the tab. It is theft from the taxpayer. Until we start sending bankers – and I include central bankers and politicians – to prison for this outrage, it will continue".

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The advantage of this rather fraudulent pyramid scheme is that loans can easily be refinanced at the end of their term. That because empty, worthless, promises can easily be replaced by more of those worthless empty promises. Worthless plus 5% interest is equally worthless; $1.05 \times 0 = 0$. To put this in numbers: the entire world altogether, all states combined, have a debt of 56 trillion dollar (see The Economist debt clock. Trillion is a thousand billion, a 1 with twelve zeros. 56 billion is about ten thousand dollar per inhabitant of this planet).

Yet, it does conveniently circumvent the problem of capitalism. In the chapters on capitalism we had seen that workers can no longer afford the products made by themselves. Now they can! We just lend them the money. That they thus technically live beyond their means we will forgive them. The workers morally have right to the consumption and they consume, so the description 'living beyond their means' does not even apply morally. That the consumption is enabled by a morally rotten system of fractional reserve banking which, moreover, is no longer based on gold, is also pardoned. The inherently bad capitalism solved with inherently bad FRB. A problem only surges if we suddenly start calling people like the Greek or Portuguese "having lived beyond their means", or "having made a mess of it", because it was that heroic behavior of borrowing that maintained the system. Asking the

money back is undesirable, impossible, and immoral. Morally – and I even suspect legally – nobody has the obligation to pay back any debt, because there *is* no debt to pay. It is zero. Since nobody ever actually borrowed anything, there is nothing to give back. Just let them go bankrupt and annihilate the zeros.

The abandoning of the gold standard is thus of extreme importance in the narrative about money. We have to go back in history and look at how it came about. Lesson three of the lectures on history of money (after money for trade, [Chapter 2] and Fractional-reserve banking [Chapter 7]).

Intermezzo: Famous quotes about central banks:

"I am a most unhappy man. I have unwittingly ruined my country. A great industrial nation is controlled by its system of credit. Our system of credit is concentrated. The growth of the nation, therefore, and all our activities are in the hands of a few men. We have come to be one of the worst ruled, one of the most completely controlled and dominated governments in the civilized world. No longer a government by free opinion, no longer a government by conviction and the vote of the majority, but a government by the opinion and duress of a small group of dominant men" (Woodrow Wilson, 28th U.S. President).

"The Central Bank is an institution of the most deadly hostility existing against the principles and form of our constitution ... If the American people allow private banks to control the issuance of their currency ..., the banks and corporations that will grow up around them will deprive the people of all their property until their children will wake up homeless on the continent their fathers conquered" (Thomas Jefferson, 3rd U.S. President).

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In the beginning of the 20th century the British pound – 'Stirling' – was the defacto monetary standard for international trade. This because everybody considered it reliable. It was covered by gold (or silver) and the FRB ratio was rather low (it started at 2:1). Somewhere before that time the central bank was created and got interwoven with government. That way a 'monetary policy' could be implemented. Anyway, this is not very relevant at this point.

As we know, England entered a world war (World War I, better known as the Great War). Had England not interfered with it, the world would now probably be much ... the same, with Germany dominating the continental economy. This aside. That war was very costly and had to be financed. The British government did not have the money and the money had to be printed, which was not possible because it was connected to gold and gold was limited. For a moment the British government printed new banknotes anyway, but soon the rest of the world started converting the Stirling promises to real gold in London and the things went out of control. The solution was to abolish the gold standard. No longer was convertibility guaranteed. This happened in 1914, and, by the way, similar things happened all over Europe.

Immediately the pound Stirling lost its status as international trade currency. That role was immediately taken over by the U.S. dollar, that continued to be money that was backed by gold. In 1944 the famous Bretton Woods system was introduced. Gold backs the dollar and the dollar backs the currencies all over the world. Some countries used names for their currencies (like the Dutch 'gulden' or Polish 'złoty') that still reminded of the days they represented gold. Yet, in many countries were the gold reserves even physically transported to the United States Bullion Depository in Fort Knox. It is still there. (Although, maybe not. When Germany wanted to audit their gold there, the U.S. refused. Is the gold still there? Maybe not).

In 1965 the U.S. started to have their own, yet similar, financial problems caused by their war in Vietnam. In 1971 therefore President Nixon abolished the dollar gold standard. The effects were not difficult to predict. A strong inflation caused by the overflowing the economy by freshly printed money. If more money circulate for the same amount of goods, the ratio money to products goes up. Inflation. In a decade, from 1971 to 1981, the buying power of the dollar dropped to about

45 dollar cent.

We thus see that in 1971 the gold standard was removed from the U.S. currency, and since the U.S. dollar was the base of all major international currencies, they effectively, in turn, also lost their support. The before-mentioned concept of empty-promises free-floating fiat money was created in Washington (or rather New York), and it spread all over the world. It is interesting to see what more history can tell us about money.

The Federal Reserve (the central bank of The U.S., also known for short as 'Fed') had at that moment the main task to fight inflation (after previously having had as unique task being the lender of last resort). Money was no longer fixed to something physical and was thus free floating. This increased the degrees of freedom of money and the Fed had thus political (decisive) control over society, a society that was supposed to be ultra liberal. They could, and were now supposed to, regulate the amount of money circulating, to keep inflation in check. They did this through the act of buying and selling state obligations. They could, for instance, enter the market and buy U.S. 'bonds' (10 year treasury notes) by exchanging them for freshly printed money. More money circulation causes inflation. If inflation got too high, they'd simply sell their bonds and thus extract money from the market. The aim was to keep inflation at around 3%. Note that inflation is thus not a natural phenomenon, but a politically orchestrated product made possible by fiat money. Before fiat money there was no inflation; the amount of gold was constant and thus the amount of money was constant (the two coupled through FRB^2) and with increasing production there was rather a tendency of deflation, which was actually not a problem in earlier societies.

To achieve the goal of 3% inflation, the central banks also have to their disposition the interbank loan interest, for instance LIBOR (London Interbank Offered Rate) for which they make a target rate which they advise their member banks to use as a reference in their business. Note, as pointed out by Godfrey Bloom in the intermezzo on page 123, it is highly hypocritical to jail bankers of Barclays for fixing the LIBOR, while on the other hand demanding from the Central Bank to do exactly the same. "The sheer effrontery of this is quite astonishing". Never mind. The result of higher rates is that people will be less inclined to borrow money from banks and thus less bank

money will circulate in society and this lowers inflation. The Fed used this in its fight against inflation. However, scaring people out of borrowing money also stops companies from investing, and, moreover, workers could by now only afford the products made by themselves by borrowing. An economical crisis thus resulted in the 1980s. The U.S. dollar being the international reserve currency through Bretton Woods, the crisis spread to all corners of the planet. (Interestingly, this pan-global misery was politically decided by a bunch of people in the Fed in Wall Street; many countries no longer have autonomy and effectively have become vassal states of the Fed).

From the crisis we learned that it should be made easy to borrow money in order to avoid a crisis. The tendency is an ever dropping interest rate. The system managed to slowly recover and what was surprising was that especially the stock market was doing very well. A wave of speculation on shares resulted, something we call a stock-market bubble. On Monday 19, 1987, this bubble spectacularly burst. On this day, known as Black Monday, the stock market crashed and share prices dropped a whopping 23%. The monetary weapon used by the Fed to fight this was lowering the interest rate. Pump money into the system. Everything to rise the prices of shares, which now seemed to be the primary goal. Inflation was no longer of any concern. From 1944 to 1987 the function of the Fed has thus dramatically changed. In 1987 it only protected the interests of big capital. European Central banks, being effectively mere branches of the Fed, rapidly followed suit. Share prices had to go up, "What is good for the capital is good for the people". Note that the monetary policy of the Fed has so strong an impact on economy that we can no longer call the world economy a free liberal market. The noble pursuit of liberalism has been abandoned in favor of protection of the interests of big capital, a system also known as 'corporatism', or 'corporate fascism'. Also remarkable is the fact that the share of banking in the U.S. economy grew to about half.

Speculation on shares continued and the system started taking ever greater risks. Large profits were made. It seemed too good to be true. And if somethings looks too good to be true, it nearly always is. In 1998 the best of the best, led by two Nobel laureates, Myron S. Scholes en Robert C. Merton, and the most succesful hedge fund LTCM (Long Term Capital Management), risked bankruptcy. Factually because they had been running a pyramid scheme. For the first time a so-

called bail-out was done. This out of fear of a repetition of the crisis of the 1930s when everything was left to go bankrupt, in the true spirit of liberalism, but which led to international chaos. For the first time the words "Too big to fail" were uttered.

The signal of the Fed to the financial industry was loud and clear: Take as much risk as you want. If things go wrong, we lend a helping hand and bail you out. This is perverse. Banks and other financial institutions began taking risks for which they were heavily rewarded. But when push came to shove, the risk was entirely taken by the tax payer, that never had profited from the risk taking. Later it was quite adequately described as, "Heads I win, tails you lose". A good example is the high yield on Portuguese government bonds, which reached some 20% at a certain time. They were so high because Portugal ran a great risk of going bankrupt and investors might, with high probability, never see their money back. They wanted to be compensated for taking on the risk. However, when Portugal actually was on the brink of bankruptcy, it was not these investors that were risking anything. With the help of their cronies in government (European Union) they sent the Troika (the E.U., IMF and ECB) to Lisbon to guarantee Portugal coughed up the money. 20% interest, 0% risk. The risk resides at the tax payer that bailed out Portugal, Greece and Ireland.

In this environment of zero-risk investments, many companies shifted their core activity to financing. The biggest example is General Electric (formerly best known for electrical equipment). Also Goldman Sachs, formerly a financial consultant, started becoming an investment banker. In Europe, Volkswagen started financing sales of their own cars to their clients. (Well, had to be, otherwise Marx would strike with a revenge; products cannot be bought by the workers who made them; *Volks*wagen would become *Elites*wagen). This time mostly houses and their mortgages were used as leverage in the FRB game. Interest rates were lowered yet again by the Fed in the wake of the 9/11 events, for fear of a crisis. This incentivated many to buy a house. Even those who had, in hindsight, no way of ever paying back the debt, like the so-called NINJAs – no income no job or assets. Financial institutions were very keen on selling *any* mortgage. That because *anything* can be used in the FRB multiplier machine. Anything that has any value can be put as an asset on the balance sheet. And, with it, money can be lent out, appearing as assets and li-

abilities. Also mortgages. That the intrinsic value of the mortgages is zero, because they cannot ever be paid back, does not matter, because the Fed/government *guarantees* that they have value. "Don't worry; if needed, we'll bail you out!" This is perverse. But it got even worse.

Mortgages were insured at the AIG (American Insurance Group), the largest reinsurance company in the world. (A reinsurance company is not a run-of-the-mill insurer where a person can insure a car. It rather insures specific, often large-scale, risks of companies). And they'd come up with something new. Instead of Mr. Johnson insuring himself against not being able to pay back the loan at Bank of America for the house he bought, *any* entity A could get insurance against the event that entity B can not meet its financial obligations to entity C. So, a bank like Wells Fargo, that has nothing to do with the house or the mortgage or the person in question, could go to AIG and get an insurance against that Mr. Johnson would not pay the installments for his house and would enter into default. Even worse, it could take out as many of those insurances it wanted. On average, actually, the mortgages were twenty times insured. That implies that the system would *profit* if the Mr. Johnsons of the country were all to enter into default. That is perversity lifted to a completely new level. Not only is there no risk with defaults, there is now a gain if they happen. It is as if the financial institutions would profit from the destruction of the world. It is a time bomb. Since it has no morality, a liberal system that benefits from destruction will, sooner or later, destroy. Only humans have moral values and reflect their own behavior against it. A financial system has no soul and no other objective apart from profit.

The inevitable happened. House owners entered into default by the droves. AIG risked going bust. A bailout of about 85 billion dollar was performed. Approximately 300 dollar per inhabitant of the U.S. But why did the immoral behavior of the financial industry get rewarded by money from the morally-correct tax payers? Well, of course, also many house owners speculated on their property. While they obviously could not afford it, they were living in mansions in the hope that the prices of these would go up and profit would be made anyway, even when defaulting. The suckers would be those who did not buy a house beyond their means. However, the result was that the house market was suddenly flooded with houses from foreclosures.

Through the mechanism of price-adjustment by supply-and-demand this lowered the prices of houses and caused that many house owners decided to hand over the key of the house to the bank since the mortgage was higher than the value of the house. (In the United States, a home owner can hand in the property that was used as security in the mortgage and call it even. In many other countries, the home owner can remain with a net debt after the bank confiscates the house, sold it and with the money amortized the mortgage. Not so in the U.S.). The effect was that the value of the mortgages also dropped on the free market. If Johnson has 80% chance of paying back the 100 thousand dollar loan for the house and 20% of not managing it, the market value of the mortgage is not more than 80 thousand dollar. With the mass defaults, and the lowering of house prices, the probabilities shifted to even more defaults; it is a positive-feedback system. However, these mortgages, in turn, were used as security in the FRB game by banks and financial institutions. What happens to the balance sheet of an investment institution when an asset suddenly loses value? We have seen this before with the wrecking of my car (page 98), the equity of the company immediately drops, possibly pushing it into insolvency. Financial pandemic chaos was ensuing. Lehman Brothers was the first victim in 2008. A domino effect was envisaged. The end was in sight.

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Here we have to make a small side track. It is now being suggested that (uniquely) the high prices of houses are the problem and that things like NINJA loans are immoral and at the core of the problems. However, those of you who have followed the narrative until now and have read the previous chapters, readily understand that the high prices of houses are *essential* to the economy, exactly because for high prices a lot of money can be printed and lent out. This money is injected into society and that avoids a Marxian catastrophe. Prices of houses are high because a lot of money can be lent and a lot of money can be lent because the house prices are high and keep rising.

Intermezzo: Banking and houses:

Take a country with 10 houses and 10 people each having 10 gold coins. A house on the free market costs 10

gold coins (established by supply and demand). And the people are the full owners of their houses. Now, the people bring their gold to the bank. The bank uses FRB and creates for every gold coin 9 gold certificates. So, now there is 100 gold + 900 certificates in the bank. For buying the houses, the people borrow from the bank (because they have only 10 gold coins; the free market price is higher ... by a factor 10). They get a loan for 90 certificates and buy a house for 100 money. Suddenly, they are only 10% owner of the houses. (They got 100 money, but it disappears in spending consumption goods, which accumulates the money on the place where there is already a lot, as shown).

And this system will never change. Every time the 'owners' pay back their house, or part of it, more money will be printed; the houses working as collateral for the actual money creation. The virtual high value of the houses used to create virtual money to drive up the price of the houses. As long as houses change hands every now and then will the people never be owners of their own house. They will always stay in the hands of the banks. Like a donkey chasing a carrot connected to its head; always moving forward, yet never decreasing the distance.

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As such, the high prices for houses are both the problem and the solution to the problem. Yet, it is a untenable situation that is kept alive by papering over the cracks. In many countries the buying of houses is incentivated by tax breaks on mortgage installments. Imagine the government decides to abolish these tax breaks. That seems fair, because it is anyway unliberal to favor one part of society – those with low mobility, never moving in their lives – over others. And, the tax break has no effect on overall welfare of society. That can easily be understood if we realize that houses are sold on the free market and a family can spend approximately 30% of their income on their dwelling

one way or another. Imagine a family can afford 500 euro per month on it and this results in a house of 100 thousand euro being their price target. 500 euros per month in interest and amortization. Now imagine government introduces a tax break. It gives back half of the costs of the mortgage. Well, the family can still afford 500 euro, but with the help of government, the cost of the mortgage can be 1,000 euro and that converts into a price target of 200 thousand euro. With the 200 thousand euro it goes to the market. There it finds out that *everybody* got the tax break and brings in more money. The exact same house has increased in price and now costs ... exactly 200 thousand. At the end of the day, the family lives in the same house, with the same cost, but more money has been borrowed for it. The family feels very rich indeed. Yet, it is a mere fiscal accounting trick to ensure the essential Marxian-crisis-avoiding money-printing game can continue.

If the tax break is abolished, the price of houses will immediately adjust to the new reality and that means that many mortgages are higher than the value of the corresponding house. Anti-money printing has to take place. Marx wakes up and prepares us an apocalyptic crisis of overproduction, where consumers (workers) do not have enough money to buy the products they made themselves. In other words, the prices of houses *must* forever rise. It is the motor of the economy.

In conclusion, high house prices in the books of society are essential for the fractional-reserve-banking game of printing money. Money that is used to buy the products made by society. Without this money, citizens cannot buy the things they made themselves. It is therefore of quintessential importance to have rising house prices. It is one of the main priorities of the central banks (and thus government) and news of rising prices are seen as a perfect indicator of economy and always brought as good news. (This might surprise us; basically they tell us that our salary is ever more becoming smaller. "Yeah, good news, your salary is becoming insignificant"). In times of crisis, as we have now, ever more people have a negative equity (in those countries where it is possible) and are technically bankrupt. Moreover, the debt relative to income grows in all countries. In the U.S., for example, the average debt grew from 1970 to 2007 from 60% to 138% of spendable income. 'Home owner' in 2016 mostly means 'mortgage owner' ("If you have ten dollar in your pocket and no debts anywhere, congratulations, you are richer than 25% of American citizens" [source unknown]).

And all those people that cry shame, first they should search their own conscience. Many buy a house with a speculative intention. The high price is taken for granted, if there is a good perspective for it to be even higher in the future and profit can be taken. Ill thinkers are ill doers. Everybody acts in self interest, just like Adam Smith told us. And now the losers of the game call the winners of it immoral. Bad losers!

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Coming back to the narrative, the result of the low reference interest rate of the Fed thus stimulated economy. That is, a quasi-economy. The growth of economy was not caused by increased production (more products made, such as more houses), but just in rising house prices. Houses themselves are not an investment, because houses do not produce anything. I redirect here the reader to the lectures of Khanacademy who nicely explains the difference between a house as investment – for instance if the owner can find rest in the evening to do his work better the next day – and a house as buying object for increased welfare – being rested.

In the meantime the low interest rates caused inflation. And inflation was one of the prime concerns of the Fed, or used to be. The answer was in simply redefining inflation. It is quite communistesque, where manipulation of numbers resulted in perfect economical outlooks, but the governments simply removed the house prices from the inflation figures. Exactly because they had too large impact. (Well, if people spend 30% of their income on it, methinks they should have an impact on inflation figures. Inflation should tell you how much you can buy with your money). Yet, inflation is now what the Polit Bureau ... erm ... Central Bank and government want it to be. Later more about inflation.

To summarize this chapter: By abandoning the gold standard the system entered a money-creation spiral of eternal borrowing. That is to say, the consumption of today is being paid by promises of paying it back tomorrow. The entire Western central-banks-based economy can be considered a huge pyramid scheme, a concept mostly known from Charles Ponzi who gave his name to the internationally famous concept of the Ponzi scheme. Ponzi was an American investor of the 1920s that paid dividends to older investors with money brought in

Table II: First three types of money in the euro-zone. Below it should be a M_{-1} (gold) level, or anything solid (that can be expressed in kilojoules) but that pillar was removed. The system is thus unstable since it rests on air

Tier	Meaning
M_0	Banknotes of the ECB and balances of current accounts of banks at the ECB
M_1	M_0 + freely claimable money of clients at banks
M_2	M_1 + all forms of capital convertible in M_1. Ex. saving accounts.

by new investors. The most famous modern executor of this scheme is Bernard L. Madoff who swindled investors out of some 60 billion dollar until the system collapsed. In 2008 he was arrested and sentenced to 150 years in prison. (Why no central banker is in prison?)

Our economical system is a Ponzi scheme. Most Western countries, are effectively vassal states of the U.S. since the introduction of Bretton Woods in 1944 that links them to the U.S. central bank and government. They follow every step of the Fed, making the presidents of it – Paul Volcker, Alan Greenspan, Ben Bernanke and Janet Yellen, etc. – the most powerful people in the world. Organizers of a Ponzi scheme where an empty-promises FRB game is performed that is not based on gold or any physical commodity.

For completeness sake, Table II gives a summary of official definitions of money (creation) in the European Union. The basic level, M_{-1} (gold), has simply been removed by them, which makes the entire system float on air.

In 2001, Alan Greenspan said about the Ponzi scheme of the central banks: "The United States can pay any debt it has, because we can always print money to do that. So there is zero probability of default".* How can it be that the world still trusts this system that is being

*Note the Freudian slip of the tongue (?) of Greenspan equating the private central bank with the state. Apparently he considers the two to be one and the same. (Yet, remember, the central bank takes no orders from the state, see Greenspan's statement on p. 111 ...)

slighted by the organizer of it himself? In the previous chapter we have seen that about 99.9% of all the money (gold promises) was not covered by gold, but there was still a constant ratio between gold and money. Since abolishing the gold standard the price of gold in terms of dollars has risen by about a factor 20, from 2 thousand to 40 thousand dollar per kilo. Or, better to say, the price of the dollar has dropped by a factor 20 in terms of real tangible products. That now means that basically 99.995% of money is air. At best 0.005% of the money is backed by something. And, moreover, there exists no mechanism whatsoever anymore to keep it in check. Big Brother says that if he so wishes, the money I have in my pocket, for which I worked hard, will become utterly worthless, by the press of a button.

It is, as it were, as if I come to a car dealer with a bucket of money and buy a car, the show piece of the dealer. When I pay for it and the dealer hands over the key, I'll say, "You know what, just give me another one. A red one this time". When he asks for the money, I take a printer out of my bag and print the demanded money. I'd leave the dealer speechless, wouldn't I?

Does anybody still have faith in the system? Some, those in control and that benefit from it, would like us to do so. They leave no opportunity unused to convince us. But let me here end this chapter by a social-network meme, to make you think. It shows you who is actually losing out in this game:
"In 1964, the minimum wage was 5 silver quarters. In 2015, 5 silver quarters have a melt value of $15.15. We don't need to raise the minimum wage. We need to fix the money."

Chapter 9

Aspects of money

> ”Only when the last tree has died and the last river been poisoned and the last fish been caught will we realize that we cannot eat money.”
>
> – Cree Indian saying

We are now nearly at the end of the narrative of money and the economy. We have seen how it is a pyramid scheme of empty promises, yet essential for a capitalist economy. What remains is just working out some details that are relevant, assembled into a single chapter. Some details have interesting aspects that many people probably don't know. Things like taxes (both direct and indirect) and inflation, as well as the subject of pensions and the stock market. Let's start with inflation.

9.1 Inflation

Inflation is the devaluation of money. This inflation is caused by the increasing of the money supply faster than the increase of goods. The central banks regulate the supply of money by buying and selling of assets such as government bonds, and since recently by quantitative easing.

The effect of increased money supply is that today you get less products for your money than yesterday. Inflation. The definition is simple. In practice, however, it is quite a complicated concept to comprehend. We can describe the history and definition in modern terms.

Inflation did not always exist. Until the end of the 19th century there was no inflation. Inflation was rather impossible because no new money could easily be printed and the money supply was rather constant; gold-to-money multiplication was limited to a factor of about 30. (See the chapter on fractional reserve banking, Ch. 7) and all gold was more or less delved. The amount of gold was constant and also the economical growth was zero. (See Piketty in his book *Capital in the 21st Century*). The ratio between money and goods was more or less constant and the free market thus established a stable value of the currency.

Everything changed when economy grew rapidly in the beginning of the 20th century. Productivity increased and thus a situation of deflation formed, more products for the money. This is normally seen as undesirable or even detrimental, because people will tend to keep the money in the pocket (waiting it to automatically become more valuable) instead of using it for consumption or investment. Economy would stagnate and that is undesirable. A tiny inflation is normally considered beneficial for the system. The limits to growth should be set by natural boundaries and not by the psyche of the humans. Too much inflation is also not good, because then people lose their confidence in the currency. And, money, as we have seen, is solely based on the trust. A golden mean is to have an inflation of about 3%. It makes sense; by printing money, the system can be turned into a non-zero-sum game and a Marxian catastrophe avoided.

How this inflation figure is achieved is also directly evident. The amount of primary money of the central bank (M_0, Table II) is regulated by the buying and selling of government debt papers, like bonds and treasury bills. Because this primary money is used for second-order money creation at normal banks, also the total amount of money will increase. To have an inflation figure of 3% in an economy that is growing 1%, the central bank simply prints 4% extra money per year. Apart from that, the central bank can regulate the interbank borrowing rate, like the LIBOR or Euribor, which controls the demand

for loans at the member banks. Moreover, it can relax or tighten the reserve ratio (RR) requirement that limits the two types of FRB money creation. All in all, the central banks regulate the money supply, which in turn determines the inflation figure. The function of the central bank has thus evolved from mere non-economy-interfering lenders of last resort into a central-government non-liberal economy-interfering political institute that controls the inflation (and later even functioned as economy-controlling, share-price stimulating big-capital representatives). Imagine, the European Central Bank under guidance of Mr. Draghi or the Eurogroup under guidance of Mr. Dijsselbloem has a meeting, and the millions of people in Greece and Portugal, the next day, enter into misery.

Inflation itself is easily measured, isn't it? Not! It seems very simple – how much more expensive have the products become? – but it is far from simple. First of all there is the question, What products? It seems obvious to take products into consideration that are actually sometimes bought by people. It does not make sense to incorporate the price of paintings of Rembrandt in the figure of inflation because not many people actually will buy these paintings. (This is logical, but not evident. As we have seen, 30% of the spending of households, namely the cost of housing, is not considered).

Most countries have special institutes for measuring the inflation (Centraal Bureau voor de Statistiek; Instituto Nacional de Estatística; Office for National Statistics). They conscientiously keep track of what people consume and what the prices are of these goods. They create a so-called consumer-goods 'basket' with weighing factors of various products; the more the product is bought, the higher the weighing factor. The consumer on average spends X euro per month on meat, Y euro on cars, etc. Every product has a relative share in the basket. With this list of weighing factors in hand we can go take a look how the prices of goods have changed and how much the inflation is. Simple.

Well, apart from the fact that it is rather arduous and still unreliable job – statistics by sampling a part of the population is not necessarily representative for the entire population, the invariably failing pollings before elections a blatant example – is it also an impossible task. Spending patterns of people change over time. And also the products themselves change over time. To start with the latter, is a Renault Megane of 2016 equal to a Renault 12 of 1970? Both are

middle-class cars of their time, but there the similarities stop. Now, did cars get more expensive or not? Who knows! A Renault 12 is no longer being sold, so we do not know its current price. Other products did not even exist at all. An iPad, for example. Maybe you read this text on an iPad. Does that substitute a book?

Moreover, even with a constant offer of products, the spending pattern of people changes constantly. Maybe because of fashion. Or maybe other reasons. Maybe because of exactly the prices of the products. In such an ever-changing environment, how is inflation calculated? Two extreme scenarios:

Scenario 1 : The price of products that are currently in the basket are being determined and on basis of that the inflation is calculated. *After* that the basket is updated according to the new average spending pattern of the people; weights are adjusted and products are added or removed.

Scenario 2 : *First* the contents of the basket are adjusted and then the total price of the basket is calculated on basis of the current market prices of the products. This basket price is compared to the basket of the previous period and that gives the inflation figure.

Scenario 2 by definition results in an inflation of zero. Or, better to say, it will be equal to the economical growth, for instance because the wages rise. How can that be? Imagine a consumer buys 1 kilo of meat per month and 1 kilo of potatoes. Imagine for the sake of simplicity for this calculation that they both cost 1 euro per kilo. The total cost of the contents of the basket are thus 2 euro. Now imagine that the price of potatoes halved and that of meat doubled. What is now the inflation? Scenario 1 would say 25%. 1 kilo meat plus 1 kilo potatoes was costing 2 before and now costs (1 kg) $\times$ (2 euro/kg) + (1 kg) $\times$ (0.5 euro/kg) = 2.5 euro, 25% more than last month. However, in scenario 2 we look at what the consumer buys now before determining the prices. Obviously, the consumer will buy less meat and more potatoes. Maybe no meat at all and only stuffs himself with potatoes. Let's say 4 kilo of potatoes. What is the inflation? The contents of the *new* basket, containing 4 kilos of potatoes, cost (4 kg) $\times$ (0.50 euro/kg) = 2 euro, exactly equal to the price of the basket of last month. Inflation is zero. This definition is thus nothing more

and nothing less than the increment in spending expressed in euros. It merely represents the effect of increased wages and reduced savings. Nothing more.

The problem with Scenario 2 is that, if the inflation figure is used for wage negotiations (some employees bargained an APC – automatic price compensation – in their salary), that the wages depend on inflation and inflation depends on wages. It is obvious that it can get out of control in a price-wage spiral. Wages are important for the production cost and thus selling prices of goods and inflation of Scenario 1 will also be affected.

Scenario 1 seems more fair, but not used by most statistics agencies. Most use definitions that more resemble Scenario 2. In any case, we have to conclude that inflation is not something simple and unambiguous. It is – or can be – subject to manipulation. The inflation figure can be a political choice. We may hope that politics do not enter the statistical bureaus, and that they manage to do their work independently, but that politicians would *like* to interfere leaves no doubt. The social-economical part of government is namely often based on it.

At this moment we can thus conclude that inflation, something that seemed so simple, is in fact rather complicated. It is also made worse by things such as hidden inflation.

When I was young, and when I had behaved nice, my mother gave me money to buy a miniature car. They were sold at the local toy store. Arranged in a drawer, looking for hours to see which one was nicest. I always liked the ones that were also visible in the street, not those sports cars like Ferrari, but simple Volkswagens. The price was 1 gulden (the Dutch currency at that time). In the meantime they have become more expensive, but that is not the point I am trying to make here.

The brand for miniature die cast cars was Matchbox. From England, they were named after the fact that they could fit exactly in a matchbox. At the time I did not even know that. For me it was simply a 'metsjboks' (as pronounced in Dutch). Come to think of it, I cannot even remember an alternative brand. There doesn't seem to have been any form of competition of toy makers or toy shops..

The fact is that these die cast cars were as good as indestructible, which comes in quite handy in a three-son family. They were very rugged; apart from the paint which got some scratches they remained

all in one piece.

Years later, I was already getting too old for such cars, another brand entered the market. Majorette. They were made in France and were the worst piece of garbage you can imagine. Matchbox cars had even technologically advanced suspension systems. "Great road performance" you would say today. They had a bouncy way of driving. Not so the Majorettes. Lousy suspension. Lousy quality. They broke down easily. It was French low grade material. The French can make good real size cars, but their miniature model cars are under par.

The lowering of the quality did not come accompanied by a lowering of price. They were as expensive as Matchboxes. The lesson we can learn from that is obvious. They were interesting for the shops because they brought more profit. All shops switched to Majorette. Matchbox went out of business. For the clients this is a form of hidden inflation. Real inflation is same product, higher price. Here we have same price, lower quality.

It is forbidden inflation because it does not appear in the inflation figures (model cars still have the same price and same weight in the consumer basket), but at the end of the day, the consumer has less for his money and feels inflation nonetheless. The Matchbox-syndrome is visible everywhere. I do not want to enter here into some kind of nostalgic everything-used-to-be better mood, but if we look around us, we can see mainly Chinese products and nobody questions that most of them are of far inferior quality compared to the Western products they came to replace. Hidden inflation.

Another form of hidden inflation is the so-called self-service trend. This is best described by the business model of Ikea. At this furniture shop, you have to basically make your own furniture. The assembly instructions of Ikea are notorious. I would not even be surprised if in future at the purchase of an oak cupboard you get an acorn and a sheet with instructions how to plant it, water it, grow it, fell it, cut it into planks, and screw it together into the cupboard. In the meantime, Ikea has the patent on all cupboards, so you will continue to have the pleasure of paying them.

In many countries, the self-service petrol stations were announced with a lot of fanfare. It was sold to us as something positive, namely that we would save time and that it would be cheaper. The latter seemed obvious because you did not have to pay anybody to fill the

tank for you anymore.

However, just like ticket machines selling public transport tickets, where the firing of ticket salesmen was not factored into a lowering of the sales price, but rather as an increased profit for the transport companies, so it also happened that petrol prices did not drop, but rather remained constant and the reduced cost for the petrol station meant simply increased profit. It fully makes sense in a liberal economy. Of course – how naive were you to think otherwise? – the driving force of any company is not to make *us* richer, but to make *them* richer. An iron law of economy. If self-service would not benefit the company, it will simply not be introduced. That at the end it is even bad for the clients, likewise, the company couldn't care less. The result is that the consumer now has to work (himself filling up the tank), and gets no payment for it. Also, the promised time saving turns out to be zero too. Or even negative. A trained attendant can surely fill up the tank more rapidly than a clumsy moron like I. Remember Adam Smith. He more than adequately explained that division of labor is the way to increased efficiency and productivity. (See Chapter 4). A self-service petrol station is surely less efficient for the society as a whole. Moreover, this attendant that was fired anyway has to be maintained somehow by society. It is not as if we can just eliminate him from the face of the Earth. All in all, we can say that self-service is a form of hidden inflation that is detrimental for society. It does not increase the efficiency of society as a whole, but only increases the profit of a few.

The same business model of customers working for their own products is implemented *in extremis* by modern internet companies such as Facebook and YouTube. These companies, in fact, do not produce anything anymore. The products are for the full 100% made by their clients. At first sight one may think that you are not paying for the products, but that is an illusion. There is no such thing as a free lunch. The payment is not in euros, but in sharing information, for instance who you are, what you do, what you like, etc. This is sold by them for advertisement purposes. This Google-business-model is therefore best described by, "If you are not paying, you are not the client, you are the product". Philanthropy does not exist.

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Finishing here this section on inflation, with the concept of extreme inflation, called hyperinflation. The most notorious case of hyperinflation is that of interbellic Germany. At a certain stage, workers collected their wages in laundry baskets, so great was the amount of banknotes needed to pay an average salary. In other cases, old banknotes were recycled by simply printing new numbers on them. "Fünf Millionen Mark", etc. A more recent cases is Zimbabwe, where in the 1990s inflation also reached astronomical levels. Nearly all cases of hyperinflation were caused by a state deficit that had to be financed. In ever-increasing pace banknotes were being printed to keep the state machine running. Financing new loans and refinancing old ones. Note that hyperinflation, as well as basically all inflation, can only exist if the currency is decoupled from gold or any physical commodity. At a guaranteed convertibility inflation is not possible, because it *fixes* the prices of that product (and with it all the others). That unless the underlying commodity ceases to be scarce, as we have seen with the silver bullion of Spain (see page 16). The German Goldmark was exchangeable into gold. In 1918 this convertibility was canceled by the introduction of the Reichsmark. The successive hyperinflation was the result. On November 30, 1923, the amount of gold originally promised by 1 Goldmark was costing exactly 1,000,000,000,000 (1 trillion) Reichsmark. Central-bank money has no intrinsic value; it is just a number, nothing more; one or one trillion, makes no difference.

9.2 Tax

Tax is also one of those seemingly easy but actually rather difficult concepts to grasp or define. Tax can be levied directly on somebody's income, or indirectly by adding something to the selling price of products. So called, value-added tax (VAT). Both are rather equal and an added value tax. For a shop keeper the tax is over the added value, namely the difference between the buying price of products and the selling price of the same, the difference being effectively the payment to the labor of the shopkeeper. For my work as university teacher, there is no buying price of ingredients and I only have a selling price. Added value is equal to end value. Strangely enough, this kind of added value is taxed much more heavily than the work of the shop keeper in most

countries. Possibly because tax on labor is more difficult to evade, workers being sitting ducks for the tax office.

The ancient Romans already knew that tax should not be too high, but also not too low. It is difficult to determine what the exact best tax rate is, but it seems to be something in the ball park of 11%, one share in nine. The Romans themselves had much lower tax rates, something between 1% and 3%, being an ultra-liberal capitalist society. Too low tax rate means the state does not generate enough money to keep the state machine running. Too high tax rate kills the economy and results in actually having generated less money by the end of the day. This effect is summarized in a so-called Laffer curve, a parabolic-like function going through the origin (zero income at 0% tax), reaching a maximum somewhere around 11% and from there dropping back to zero at a certain percentage. For sure at 100% tax the revenue would be zero, because nobody will work if everything will be taken away. Most countries have a VAT of around 21% and an income tax in the range 30-50%. That seems to be non-optimal. We seem to be doing something wrong. In particular energy taxation (on gasoline and diesel, but in principle any energy) is disastrous because welfare directly depends on energy consumption. Timothy J. Garret proved this in 2011 with the help of physical laws of thermodynamics. Taxing energy is thus throwing the baby out with the bathwater and undesirable, unless we have higher priorities for the environment as compared to humans, something that contradicts a liberal society.

Sometimes citizens of Southern European countries are blamed of having a low tax morality, with basically everybody evading tax as much as they can, and this then allegedly being the cause for the economical problems. However, this is a fallacy that can easily be debunked. First of all, southerners evade tax because they can. Any northerner would do it if the possibility existed. It has got to do with the behavior of ball-licking dogs. Second, tax evasion is high because taxes are high. As an example, The Netherlands, where people claim of themselves to be morally superior by having a high tax morality, is in fact a fiscal paradise. As an example, 17 of the 20 biggest Portuguese companies listed on the Lisbon stock market (PSI20) officially have their seat, and pay taxes, in The Netherlands, because they are much lower there. The Portuguese work, create added value, and the Dutch citizen receives tax of them. The lack of revenue then driving the

Portuguese government into a high state budget deficit which is then criticized in turn by the Dutch government, sentiments which are well present in Dutch society. But who can accuse whom of having low moral values here?

Imagine that the official tax is 80%, but Portuguese citizens avoid them wherever they can and wind up paying only half of them, so 40%. In another country, with high morality, citizens pay their dues, the full 30% official taxes. Below the line, they pay less, even though they are less fraudulent. In other words, it is not important how much tax is avoided, but how much is factually paid. The Troika demanded in Greece and Portugal to have more rigor in tax collection, but chasing the full 80% would be devastating to economy; no economy can endure so high tax rates. It would be better to counteract fiscal havens such as those existing in The Netherlands, measures of which southern states would benefit a lot.

Yet, increasing tax (especially on corporate activity) is problematic in view of Prisoner's Dilemma (see page 39). While it might be good for all states to increase tax on capital and its gain, for each and every individual country it is more beneficial to have lower taxes than their competing countries. This will wind up in a situation that all countries tax corporate activity as little as possible, for fear of the capital deciding to leave the country altogether. It is a competition to the bottom.

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But there is also a general intrinsic problem with specifically indirect tax, VAT. Imagine I trade with my neighbor one kilo of apples to one kilo of pears. How much tax we should pay? The question remains unanswered here, because it cannot be determined. One could think that the tax should be paid by us on the equivalent value of the transaction (the sales value is in this case equal to the added value), but that'd make us some kind of virtual bookkeepers when filling out the tax form, since we have to invent somehow a value for the transaction. What is the value of one kilo of apples? How should I know?! How can the tax office correct me when I fill out the form? What do they know of apples and pears? And what do I know about tax? It cannot be expected of me that I know something of the market value of apples. If the tax office wants 21% in tax, I can give them 21% of

the pears I received, *that* being the market value. (Something that actually happened in feudal times, the feudal lord receiving a physical share of the harvest).

Moreover, in practice, a transaction that did not take place with an invoice never took place, because there is no proof of it. This is like a law of physics, something that cannot be observed does not exist (according to Ockam's Razor). Some trade that did not get observed through an invoice did not take place for tax purposes; it cannot be taxed.

That makes us wind up in an important observation. Money is the means in a transaction (buying goods or labor) and over which tax has to be paid (something like 21% and 30-50%, respectively). This means that money is connected to transactions – that is, economy – and, moreover, to taxpaying. That gives us a new, modern definition of money. There where in ancient times it was linked to gold, and thus energy – 1 kilo of gold costs X megajoule to delve and is worth $1/RR$ times X banknotes – a modern definition of money is the following:

Money is a means to pay tax.

That is the only thing that remains of money. Money is a means to pay tax and nothing more. Otherwise it is connected to nothing. In reverse, with this definition it is clear that economy (like banking) that is not, or cannot be, taxed is not economy.

In the meantime the state wants to include all transactions into the economy, all those that are not taxable by their nature, for instance the exchange of apples and pears between my neighbor and I, because no money as involved in the deal. The driving force behind taking these transactions into the official figure of the economy is that by doing so the gross domestic product (GDP) can be boosted up, something that can be beneficial when the state enters the financial markets getting a loan to finance the state deficit. The interest rates for such loans are namely to a large extend determined through speculative mechanisms and speculation is fed by information supplied by the state and state-official statistical agencies. The higher the official economy GDP, the lower will be the interest rate to pay to the creditors. Just like in normal banks, where to get a loan, you need to show that you are so financially sound that actually you do not need it. The same accounts

to state financing. A high GDP causes low financing cost. As such, it is in the interest of the state to fiddle the GDP up.

An elegant and easy way to achieve this is by including in the official economy figures also things that cannot be measured, but only estimated. Recently the rules about how the economy is measured were changed to also include prostitution and drug sales. That this creates strange double moral standards is obvious. Apparently the state has no problem identifying illegal behavior of its citizens, but opts to do nothing because it serves it well to have these activities going on within its borders. The total state debt decreases relative to the GDP and loans for financing the deficit will get cheaper. Olé. That somebody gets literally screwed is of lesser importance.

Where will this all lead to? Most people will probably agree that the exchange of apples and pears should be taxed. If a trade has taken place, then it is fair that people have to pay their dues; "The traders should enter the equivalent value of the trade in the tax form", or something like that. Well, excuse me for being silly, but if we combine this with the above inclusion of sex (prostitution) into he official economy, and that money is tax, then, if somebody commits adultery and visits his neighbor for some nocturnal entertainment, then tax has to be paid over it. Both have to find out the equivalent market value of the act. Probably it is not completely symmetric with sex offered by women having a higher market value. So, the man has to pay more tax for the services received. If you start taxing all these things, as we should if we want to be consistent, economy will grow, and tax revenue too. Before long we will drop below the magic demarcation set by Reinhart and Rogoff, namely 90% debt relative to the GDP (p. 6). Without these accounting tricks, most European countries would probably already be well inside the danger zone.

China might also be getting a large part of its impressive growth figures from the increasing fiscalization of its economy. Rural areas where barter used to be common, more and more start trading with the help of money, which makes it count for the economy (and has as a side effect that it can easily be taxed).

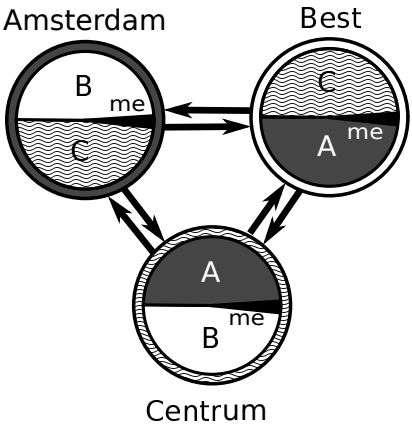
Another way to jack up the GDP is by performing virtual transactions. This happens quite a lot in the financial sector. It is of the type: one day bank A transfers 1 billion euro to bank B and the next day bank B transfers it back to bank A. The net result is zero, but a

(pseudo)economy of 2 billion euro resulted. The lion's share of financial transactions – nay, all transactions – of the banking world are of this type, because banks do not create any added value. It is obvious that these transactions cannot be taxed. Voices were heard in society that we could put a minute tax on every financial transaction, but this cannot work. The activity of banks is sluicing back and forth money thousands of times. As an example, shares used to stay in the same hands for years. In the 21st century it is closer to seconds. Now imagine that a tiny tax is paid on the transactions, say 0.1%. Within a day the IRS would confiscate the entire amount. That is because only the *added* value of an activity is technically taxable. Financial transactions of banks do not create added value and therefore cannot be taxed. The idea of a transaction tax is thus silly. On the other hand, such a tax on financial transactions would nicely constrain speculation on the market. Maybe it would limit the excesses on the market. That would be a nice side effect.

Now that we are talking about banks, they are anyway experts in financial wizardry. A bank can, for instance, easily pay out more dividend than its operational profits. In the same scheme the power of the owner of a bank can be taken away by the managers. It works as follows: Imagine there exist three banks on the market, Amsterdam Bank, Best Bank and Centrum Bank. I, like stock holder, have 2% of the shares of each bank. The rest of the shares of the three banks are not in the hands of normal investors like I, but are placed at each other. Amsterdam Bank has 49% of the shares of Best Bank and 49% of those of Centrum Bank. Best Bank has 49% of the shares of Amsterdam bank and Centrum bank, and Centrum owns 49% of the shares of Amsterdam Bank and Best Bank, see Picture 17.

The fact is that in this case I am the full owner of all three banks. I, for instance, own directly 2% of the shares of Amsterdam Bank, but also 2% of two banks that each own 49% of Amsterdam Bank. Also, I own 2% of banks that own 49% of a banks that own 49% of Amsterdam Bank. And so on. The mathematical series sums to 100%. This is easier to see when we realize that there is nobody else in the world owning shares of the three banks apart from me.

In spite of the fact that the banks are fully mine, I will be outvoted on all issues at the share holders meeting. The wages of the president could be on the agenda of Amsterdam Bank. The presidents



Picture 17: Three banks, all three effectively 100% owned by me (2% directly and 98% through banks that are mine). However, at the stock holders meeting I will be outvoted by the managers

of Best Bank and Centrum bank, respectively Bert de Boer and Cornelis Cuypers, will vote in favor of the towering salary of Anton Aarts. After all, next week is the share holders meeting of Best Bank and Centrum Bank, where their salaries will be discussed. This way, all astronomical salaries will be approved with 98% of the votes, against the explicit wishes of the owner of the banks, me.

There is an important side effect of this housing the shares of a company in similar companies. Imagine an operational profit of 100 euro is made at all three banks and each has issued 100 shares. In this case the banks can each pay 50 euro dividend per share, with a total of 5,000 euro per bank, 50 times more than the profits. That because the dividend is paid to other banks and they instantly give it back with the same speed. Of every bank, only 100 euro leaves the system, namely the dividend of the 2 shares belonging to me. Exactly the operational profit.

Yet, most share prices on the stock market are based on the dividend. A golden rule of 20 times the dividend as share price is used in financial circles, because that gives an effective interest of 5%, just a little higher than placing the money in a bank. Sailing on the infor-

mation of the dividend paid by the banks, the share price of the bank would be 1,000 euro, instead of 20 euro. Nearly completely air.

It gets even funnier. Especially in terms of tax. Assume once again that the real profit (swindling money out of clients, not dividends on investments in other banks) is 100 euro per bank, 300 in total. Each bank also gets a share of the profit in other banks, 98 times 50 euro. A total before-tax-profit of 5,000 per bank is made, a total of 15,000 euro. In view of this it is very well the banks have arranged – maybe blackmailed is a better word – a tax break at the state. Maybe they pay just 10%, there where you and I pay up to 50% on our activity and actually 25% on dividend of our investments. Even with this tax break, they'll pay too much. With 10% tax, they'd pay 1,500 euro, there where the profit was only 300 euro. That is effectively 500% tax. Absurd.

It gets even worse. With this kind of numerology, or creative bookkeeping, even entire countries can be ciphered up into Valhalla at the OECD (Organization of Economic Co-operation and Development, the database for economy). How it works? Imagine we have three banks each worth 1 billion euro; the banking assets of the country thus worth 3 billion euro. But, let us create a fourth bank, Direct Bank, where we house all the shares of the three banks and that each gets in return shares of the new bank. (Amsterdam Bank gets 33%, etc.) The value of the new bank is 3 billion euro. The total value of the four banks has doubled to 6 billion euro ($1\times3 + 3\times1$). That without moving an inch!

The fact is that the financial world (or any sector of the economy) is a small community. In such small cliques these things will happen. Share holders are sidelined, an example of which is the Fortis scandal in Belgium and The Netherlands. Share holders did not manage to send home the failing management. Moreover, manipulation of the image of the company is indeed done through ciphering the data with creative bookkeeping. It is rather the business culture of the sector. Yet, this balloon inflated with hot air just as easily deflates in times of little. The domino effect then works against it. If in a chain of events, shares with artificially inflated prices are used as collateral in other companies, these companies will be dragged down one after the other when things go wrong. The example of three banks presented here is a little oversimplified, but the idea is correct; hundreds of companies are

interconnected and all of them trying their best at data manipulation to come out as seemingly very healthy. Yet, if they are so healthy, they should pay tax. Tax is the only way to estimate the health of a company since tax can only be connected to *real* (added value) activity, and not bookkeeping tricks.

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Another interesting phenomenon is that tax is going directly against the second law of Adam Smith, namely division of labor. That can easily be seen if we again think about an imaginary situation. Imagine the society is optimized in terms of division of labor and everybody is specialized in something. For instance, I am a baker, and my neighbor is good at building houses. One day my bathroom has a problem and needs to be fixed. Well, I could ask my neighbor. He is good at it and can do it in half the time. He also asked me to bake bread and cakes for his wedding, and we did more or less the calculation, if I bake the bread and he fixes my bathroom, we'd both be better off, since we are both experts at our parts of the deal. Yet, we make a financial calculation and come to the conclusion that it is better if I fix my own bathroom and my neighbor bakes his bread. That is because of tax. Don't forget that when we do official business with each other, then the state wants to gets a piece of the action. Imagine, for the sake of the calculation, the state wants 100% of the cost price in tax, so either 100% VAT or 50% income tax. Now, if the neighbor can not work twice as efficient as I fixing the bathroom, and I do not bake bread more efficiently than twice as much as my neighbor, we'd both be better off doing the things ourselves. Tax is undoing the efficiency increasing effect of division of labor. Tax is reducing the productivity of society. Everybody will wind up doing everything himself, lest the tax office benefits. Unless we start taxing production that is for own consumption. Now, that's a thought.

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Now that we have discussed some technical aspects of tax, it is interesting to see if with a different taxing system we could actually avoid a crisis, or have a serious impact on capitalism or the economic system in general. Especially given the hue and cry in society about the injustice of the fiscal system, with capital often managing to avoid taxation

at all. As an example may serve the recent case of the Panama Papers (a set of documents showing tax evasion of many large companies and wealthy individuals organized by a company Mossack Fonseca in Panama). The answer to the question is simply no, it would not make any difference at all if corporate activity was taxed higher and labor less. Who followed the reasoning until now, presented in the previous chapters, readily understands that higher taxation on capital (and less on labor) would not make a iota difference. It is not difficult to see why. If tax on companies profit is increased, this profit obviously will go down. At least initially. Yet, Piketty has shown that average profit of capital is about 5% and this was seen as an empirical law of the market. If now this profit is taxed, capital will simply refuse to produce and we wind up in an overproduction crisis. (A crisis in which there exist enough infrastructures to produce an abundance of goods, but people live beside the machinery in poverty anyway). Fortunately, the market has a way of adjusting itself. As we have seen, competition not always brings prices down, but can also drive them up. That means that in this case the average profit margins reestablish themselves at 5%, with a higher price demanded for the produced goods sold to the consumers, that is, workers. It is as if the workers pay higher taxes on their wages anyway. At the end, they get consumption rights that are necessarily less than they produce. They produce one car per day and can consume less than one. It always boils down to this. Either the laborer is skimmed, or the production stops altogether, since capital is not philanthropic.

It can thus be concluded that it makes no difference whatsoever how much the capital is taxed. The entire discussion on fair taxation is fully beside the point and it is at best a way for main stream media to fill their newspapers and television programs with scandal news. It distracts from the core issues. Taxation can basically only help to force certain types of consumption and discourage others (except energy; taxation on energy only kills overall real economy in terms of kilojoules, maintaining or stimulating a pseudo-economy in terms of euros, or more likely it will have no effect whatsoever apart from inflation). Moreover, taxation can be used to implement socialism, the transfer of consumption rights from people with high income to those with low or no income.

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Ending this part on tax, it is useful to come back to the tax moral. Often Southern European countries are accused of having low moral values when it comes to tax. That is mostly due to the high tax rates, as discussed before. On the other hand, many Northern European countries are effectively tax paradises. A good example is Luxembourg. A tiny stamp state, but because of the low tax rate, it attracts a lot of companies. Luxembourg thus collects small percentages, but over large sums. It brings in fortunes, especially when compared to the tiny population. Per capita Luxembourg is the richest country of the E.U. Remarkable. More so, since Luxembourg does not have any industry worth mentioning. Not even much agriculture. It is basically full with politicians (halfway between Brussels and Strasbourg), other than fancy stories. It just attracts companies, not to do any activity, but simply to have headquarters there. Why they do this? (Hints: Dog. Balls).

On the other side, there exist countries where actually economic activity is performed that is producing real tangible added value. The tax over this added value is not paid in the country where it is produced. No, it goes where nobody is doing anything other than panhandling (a.k.a. tax collection). For example a software company or hamburger chain. 10% of its production is handed over to Luxembourg and its citizens. This goes far beyond a low tax moral. This is clean theft. To make things worse, the receivers of the money spend their abundant free time in coming up with silly explanations for why they deserve the confiscated wealth and insulting people that produced it for them. Welcome to the absurd reality of the 21st century. The organizer of this swindle in Luxembourg was Jean-Claude Juncker. That is why he was punished with ... promotion to Brussels where he now leads the pan-European theft scheme, a recurring phenomenon in centrally-led governments.

Finally, in his movie *America: Freedom to fascism*, Aaron Russo claims that tax on income (labor) is illegal (tax can only be levied on corporate activity). He reports cases where people that refused to pay tax were actually acquitted in court because there is no law that states they have to do so. Now, that is an interesting idea.

9.3 Pension

Those of you who are pensioners in one of the wealthy countries are rather well off. At an early age, often in full health, one can ”start enjoying life”. Often the reasoning goes that such an early pension is deserved because of hard working during the active life and having contributed a lot to society. Not to take anything away from their altruism, the reasoning is incorrect and is also rather insulting to people in other countries that do not have such good pension systems. We have already seen in this book that those who built up capital, now do not have to work; most income is generated by capital in 2015, and thus a good pension is deserved on basis of ownership of capital rather than hard work. Unfortunately, future generations, even those of wealthy countries, will not have the same quality pensions. As Thomas Piketty has shown in his book *Capital in the 21st century*, the current elderly, the post-war generation, built up capital with labor, there where future generations will not manage the same. The current working generation – and even more so generations beyond that – will only be able to own capital by inheritance and not by work. Therefore, they will be able to have a pension if they inherit capital from the current pensioners. Otherwise they'll miss out. That is why most governments talk about unaffordability of pensions.

It brings us to the subject of pensions. Is it possible that people have a 'right' to pension, that is get rights to consumption without working? Well, the idea that somebody can save money and then later can use the money to buy things is incorrect. This can easily be understood if we take an extreme case that explains it better. Take a closed-society like a remote village, but one in which curiously, everybody has exactly the same age. So, everybody sets a little money aside and then, at exactly the same day, everybody stops working and enters retirement. They all take the money out from under mattresses and start living on that. At the shop, it immediately turns out that there are no products to buy. The shopkeeper is also retired. The baker as well. The farmer also. Everybody is retired. In the absence of any products to buy, the saved money is completely worthless.

What actually happened before this day of mass retirement? Well, imagine everybody saved 10% of their income in terms of money. But, did they actually *consume* less? No, with the remaining 90% of their

money they entered the free market and found out that prices of products was 10% lower. In other words (of Jean Baptiste Say), what was produced must be consumed. A baker baked bread and consumed the same amount of bread (or equivalent in any other commodity). Nothing was left unconsumed. That this was done using 10% less money is irrelevant. Money is just a means to calculate the distribution of consumption rights.

In other words, people can only retire, not if they have acquired money, but if other people do not mind working and handing over some of the produced goods. *Somebody* has to produce the goods consumed by them. Pensioners always live at the cost of others that are currently working. That is because pensioners have saved money and not goods. If, on the other hand, they have accumulated capital in their active life time, then they are capitalists, and capitalism accumulates wealth. Such people can even retire without ever having worked a single hour in their lives if they were so lucky as to have inherited wealth at an early age. The rights to consumption have nothing to do with having earned them by work, but rather having inherited them, or them having been conceded by society for social reasons.

In a simple imaginary example. A country where everybody works and makes one thing, manna. The manna is brought to a central shop and everyone gets manna-notes with which things (erm, manna) can be bought in the shop. However, manna is perishable and at the end of the day what is left over is thrown away. It is clear that he who saves his manna-notes in order to one day come back and use them will get disappointed. When he finally goes to the shop, the price of manna will go up in a game of supply-and-demand (more manna-notes for the same manna). Inflation. The system only works if at that exact same moment, somebody else decides to save money for his pension. In other words, the system is a so-called (socialist) paygo system where it is tolerated that some consume without working and people tolerate this because they hope that the system will still work the same way in the future, that the money they save now – the non-consumption they do now – will be rewarded by society by also allowing consumption without working, i.e., parasiting in the future.

In case there is no paygo system of balanced savers and anti-savers (pensioners), then, if there is a free market, there will be deflation and inflation determined by the amount of goods and money on the market.

The fact is that you can only save money and not the underlying product (manna in this case). In this case the opening phrase of this chapter is important: "Only when the last tree has died and the last river been poisoned and the last fish been caught will we realize that we cannot eat money". You cannot eat money. So, you cannot save for your pension. Full stop. You can only live as a parasite of a future generation. Will they tolerate you? Will they let you enjoy life?

Probably they will. As long as they have the prospect to also be able to have a good pension when they get old. It only starts getting problematic if they are now being told that the system is unaffordable. In that case, most will want to 'take things into their own hands', actually aggravating the situation, because that is not possible, as argued above. The rumor that it will end will cause an imminent collapse of the system, as in a self-fulfilling prophecy way. That while there is no need for it. Since we all together are producing ever more stuff, there is room for ever earlier retirement.

Retirement can also be paid by having built up, or inherited, capital (the latter ever more significant, as demonstrated by Piketty). Then one can skim the workers and live like a king, actually without ever having had the necessity to work. A class division is being created with some retiring at birth and others never retiring in their lifetime. This division is taking place within countries, but also between countries. Next time you go to a poor country – enjoying a well deserved pensionerÂžs life – remember that the person serving you your coffee had the misfortune of never having been close to capital and as such has to work and serve you until he drops dead on the job.

9.4 The stock market (and speculation)

A nicer example of the free market than the stock market is not possible. The price of a product is completely and utterly determined by supply and demand and we can see it happening in front of our eyes. It has some interesting side effects, which we can recognize in this system easily, but actually are also inherent to other free market systems. First a little bit of history.

Amsterdam is the proud host of the first stock market in the world. It is in the center of the city (Damrak; between the Centraal Station

and De Dam on your left). It is since 1903 located at this square. The first location was opened in 1611 and was specifically meant for trading shares in the Vereenigde Oostindische Compagnie (VOC, an international shipping and trading company) that was founded some years earlier (1602). It exactly coincides with the golden age of Holland. And this is no coincidence. As Niall Ferguson said in his book, *The Ascent of Money*, the richest countries are those with the most-complex financial structures. Dutch people, like me, like to attribute their golden age to some kind of intellectual qualities and work ethics, something that is called the 'VOC-mentality' in local language – as if Dutch people have a superior instinct for business. The fact is that the wealth was mainly caused by the financial innovations and especially the stock market. For the first time anybody could just buy a part of a company and get a share in the profit. It attracted a lot of investors. At a certain point up a fifth of the population of Amsterdam was owner of the VOC. The VOC had thus ample cash and could expand rapidly. The tiny country of Holland suddenly even overtook Spain and Portugal who had not long before arrogantly divided the world into two halves in the Treaty of Tordesillas. Well, they can divide the world any way they want, but money decides at the end of the day. The VOC in Amsterdam basically was running the world through trade. (To be honest, also the availability of wood – the name Holland is derived from *holz-land*, wood-land – helped a lot; ships needed a lot of wood to be constructed).

The big question is then, why Holland? Why not in Portugal or Spain; they were much better geographically located and had moreover already a huge advantage in discovering the world. The answer is rather simple and finds its roots in religious grounds. Not long before the onset of the golden age in Holland, the Sephardi Jews – not Semites, but Khazars from present-day Russia, between and north of the Black Sea and the Caspian Sea, so technically speaking not real Jews, descendants of Jacob, but to-Judaism-converted people[*] – were kicked out of the Iberian peninsula and they took with them their knowledge and infrastructures (including gold) of finance to the North. It initiated the decline of the Portuguese and Spanish empires and the kick off of other regions, the regions to where they fled, ba-

[*]Eran Elhaik, Genome Biol. Evol. Vol. 5, pp. 61-74. doi:10.1093/gbe/evs119

sically London, Paris, Germany and the Low Countries. It marks a recurring problem; everywhere the Jews went, they brought prosperity, because they were the only of the three Abrahamic religions that have no moral problem with banking – there where for example Jesus threw out the bankers from the temple, Matthew 21:12, «Jesus entered the temple courts and drove out all who were buying and selling there. He overturned the tables of the money changers and the benches of those selling doves. And He declared to them, "It is written: 'My house will be called a house of prayer'. But you are making it a den of robbers."».

Then when things went inevitably wrong, the Jews got the blame and were converted, kicked out, or murdered. The book of Abalafia, *The Great Sea*, gives many examples of it. The most important example, and relevant for this book, is Venice, where the Jews were living in the part of the city called Ghetto Vecchio (which is still the word for a quartered off poor area of a city, a 'ghetto') from which they were doing their financial business from tables ('*banca*' in Italian, hence the name bank for a bank). It gave great riches to the city and formed the basis of the Venetian empire. It ended when the money game ended, helped moreover by a changing of the market from Mediterranean to pan-global trade. Empires come and go. At the basis of many a great empire lies a strong financial system. A strong financial system is normally provided by the Jews. Other religions see making money with money as something immoral. To give an example, only in 1658 in mainly Protestant Holland an end to this monopoly was made by a law that stated that a banker could no longer be excommunicated when charging interest on a loan. But the Jews are even today still prominent in financial business. (As Norman Davies wrote in his book *Europe: A History*: "... the prominent role of Jews in European credit and banking is a fact of history"). In Holland all religions were tolerated and that attracted the best and the wisest. (Until they moved to Nieuw Amsterdam [now New York], some time later, where they started a new cycle).

Holland thus profited from the exodus of Sephardi Jews from the Iberian peninsula and the financial wisdom (and gold) they took with them. This wisdom combined very well with the Protestant mentality of the Dutch, 'hard work is liberating and a good life of luxury is a taboo'. Together they were an explosive mixture (remember, less consumption and more investment, means a faster growth). Earned

money was invested in the VOC and multiplied. Capital was growing at a rate that sometimes reached 20% annually. In an environment where no difficult moral questions were asked, this wealth attracted even more wealth, in what can be called a giant pyramid scheme. The world, mainly discovered by the Spanish and Portuguese, was exploited by the Dutch. It attracted ever more wealth and the stock market was one of the things that gave Amsterdam the edge over rivaling cities like London and Paris. There can be only one number one. Amsterdam was it. Built on muddy swamps, it soon became the capital of a huge empire.

❇

After this short interlude on the history of financing we are back to the subject of shares and the stock market. The principle of shares – shared ownership – of a company is simple. The owner of a company can sell part of the company on the free market. This can be useful if a well-run company has opportunities to grow (has a lot of goodwill in the books), but has no ready cash to actually do the investment and start expanding the business. Shares are exchanged for cash. Both parties are happy in the exchange. The supplier of the cash sees a good investment opportunity and hopes to get his share in the forthcoming profits. The owner of the company sees that his company increases much in value. His share, although relatively getting smaller, in absolute terms is getting bigger.

Another advantage, when the shares are traded on the open market, is that they can easily be sold again if the need arises. This further increases the value of the shares, and thus of the company, the increased fluidity of capital adding to the value by making it more flexible. A morality issue enters into the system, however, in that the investors are now getting emotionally detached from the investments. That means that even more than before the sole object of capital is to make profit. Basically 'no questions asked', there where an entrepreneur is closely linked to his business and often shows signs of morality, at least as in 'being proud of the business constructed'. However, morality and ethics are not part of this book. Shares are traded on the free market and this adds value to everybody involved (In a trade, always both parties are happy, see page 12). The concept of shares is quite simple.

In spite of its simplicity there are some remarkable aspects of the stock market. First of all, sometimes the value of a company is estimated on basis of the price of the shares on the stock market by simply multiplying it by the number of shares existing. This is called the 'market capitalization'. And here immediately the trouble starts. The price of the shares on the stock market is namely only the trading price of the *latest* trade. To show the difference: Imagine I have 50 of the 100 shares of the bank Swindlor (ticker symbol: BSW). It is quoted at 1 euro per share. So, theoretically they are worth 50 euro. But if I try to sell them I will see that they sell for much less than 50 euro. The first one I will probably be able to sell for a price close to 1 euro. But by offering my shares on the free market the supply will increase, with the demand constant, this will lower the price. Likewise, if I want to buy the remaining 50 shares each one will cost more. Only if my trade is rather insignificant to the total amount of shares will the impact be small enough to be able to sell and buy at the market price.

To understand how this technically works, consider the stock market as two piles of orders. The left pile contains the buying orders ('offer'). We sort them on price, the highest ones on top. The right pile contains the selling orders ('let'), with the lowest price on top. We get for example the situation below:

Bank Swindlor, BSW			
Offer		Let	
number	price	number	price
20	0.90	20	1.10
30	0.80	10	1.30
20	0.70	50	1.40
10	0.55		

A stock broker receives the orders, sorts them and sees on top if a trade can be executed. In the above case the minimum asking price is 1.10 euro and the maximal offer is 0.90 euro, so nothing happens. The market price of the stock is not established, yet. This continues until one side concedes and agrees to pay more or accepts less for the shares, respectively. Alternatively, a new trader enters the market and places an order that can change the situation to one in which a trade

can be executed. Imagine I place an order "I want 30 shares for at most 1.50 euro". It is placed on top of the left pile of buying wishes:

Bank Swindlor, BSW			
Offer		Let	
number	price	number	price
30	**1.50**	**20**	**1.10**
20	0.90	**10**	**1.30**
30	0.80	50	1.40
20	0.70		
10	0.55		

Now a deal can be struck. In fact, even two. They are shown in bold in the above table. The first transaction is 20 shares for the price of 1.10 euro and that makes the second selling order float on top, 10 shares for the price of 1.30 euro. That trade is also concluded, so we wind up in the following state (Note that, technically speaking, my order does not even appear on the offer pile but I directly lift the orders from the let pile):

Bank Swindlor, BSW			
Offer		Let	
number	price	number	price
20	0.90	50	1.40
30	0.80		
20	0.70		
10	0.55		

The last transaction took place at a price of 1.30 euro. That is the new official stock market price that appears on the boards. We could also have said that it should be 1.17 euro, namely the average of the last two transactions, which, after all, consisted on one order from me. Or we could say that the new official price is 1.15 euro namely the average of the actual two orders on top after the last transaction, some kind of halfway point.

One thing is for sure, we always sell our shares for a lower price than what we bought them for. If I were to enter now with my freshly-bought shares on the market (cost: 35 euro) and sell them 'for any

price' then I'll only get 26 euro for them (20×0.9 + 10×0.8). An immediate loss of 9 euro.

Yet, in financial creative bookkeeping of companies, funny things can happen. In 2013 a bank in Portugal bought all the shares of the company Brisa (turnpike roads) – *a raison de* 2.22 euro per share – and the next day put them in their books for 5 euro apiece. The reason why the bank is doing it is obvious; it increases the equity of the bank. Equity is needed for FRB money creation. Yet, if the bank is a target of speculation caused by a loss of trust, things can go fast and it might be that they'll be forced to sell the shares again. The probability the bank'll get 5 euro per share is close to zero. Wishful thinking. They should even count themselves lucky if they'll get 2.22 euro.

❇

The game of shares and the stock market is full of bookkeeping tricks. Something we had already seen with the taxation and dividends of my three banks on page 149, where they managed to pay dividends far in excess of their profits. But the biggest problem resides in the speculative character of shares. One would hope that the price of the shares on the stock market represents the value of the company. For example, if one million shares exist of a company and the company has a book value of 1 million that the share price will be 1 euro per share. This assumes that the value of a company is easy to determine *and* publicly known. A so-called 'efficient market'. We have already seen this in the example of the OPEC that was talking the oil price into the sky by misinforming the market about the oil reserves by inventing illusionary concepts like 'peak oil' (always being 30 years in the future. See page 13). The market is often not efficient. Even worse, the people with correct information are well advised to keep this information to themselves. Or actually misinform the others, if possible. Many investing companies give so-called 'recommendations' to fellow investors. They tell us which shares they think you and I should buy. And we are supposed to believe that they give us this information altruistically out of their own goodness. Looking past our own naivety, it is obvious that these recommendations are meant to steer the share price in a certain direction desired by the originators of the advice. If they tell us to buy shares of a company, it means that they already bought them and want to manipulate the market

driving the price up, at which stage they'll sell the shares with a hefty profit. After which they'll issue a sell recommendation. Following their advice, we will always be fishing behind the net. And, because shares are nearly a zero-sum game, if they win, we lose. Full stop.

Often it is thought that the future evolution of the share price can be predicted on basis of the history of the prices alone. The idea is that the price curves themselves contain information about future trends. This technique is called empirical forecasting where the future is predicted on basis of the past, instead of on basis of a model. In a simple example – what most people use in their investment portfolio – if the trend of a share is to go up, people think it will go up forever. So, the rise is fueled by the rise itself. This is a self-sustaining system easily expressed in an equation: the price of a share, p, is the value of the company divided by the number of shares in circulation, A/n, plus the first time-derivative (a.k.a. 'growth rate') of the price of the share itself,

$$p = A/n + \gamma \frac{\mathrm{d}p}{\mathrm{d}t}. \tag{16}$$

This is an exponential runaway system (see Appendix C), also called 'speculation', where the price of the shares no longer represents the value of the company, but only represents the future (expected) value of the share. Other models take higher-order derivatives into account, or use data averaging (a 50-day average technique is quite common), but the idea remains the same, predicting the future data on basis of past data only.

A famous case of an empirical forecasting informatics using simple analytical tools was Jean-Pierre Van Rossem. In the 1980s this Belgian stock-market guru used a Commodore 64 (64 kB memory; a modern computer has about a hundred thousand times more), so the rumor went, to analyze and predict the stock market. The thing that made him rich is that people *believed* he could do so. They gave their money to his investment company, Moneytron. In this pyramid 'Ponzi' scheme that would make Madoff proud, Van Rossem accumulated a total of 800 million dollar and some 107 Ferraris in his garage. At the end he got caught and convicted. All his Ferraris lost.

Stock markets cannot be predicted on basis of past data alone. This theorem is called 'efficient market hypothesis' (EMH). This means that no predictable profit can be made if all agents operating on the market

have the same amount of information. Imagine on the contrary that I, on basis of the share prices or any other piece of information, am able to predict that the shares of Dresdner Bank will go up 10% tomorrow. Easy money, so I buy myself heavily into Dresdner Bank. However, if I know it, everybody knows that Dresdner Bank will rise 10% tomorrow, so everybody will buy Dresdner Bank shares today and the shares will already rise today. So, no profit can be made anymore.

This is a general law of predictability of the future. Nobody can, for instance, predict what discoveries will be made tomorrow, because if somebody knows, then the discovery is already made today. All the techno-gurus are therefore fraudsters. All empirical forecasters are fraudsters. In spite of this, hundreds of (pseudo)scientific journals exist to do just that, and most deal with economical problems. A typical 'paper' in such a journal will analyze the past performance of investment portfolios and determine that there were better strategies that are then suggested for the future. Well, I suspect none of these authors are rich now, unless they manage, like Jean-Pierre Van Rossem, to convince others that they do have the right strategy.

Profit can only be made on basis of information that other's *don't* have. For instance somebody that has privileged inside information of a company. Maybe knowing the yearly financial statement before it is made public. This kind of insider trading is forbidden by law in most countries because it is unfair competition. In spite of this it unavoidably happens. That is because it is highly lucrative and often difficult to prove (see for instance the case of the CEO of Philips in 2000). Because the total stock market is a zero-sum game, if there are people with inside information making loads of money, the rest, those with only outside information, are losing out. So, if you have no inside information, stay off the stock market, or you run the risk of being plucked by those who have.

Because of the uselessness of empirical forecasting it also does not make sense in talking about 'support levels' and 'resistance levels' – other pseudo-intelligent stock market gibber. That goes in one ear and out the other ear. These are terms for illiterate people to sound wise to the listeners in order to make them hand over their money.

This way, literally millions of people exist in the world that call themselves 'financial adviser'. (Recognizable, at least the male specimens in Europe, by striped suit, blue shirt and yellow tie; beware of

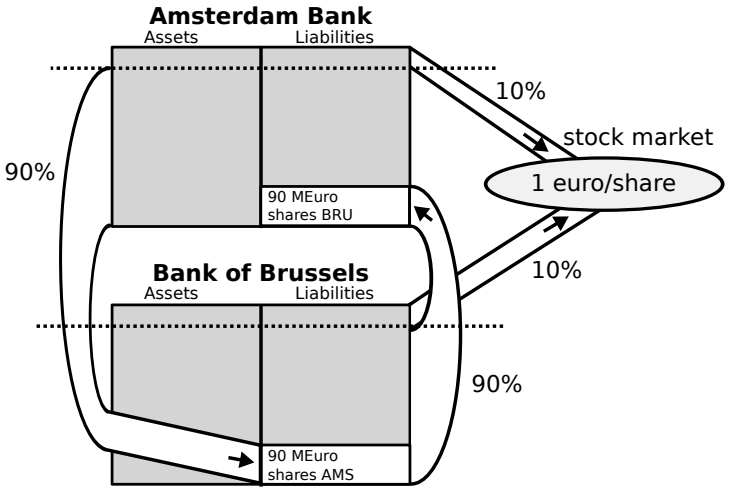
those that are smiling. If he wins, you lose). It is possible because capital has a large yield and even after subtracting the cost of these layabouts – parasites of society, since they do not produce anything – enough remains for the capital. (In any case, they make profit for capital, because idiots like you and I eagerly hand over their money to them). The yield on capital is 5% as Piketty has shown. The zero-sum game is in practice therefore more like a 8%-sum-game before costs and 5%-sum-game after subtracting the costs of these no-goods. A private investor might get a positive yield if all information coming from advisors is ignored. This is a technique called 'buy-and-hold'.

The real top investors make use of the self-fulfilling-prophecy effect and can get yields far above 10%. If Warren Buffet buys bonds of the Greek state, everybody will follow him. That because he has always been right until now. And then the price of Greek bonds obviously goes up. Blimey, he is right again! Greece out of trouble because it can finance itself easily. A poignant example of this is described in the book *Why I left Goldman Sachs* by Greg Smith: Mr. Buffet was incentivated with a signing premium of 10% for a loan. He gave billions and immediately received billions back. The mob followed and a couple of days later Mr. Buffet sold these assets without ever having done anything for them, since the risk for him is quite low considering the self-fulfilling prophecy effect.

Adding to this, Daniel Kahneman, in his book *Thinking, fast and slow*, in the chapter on "Regression to the mean" presents a theory that says that companies that did bad in the past will do good in the future. In other words, we have to invert the above equation (or choose a negative value for γ in Eq. (16)). Invest in garbage.

❄

The scheme of shares can easily be used to create a bank out of nothing. It works as follows: Anton starts a bank (Amsterdam Bank) and Bernhard another one (Bank of Brussels). See Picture 18. 90% of the 100 million shares are placed at each other's bank. The rest, 10%, is sold on the stock market. But rather, Amsterdam Bank and Bank of Brussels are going to the market an buy them themselves. They can even use the money of their own banks. Freshly 'printed' money created with FRB, with ... the 90% shares they have in the vault as collateral. It is a chicken-and-egg situation, the discussion of who



Picture 18: The starting of two banks without money with as equity 90% of each other's shares. The remaining 10% of the shares is sold on the stock market and traded (if needed even bought by the banks themselves) where the price is kept at 1 euro. The equity is thus 90 million euro at each bank. This is used to create money which is used to buy the shares. It is a chicken-and-egg situation

came first, the money or the shares, avoided. This way they can keep the share price at a stable 1 euro which is good for the system of (the two) banks. The result is that the market capitalization of the banks is 100 million each and each have an equity of 90 million. They are both solvent. Thunderbirds are go!, to paraphrase the famous television animation series. Both banks can further create money with FRB, possibly used to prop up the price of the shares and further increase their assets. Even if they get a visit from the European Central Bank they'll pass the stress test with flying colors. Nobody comments on the fact that it is all based on air, because everybody knows that that is systemic in modern-day banking.

It may be obvious that if one bank fails, the other soon follows suit. The equity namely fully evaporates on the demise of the other bank. However, because of this interconnection between the two banks

and their mutual dependency, they are now considered 'system banks' that are not allowed to go bankrupt, for fear of dragging the entire system down with them. They are too big to fail and government will do everything in their power to save them. Confiscating savings from citizens, or simply promising money (issuing bonds and giving them for free). Probably the entire sum of 90 million euro of virtual money that was counted as equity before the collapse of the bank. The banks stay in the hands of Anton and Bernhard, because they got the banks into the mess and are therefore the experts in the field of banking. It is like hiring Don Corleone as police chief, because he knows so much about crime. The Minister of Finance that enabled the bailout of the banks later gets a nice job as CEO of one them.

In reality things are a little more complex. There exist a multitude of banks and not just two. But they are indeed linked to one another through complex financial constructions as described above. These consist not only of mutual stock placement, but also other financial products, like CDOs and CDSs (collateralized debt obligations and credit default swaps, respectively), to name but a few. These are called 'derivatives', since they are derived from the original financial products. Participations in tranched reselling of mortgages, insurance on defaults and foreclosures etc. They can all serve as a basis to do banking. Everything interconnected. Yet, and this is the key issue, none of the products are linked to underlying values of physical products, but are purely speculative. It is as valuable as people think it is valuable. And the value is principally estimated on basis of a (time) derivative of the value itself (Eq. (16)). Imagine that the economy of China is growing 10% per year. Great. Everybody invests. 'Shares' of China thus do 1000 renminbi apiece, γ being 100 renminbi/%. Now, imagine that China suddenly grows only 8%. No big deal, right? Still growing spectacularly, right? Not! It simply is not enough. With γ unchanged, the share price of China is suddenly only 800 renminbi. And that means that the derivative can be 200 renminbi per 1 millisecond, negative. Multiplied with γ, it makes the share price even drop below zero! (In reality it probably bounces back to the intrinsic value A/n and that makes it a so-called 'penny stock', each share with a price in the 1-cent range). While a bull market tends to be exponential and prolonged, a bear market is rapidly turning into a crash, with a stampede of investors selling off as quickly as possible. A stock

market crash is natural because of the systemic speculative character of the stock market.

The first documented prolonged hype and sudden bubble bursting is the case of tulips in, yet again, Holland. At a certain point the bulbs were worth their weight in gold. Until from one day to the next the price crashed. A good modern example is Enron, the energy provider of the United States. By virtual trading it managed to be the most innovative company of the country (according to Fortune). Until in 2001 an energy expert asked, "But *where* do you exactly make profit? *I* don't see it!". In December of the same year Enron was bankrupt. That's how fast it can go.

9.5 State financing

As said before, the state has a constant budget deficit; it constantly spends more money than it receives. Also explained before, for a family budget this would be a problem, but for a macro-economy not. None whatsoever. It is even essential for a healthy economy.

Look at it this way. Imagine for the moment that there are no other countries. That the European economy is a closed system without import and export of goods and foreign exchange of currencies. In this work it is the definition of macro-economy, the closed system of the economy (if import and export to other countries are included then the macro-economy also includes those countries to make the system closed again).

The private sector is working on capitalistic principles. In order to work, they need profit. In a zero-sum game, this means that the rest, the public sector, *must* make a loss. Turning it around, if the public sector does not make a loss, the private sector does not make profit and the entire system halts. Loss for the public sector is acceptable because it is not having profit as a goal but has more humanistic goals.

Now, what happens in this system if the public sector, the state, spends more money than it receives. That deficit, a hole in the budget, has to be filled up somehow. It can be done in three ways (if the state does not want to go bankrupt, which would be a fourth outcome):

- Taxing

- Borrowing
- Printing new money

However, in reality the last option does not exist, because printing money is, remarkably enough, not a monopoly of the state, but of a private company. Only the bank cartel, through the central bank, is allowed – by state law nonetheless – to create money. That leaves us with confiscation (tax) or borrowing.

Taxing, as we have seen before, is not possible because if the tax on capital (corporate activity) is too high, the profit margin will drop and capital will stop producing and we end up with an overproduction crisis. Thus, the state can do only one thing, borrowing money. Forever living beyond its means. In the introduction chapter we have seen that technically speaking it is possible that the state continuously spends more than it earns. Now we see that not only is it possible, but it is even necessary. Without a public sector running a constant deficit, the system will come to a halt. If a country like Greece, Portugal or Ireland is spending too much, this is not a sin, this is rather a solution to the problem. These countries should not be stigmatized, but rather be heralded as the saviors of the economy.

The state thus borrows money from the banks that freshly print it out of nothing. That is to say, the state swaps state promises (obligations like treasury bonds, treasury notes, and treasury bills – t-bonds, t-notes and t-bills for short – having a maturity of 20-30 years, 2-10 years, and less than one year respectively) to bank promises. Note that the bank does not factually promise anything and the state cannot keep its promise, as reasoned above. If it were to pay back its borrowed money, the system would collapse. We can thus conclude that state financing consists of swapping empty promises. Inflation will slowly water down the loans until they become insignificant.

Inflation is therefore an essential item of state finance. It has to be kept at a neatly 3%; too high and people lose their trust in the currency while too low will lead to difficulty in emitting new treasury papers, since the old ones are too much of a burden. The inflation has to be bigger than the interest paid on the loans, so that the weight of state financing diminishes over time.

The treasury papers are deposited in the banks and can be used as a collateral for fractional reserve banking. The central bank buys

and sells these papers from the market and thus inserts and retracts central-bank money – those notes in our wallet – from the market. It thus controls M_0 money through the open-market trading of treasury papers. The banks can use this M_0 money to FRB it into a multitude of higher-level moneys, M_1, M_2, etc. This extra money leads to inflation. Thus, the central bank can control inflation through the trading of state paper.

Without money creation, the system has a tendency for deflation because the amount of goods produced steadily increases due to increased productivity and an increased amount of capital. As an example, more loafs of bread will be produced because the baker buys a new highly-efficient bakery. If the amount of money circulating stays the same, the increased supply of bread will drive its price down.

If the state were to pay back its loans, this situation only aggravates because the supply of money would drop and the FRB now multiplies the destruction of money.

Deflation is taboo because of difficulty of managing state finance; it would basically wind up in a runaway debt spiral, with the weight of debt and interest payments ever increasing on the budget. Moreover, deflation will make people keep their money in their pockets; better to wait buying something until tomorrow because tomorrow it will be cheaper. Consumption and investment will slow down.

This last part is dubious because it is based on analyzing people's behavior, which is not an exact science. A person can also think to the contrary, that investing is good in a deflationary system, because on top of getting a return, this return is ever more valuable.

Yet, it remains essential that the monetary system contains a constant inflation. Note that this control of inflation by central bank and government together is a form of centralized government where peoples' incomes and wealth are slowly taken away from them, instead of these being determined by the market as is wont in a liberal decentralized society. The government and banks determine our income somewhere in a meeting. It is of course nice for them that they can erase debt in an easy way without ever paying back a cent, something that then also obviously applies to our mortgages, but a real liberal would like that the market takes care of everything and not that our wealth is determined by ballot or committee.

Inflation is a form of taxing the creditors by the debtors because

it takes away buying power from the later and puts it at the former. If you are, like the state, in constant debt, you like inflation. If you are, like financial institutions, lending out money (or having a savings account), you don't want inflation.

Now, what happens if a bank is in trouble and a bailout is performed? Money from the state ("our taxpayers' money!!") is used to keep it afloat, isn't it? Well, rather not. The state namely does not have any money – it is running a constant deficit – and would have to borrow it. From ... exactly the banks, if not the exact bank in question. What happens is that the state is issuing bonds, or any other treasury paper, and gives them to the bank without getting anything in return. An empty promise winds up in the vaults. Nothing more. No money of the taxpayers is used. Government, however, cannot communicate this to the citizens because that would be admitting that the entire monetary system is an air-creation scheme. The system is based on trust and government is well advised to keep its mouth shut and wait until the storm blows over.

9.6 The new role of the central bank

Initially, the central bank had as its only task the saving of banks that were threatened by a bank run. The central bank – a bank union, or bank cartel – lends money to banks in need as a lender of last resort. In effect, all banks join in and help out their colleague bank of the cartel.

At a later stage, the central banks also started controlling the inflation that was kept at a certain desirable level, in order to have a stable state financing. This is strange. After all, why should a private-sector commercial institute be in control of a thing as important as inflation? If it is in the interest of the public sector and thus the common people, shouldn't it be in the hands of a body that is elected by the citizens? In a democratic society, the management of the monetary system should be done by a democratic agency.

The control of the money in circulation was done by buying and selling state paper, t-bonds, t-notes, and t-bills. This way new money is injected into the coffers of the state and salaries of public servants are being paid with it, as well as projects. This way the new money

is injected into society.

A second way in which the central bank controls the amount of money in circulation is by manipulating the so-called 'discount rate', the interest that is charged between member banks if they want to borrow money from each other in a short term. If this rate is low, banks will borrow more central-bank money (M_0) that is used for FRB multiplication which increases the total amount of money in society.

At this stage a hypocritical detail has to be pointed out. A member bank of the Central Bank of England – Barclays – was fined heavily when they were manipulating the Libor (London interbank offered rate), that while it is the official function of the bank union in its entirety to do exactly that.

As a third tool, the modern central bank can control the total amount of money in circulation by setting the reserve ratio. As we have seen, the reserve ratio sets the limit to FRB money creation. The central bank can for instance increase the reserve ratio requirement from 1:30 to 1:20. Banks then have to replenish their reserves. The only way this can be done is by taking money out of society. Individual banks can hope to recapitalize by emitting new stock in exchange for money, the banking system as a whole simply has to get money back from outstanding loans, basically not emitting new ones when the old ones mature.

❇

This was the second version of the role of central banks. First was lender of last resort, next was fighting inflation. They therefore started directly interfering into the economy and taking over the tasks of the government of steering society. It is highly undesirable, because, where the government has to justify its actions in front of the people, the central banks do not have any obligations towards the citizens and are by law independent of the government. It is a one-way non-democratic system, where the economy is run by a select group of bankers. Adam Smith turns over in his grave.

Intermezzo: German Economist Rudolf Hilferding:

"In this sense a fully developed credit system is the antithesis of capitalism, and represents organization

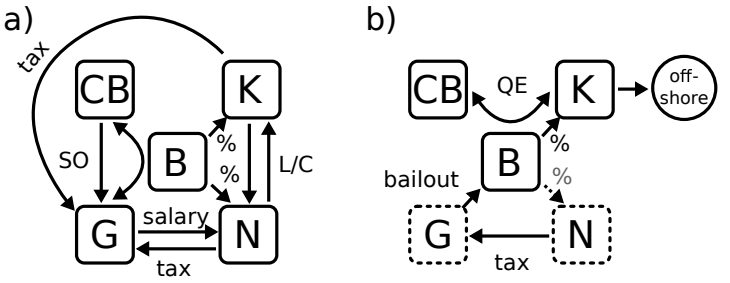
and control as opposed to anarchy. It has its source in socialism, but has been adapted to capitalist society; it is a fraudulent kind of socialism, modified to suit the needs of capitalism. It socializes other people's money for use by the few"

❇

Moreover, one of the core targets of the steering by central banks is the elimination of government. It is said that government is inefficient (because of lack of competition, which makes people lazy) and should thus be minimized. There is something to say for this argument. However, if we eliminate government, the possibility of money-creation is canceled. Without a public sector running debt, there cannot be a private sector making profit. There has to be a public sector that has a constant deficit, used for creating money by issuing state obligations. First because then the rest can make profit in a zero-sum game, and moreover, the debt can be used to create new money, turning the economy into a positive-sum-game. A reasonably large public sector is *essential* in an economy that has fiat money. Minimizing or canceling the state is equal to digging a grave. A state cannot have a deficit that is large with respect to its own size, while it needs to be some 3% of the economy size. This sets the lower limit to the share of the public sector in the total economy. The magic limit of Reinhart and Rogoff of 90% (see page 6) depends a lot on the size of that state participation in the economy.

Modern economy thus got into trouble because the state has become too small and cannot borrow more money since the Reinhart and Rogoff limit was reached. The solution was not only swapping central bank money with state obligations, but also swapping money with obligations of private companies. The central bank simply directly bought toxic products out of the vaults of the banks. This is called Quantitative Easing. Individual member banks thereby became more healthy, but the central bank (all banks together) has become much more insolvent. They have in their assets items that are basically worthless.

Quantitative Easing (QE) is a form of anti-austerity. There where the public sector is not allowed to make a loss, now the private sector



Picture 19: Money flow before (a) and in the future (b). CB = central bank. K = Industry (Capital). B = Banks. G = State. N = People. SO = State obligations. % = loans/savings/amortization/interest. QE = Quantitative Easing. C = Consumption. L = Salary.

is allowed to make a 'loss', since any loss will be lifted by the central bank. The private sector debt is thus currently rising sky high and by far passes the Reinhart and Rogoff limit of 90% in most countries.

Note also that the stimulating package of QE is not having a serious impact on economy. That is to say, it does make the economy show growth figures, but this is mainly virtual economy of financial transactions. The companies, that now have easier access to money, used this newly borrowed money not to invest in production to make goods for consumers, but rather use the money to buy back their own stock, thereby making the shares rise exponentially. The economy grows, but the people do not see more wealth. Because of this effect, no inflation exists, because the money is not used to buy products (share prices do not have a weighing factor in the consumer basket used for calculating inflation).

The virtual economy is growing (those numbers that are presented by the politicians) – share prices, house prices, etc. – but the real economy (in terms of kilojoules) is not growing. To understand this, look at Picture 19 that summarizes money flow.

In the old days the role of the central banks (CB) was buying and selling of state (G) obligations (SO), possibly through banks (B) and open market trade. Capital is paying salaries (L) and receives money for consumption goods (C). The state levies tax on capital (K)

corporate activity and people (N) and also employs people. Banks receive savings and lend out money, both with interest (%).

In the latest version of central banking, it has taken on the role of stimulation of the economy, apart from fighting inflation through manipulation of the money supply and being lender of last resort. Moreover, it has imposed a reduction of the state onto society. Central banks have taken over the government of countries. That makes the often cited phrase, attributed to Mayer Amschel Rothschild relevant, "Let me issue and control a nation's money and I care not who writes the laws." (The opening statement of Chapter 8). Factually the central banks that issue the money are running the state. So much for democracy.

There is no possibility for easy money creation through state obligations and the demand for money is so low that negative interest rates are even existing. Negative interest rates are a mathematical absurdity. Why would anybody lend out money – or anything else – and ask less for it back at the end. Even for things that have a negative value that does not make sense.

When money is lend out, it has a certain probability of a 'default' (a not getting back the money, neither the interest, nor the principal)*. If this risk has a probability y than the lender wants to be compensated – rewarded – for taking the risk by receiving interest. The break-even point is when the compensation leads to zero profit:

$$(1+x)\times(1-y)=1. \tag{17}$$

This yields a beak-even interest of

$$x=\frac{y}{1-y}, \tag{18}$$

or an intrinsic calculated risk of default of

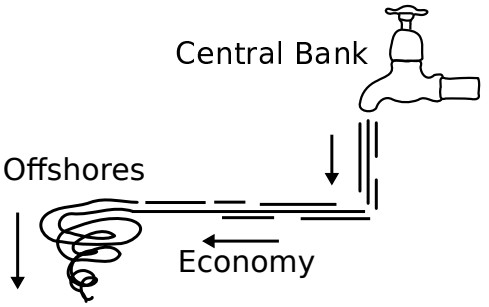
$$y=\frac{x}{1+x}. \tag{19}$$

*Bankruptcy destroys debt, but not money. That puts the system on a mathematical possible track of the total amount of debt being equal to the total amount of money instead of debt always being larger, a feature that the system has in the absence of bankruptcies. This mathematically distinguishes a bankruptcy from paying back a loan. The latter annihilates both debt *and* money, leaving some debt behind.

This is a mathematical absurdity, because for a negative interest rate the estimated probability is negative. In fact the situation is a little worse because nobody invests with an aim of breaking even. The interest should be higher than given in the above equations, so that the investor makes profit. Also the argument of 'safe storage' is often used to justify the negative interest rate, 'parking the money in a safe place'. This argument does not hold because nothing is parked. The money is not parked anywhere, because the basis of the money is the thing for which it is swapped. If this asset fails, the money fails with it, and vice versa. Reason has now blatantly left the monetary system. Later more of this default risk calculating idea.

To summarize here the role of central banks, monetary system and economy in general. To put it in a depressingly black way: Money is no longer put into circulation through state obligations, because the state has been marginalized. Instead, QE is used to buy general (toxic) assets from banks and other financial institutions through complicated schemes (see for instance the Geithner plan). People do not earn reasonable wages anymore, because human productivity has become irrelevant in a society where every type of labor can be replaced by machines (that is, capital). This also implies that no consumption can take place (unless the money is lend to them making people live beyond their means). The economy has become virtualized where money received by companies is used to prop up their own stock in share-buyback programs and issuing dividend in the absence of profit. The remaining activity is financial transactions (which already make up about half of the economy). Neither are taxed because all capital flees to fiscal paradises – offshores – like Panama. Workers cannot flee so easily (while we have seen in Europe an enormous flux of economical refuge seekers). The only thing that still sustains consumption is a debt spiral. People are becoming debt slaves, where generations to come are pawned off. In any case, in QE, only a tiny fraction is used to increase spending by consumers. Most of it goes through companies and disappears rapidly to fiscal paradises.

The system is becoming a system that does not serve humans anymore, but only itself. Note that no longer the role of the central banks is to save banks in need, something that was their original task (see page 111). This task is now completely in the hands of the state, through bailouts. If things go wrong, the state has to cough up the



Picture 20: Modern economy: The Central Bank creates money, that is injected into the economy and rapidly disappears into fiscal paradises. In QE, only a tiny fraction is used to increase spending by consumers.

resources to save a bank. It is what is described as a banking system that boils down to "Heads I win, tails you lose". As Napoleon Bonaparte said: "*Lorsqu'un gouvernement est dépendant des banquiers pour l'argent, ce sont ces derniers, et non les dirigeants du gouvernement qui contrôlent la situation, puisque la main qui donne est au dessus de la main qui reçoit. [...] L'argent n'a pas de patrie; les financiers n'ont pas de patriotisme et n'ont pas de décence; leur unique objectif est le gain.*" ("When a government is dependent upon bankers for money, they and not the leaders of the government control the situation, since the hand that gives is above the hand that takes. [...] Money has no motherland; financiers are without patriotism and without decency; their sole object is gain.")

Chapter 10

A summary

> "I spent 90% of my money on drink and women. The rest I wasted."
>
> – George Best, professional soccer player

We can now make a summary of everything written down here in the chapters before. It has two angles, one is on the monetary system and the other is on the economical system.

The most important conclusion is that our system of money, and thus the entire economy, is based on promises. Life of today is paid by promises of paying tomorrow. And profit has to be made in the process, otherwise it halts. That is why economy always has to grow, if not, the system digs its own grave.

Because the real economy is consumption of energy and resources in general, we have to exploit the Earth in an accelerated way. We have to consume tomorrow more than today. Because the planet is limited, a catastrophe is unavoidable. This was already predicted by Thomas Malthus in his Malthusian Catastrophe. We can try to virtualize the economy by disconnecting the currency from energy, as was done by the Bretton Woods agreement, which disconnected the money from gold and thus energy and effectively created the possibility of an infinite game. However, this also seems to go wrong. A summary of what happened:

First of all we have seen that even if money is connected to something physical, such as gold, a nefarious scheme is played in that more gold is promised than the promiser has physically available, so-called fractional reserve banking (FRB). It is not considered bad and is actually established by law.

We have seen that this still limits the game because gold is limited and the FRB gold-multiplication ratio is limited. The latter because the system is based on trust. If the FRB ratio of promised gold to real gold gets too high, people lose their trust in the system. Yet, the amount of money *must* always grow, because the freshly printed money is lend with the expectation (only) of making profit on it, namely interest. "Without interest, I am not interested in lending you my money". The interest causes that always more money has to be paid back than exists in the world. When money is created, it is done by creating a debt. Money = debt. However, the amount of debt created is always bigger than the amount of money. The borrower of the money cannot ever hope to pay back the debt. An individual borrower (micro-economy) might still do so, but all borrowers altogether (macro-economy) have no chance.

That means that debts have to be continuously refinanced when they mature. New money has to be printed. Ever more money. An eternal debt spiral. However, the spiral is limited by the finiteness of gold, and a finiteness of the FRB reserve ratio. The latter has a natural limit of 20-40 times the gold reserve.

To steer the economy out of these natural troubled waters, the gold standard was abolished. Money could no longer be exchanged by law to gold. It is now fiat money which means that it is based on nothing. Gold, or oil, or whatever product, represents energy (or labor, the two physically the same, both have the unit joule). Abolishing the energy standard makes the monetary system based on faith only. It is a miracle that it works.

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On the other hand, a system with a 'solid' monetary system, for instance only gold, and no paper promises thereof, also fails sooner or later, because it has the tendency to concentrate wealth, or capital in general (money and means of production). That is, if we have a political economical system of capitalism, a market where the capital

is free and can decide to produce or not. That is because capital *only* decides to produce *if* it makes profit. And in a liberal free society everybody and everything is free to do what they want.

An empirical law, as found by Piketty, is that capital makes 5% profit. The result of this is that if the economy is growing slower than this 5%, the share of capital in economy is growing at the expense of the share of labor. Labor gets an ever smaller share. And even when the economy saturates, as is inevitable in a limited world as our planet, the share of labor reduces. Since payment is proportional to the share, the share of consumption diminishes. This in relative terms, but when the economy saturates, also in absolute terms (see intermezzo below). Workers can no longer afford the stuff they make themselves. This is a Marxian catastrophe. As Marx wrote himself, "What the Bourgeoisie therefore produces, above all, are its own grave diggers". Capital will at the end only produce new capital. Useless capital (in the eyes of humans).

Intermezzo: Wages

The share of labor diminishes relatively, but as long as the total pie increases, one might hope that in absolute terms each one's slice of the pie increases. This is indeed the case in a fast-growing capitalist society. However, when saturation sets in and the pie size is constant, each slice actually shrinks. We have already seen the famous internet meme on page 136, "In 1964, the minimum wage was 5 silver quarters. In 2015, 5 silver quarters have a melt value of $15.15. We don't need to raise the minimum wage. We need to fix the money". This is an interesting statement. Apparently, a worker in 1964 produced an amount of labor per hour (kilojoules) and could trade it to something of (nearly) equal value, five silver coins, which also represents energy, namely the energy to delve that amount of silver and refine it and mint it into five coins. Maybe only 10% was lost in the trade. In 2015 the energy needed to make these five coins has not increased much, yet now the worker cannot

trade with the same efficiency this same amount of labor produced and offered on the market. He is being skimmed more by the system and his slice of the pie has dropped even in absolute terms to below the equivalent of five silver coins.

Sometimes it looks we are getting richer, but that is an illusion often caused by (hidden) inflation. We can now all buy a three-piece suit from our wages. In earlier days, a worker would have to work two months to buy himself a suit and a pair of shoes. Upon closer inspection, a hand made suit and pair of shoes *still* costs an average worker two months salary. And, if the suit is not directly bought from the tailor (possibly through bartering), but instead with the intervention of capital (infrastructure of production and distribution), this price will only go up, just as with the silver coins.

To avoid this Marxian catastrophe, people were borrowing money – either directly or through the government. In a zero-sum game, if the private sector (the capital) needs to make profit, the rest, the public sector, must make a loss. The state continuously runs a deficit and never pays back old loans. They are simply eternally refinanced. People and governments – all those without a goal of profit – constantly live 'beyond their means'. This living beyond their means is actually what keeps the system running. The alternative is a Marxian apocalypse.

This eternal refinancing can only be done if money is not linked to a physically limited commodity such a gold. The Marxian catastrophe was initially avoided by FRB and later by abolishing the gold standard. However, we are now in a third phase. Namely that the goldless money system gets out of control, with state debts more than 90% of GDP. It is considered intolerable. The money is demanded back and state deficits are ordered to be reduced (by the central banks, that are fully running the economy). This, however, unveils the Marxian catastrophe that was covered with the fiat money veil. Suddenly workers see their effective wages tumble and the economy plummets. Rapidly the course

of action was inverted and the debt spiral again put on the agenda, this time through quantitative easing (QE).

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A Marxian catastrophe is easy to understand. Already Plato and Socrates understood the core issue. Going back to the equation of Marx. A normal worker produces a commodity (C) and trades it on the free market for another commodity (C') that might have the same intrinsic value (in terms of kilojoules) and obviously trade value (in terms of gold), but more use value (in terms of satisfaction); both parties in the trade are happy with the trade.

$$C - C'$$

In dialectical terms, the quantity is not changing, but the quality (C' has the same trade value as C, but is a *different* product). The trade can be facilitated by the use of money,

$$C - M - C'$$

which is basically the same. In this form of trade, both parties are happy, as we have defined on page 12. 'Profit' cannot be defined in this trade, since the products are incomparable. They have the same market value (as shown by the trade; the market value is self-referentially defined by the trade) and the intrinsic (energy) value is difficult to ascertain. What remains is an unquantifiable amount of increase in satisfaction of both traders. Satisfaction does not have an SI unit and is thus not scientifically quantifiable.

However, there are also people, traders, that are not entering the market to get a change (gain) in quality, but a gain in quantity. They use money to make more money. Factually they make 'more of the same'. This is a cycle of the type

$$M - C - M'$$

Money is used on the market to buy a commodity that is sold for more money. This is fundamentally different. An average trader adds value to the deal, either by bringing parties together, or by transporting goods, or something like that. It is logical and just that a trader is

rewarded for this effort. But what about a banker? A banker does not add anything to the economy. He makes money with money. That is not a problem if money is not a zero-sum game, but a positive-sum game instead, for instance because money is being printed. It becomes a problem if the money supply is growing faster than the commodity supply; the economy turns into a pseudo-economy (that cannot be taxed) with only financial transactions, or, alternatively, inflation soars. Both happened. In the U.S. inflation reached astronomical figures, and currently the financial sector takes up 45% of the total economy of the U.S.

However, if to the contrary the amount of money in the world is constant, and the trader or banker must make profit (M' > M) in the trade, then the rest undeniably lose money. Assuming that there is no philanthropy, this rest will not be happy. It is therefore a form of swindle to the society. That is why the quote of Bill Maher (opening of Chapter 2) is so relevant, "If you have a gun, you can rob a bank, but if you have a bank, you can rob everyone". Being robbed is a mathematical certainty if the system is a zero-sum game in which no money is added, either by delving new gold or printing new paper.

In other words, all goes wrong the moment the economy and the monetary system stagnate. This can be formulated in a little more abstract way. We have already seen that theoretically any commodity – not only gold – can serve as monetary unit. Thus, any trade in which a quantitative change takes place of the same commodity is in essence problematic. If commodity X is used for payment, concentration of this commodity takes place, until one person or select group of people have all the stock of X and the economy stalls, for lack of X and opportunity for more accumulation. A step in economy (a trade) is namely

$$X - C - X'$$

It goes wrong when the following conditions are met:

1. There is a free market. A trade or activity is done voluntarily by both parties (in case only one party is happy, it is not called a trade, but theft). It means that a possible trade can also *not* be done. This distinguishes capitalism from feudalism. In the

latter the lord *ordered* the activity to take place and left some unhappy.

2. The agents on the market have a profit goal (X' > X if the trade is executed).

3. The supply of commodity X is finite.

In this case it will go wrong and the production (trading) process – economy – will sooner or later be stopped; no steps X – X' will any longer be performed. This apocalypse can be postponed by working with *promises* to X instead. This extends the game by multiplying the amount of available X. Virtual X. Let's call them Y, which could be for instance paper money (promises to gold). However, with this Y the same game is played. In a trade

$$Y - C - Y'$$

And if there is a limit to the FRB reserve ratio, i.e., the ratio between Y and X, then the supply of 'commodity' Y is just as limited as the underlying commodity X. And Y meets the criteria listed above just as well as X does. Only the eternal generation – printing – of Y would be able to save the system. If our wealth is depending on steps like the above, at the end this wealth will be dismantled.

Coming back to the case of gold money M and an economy that is driven by profit steps (M – M'), one can still think that it might all turn out to go well, because not always profit is made; even if the individual agents would *like* to make profit they not all do and therefore, the average can be zero and no accumulation takes place. There are four (or actually six) possibilities:

1. It is always the case that for a step M' > M.

2. It is on average the case that M' > M.

3. It is on average the case that M' = M.

4. It is always the case that M' = M.

(and always or on average the case that M' < M, but that is in advance ridiculous; nobody willingly works himself poor in a free market). The

last one is immediately considered unreasonable because nobody invests if guaranteed no profit is made. The third possibility is indeed a mathematical solution and the end point of our financial-economical system, in crisis with production basically halted because of lack of a prospect of earning money. Something which we call a pessimistic economical environment. It is an axiom of economy that entrepreneurs want a reasonable outlook on profit before endeavoring in economical activity. An expected average return on investment of zero is too little; the entrepreneur wants to be compensated for the risk taken. In his book *Thinking, fast and slow*, Daniel Kahneman describes this psychological effect: The bigger the risk, the more expected (that is, average) profit is needed for an entrepreneur to come into action. At guaranteed zero profit (risk zero and M' = M) no economical activity is undertaken. For increased risk, the expected profit must go up. See Picture 10. While the curves that are shown are mere simple sketches, it has to be pointed out that i) Even for low (or zero) risk, profit is wanted, and ii) For increased uncertainty of profit, a higher expected profit is required, to compensate for assuming the risk. As such, in an uncertain economical environment, the risk goes up while the expectation value stays the same, and entrepreneurs leave the market. As an example of where this idea is visible in reality: the 'flexibilization' of the labor market is a necessity in the current market, because the profit margin (μ) has dropped and thus the risk (σ) for entrepreneurs of hiring labor has to be lowered, otherwise the entrepreneur will leave the market. We see how the limits of a free market already start lowering the welfare of the workers, job security positively contributing to the happiness of people.

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The first item of the above list, M' is always larger than M for each and every economical activity, is only possible in an efficient market where all information necessary is available and available to all; an entrepreneur will shift his business to where more profit is made, as driven by the invisible hand of Adam Smith; in the end all profit is equal everywhere (and is positive). This is rather unrealistic, since the market is not that efficient. In practice, empirically, it has been shown by Piketty that the second possibility of the above list is correct, with an average profit of 5%. This means that Marx has postulated a theory

which predicts an apocalyptic outcome of capitalism, and Piketty has shown by analyzing reality that Marx was right.

This system, in which economical activity is done to make money with money – or capital with capital in general – is inevitably going wrong. Summarizing, once the exponential-growth system is no longer sustainable, there can be five possible outcomes or continuations of our financial-economical system:

1. **War**. A war destroys capital, after which we can start a new cycle. The share of human labor in the production process becomes high again. It is basically being thrown back into a medieval society with little machinery and a low standard of living. Piketty has shown that the wars of the 20th century were of this type, a resetting of economy and society.

2. **Revolution**. This of the type 'communism', in which the means of production are in the hands of the workers. Communism distinguishes itself not by the absence of capital, but by the fact that workers (humans) take the decision instead of the capital when entering business. The goal of humans is to increase wealth, there where the goal of the capital is to make profit. At least theoretically it works. Yet, history is littered with failed attempts. In practice it somehow does not work. In most cases the capital simply was transferred to a new select group of people after which the game of profit-driven economy continued. As a side effect, however, a violent revolution can also destroy a lot of capital and can become equivalent to a war scenario.

3. **(Eternal) crisis**. With the average profit margin dropping below the necessary 5%, production halts for lack of incentives and we enter a crisis of overproduction. So-called because of the existence of a huge production apparatus alongside poverty. Companies go bankrupt, but this does not change anything, since it does not destroy capital; it only transfers it to new owners. Neither the amount of money nor the amount of production facilities changes with bankruptcies. Yet, bankruptcies obviously project a climate of uncertainty and low yields onto potential investors, and the situation worsens by this psychological feedback effect. An eternal economical crisis emerges. This can be broken

by the rise of populist politicians, that surf the sentiments of society, normally put the blame on foreign or national entities (like ethnic groups in society) and a war or revolution becomes inevitable.

4. **Socialism**. With indexed taxing, wealth can be transferred from the rich (the owners of the capital) to the poor (the owners of debt) without that the poor have to give anything in return. It is obvious that the capital will not easily let go of the accumulated wealth and a propaganda campaign will be started by the capital (that also includes the media and all communication channels). High tax on profit is not a good idea because it will drag the profit margin below the magical 5% limit and production will stop, ensuing a crisis and poverty, or capital will flee the country, basically having the same effect. Not even international socialism of, say, spending 1% of GDP on aiding underdeveloped countries is possible, since it will also make the profit margin drop below 5%. Capitalism is incompatible with international aid. To make socialism work, profit has to be zero – non-zero average profit accumulates wealth – and that means economical collapse. Better is to tax wealth (possessions) rather than income (transfer of possessions), for instance by taxing away inheritances. This would stop accumulation of wealth at certain families and institutions, while not stopping the incentive to accumulate, i.e., economy.

5. **Eternal refinancing of debt**. Constantly giving away money to people that technically do not deserve it on basis of the market. This is effectively the same as socialism, with the exception that we live under the illusion that the money will be paid back, while we all know that we are fooling ourselves with this idea; borrowed money cannot ever be paid back. Full stop. Because it is the same as socialism, the same propaganda is used to prevent it. An example is the slander against the Greek people living 'beyond their means'. When we analyze the rhetoric often presented in the media, we can easily see that all news items are complete lies. As an example, as former Greek Minister of Finance Ioannis Varoufakis often revealed, the European political system is fully a-democratic and only serves to protect the in-

terest of the financial institutions and big capital in general. He revealed for instance that not a single cent of financial help provided for Greece went to the Greek citizens; all went to foreign banks in Greece. By the way, it might be that eternal refinancing of debt by printing of new money goes out of control if the amount of money to be printed grows ever faster compared to the available amount of goods. The mathematical singularity of hyperinflation might result.

Other outcomes are not possible. If we do not democratically decide for one outcome, an outcome will be chosen for us by the natural flow of things, namely crisis and then war or revolution. This we have seen in the past and we can conclude that it is inevitable and there is no hope that 'as long as we are free and tolerate everything we will be without problems and live happy ever after'. Which was basically the spirit after the Second World War that was the basis of the creation of the European Union. We can conclude that it was rather naive, and we are making exactly the same mistakes as before the war because we have wrongly concluded that the cause of the war was the lack of cooperation and excess of borders between countries rather than the intrinsic systemic problems of capitalism.

A lot of news is about the financial crisis. Trying to blame it on the excess spending of some countries like Greece and Portugal. But, what did those countries do wrong? They borrowed too much, basically promised too much. But money is empty promises. So, how can anyone be blamed to make unsustainable promises on paying back empty promises?! Empty promises do not have to be fulfilled, because they are empty, void, and meaningless. If I promise vacuum, I can give you and promise you as much of it as you want. Here. There you go, I just transfered a billion of them to your account.

Intermezzo: Von Münchausen banking system

The private sector, working on a for-profit basis, will only produce if it makes profit. In a zero-sum game of economy, the rest, the public sector, must thus inevitably make a loss. Hence, in a healthy modern economy the state runs a constant deficit, constantly

borrowing money that cannot ever be paid back. If an attempt is made to pay back the debt or curtail the deficit, the system stops, a.k.a. 'crisis', with neither the public nor the private sector undertaking any economical activity.

In state financing, normally, states hand over to the bank so-called 'bonds', promises to pay money in the future (a promise that cannot be kept, as shown above) and get in return new money from the bank. Money that promises ... exactly nothing (where it used to promise gold). In modern times, money is just a number, nothing more. As such, state financing is an exchange of empty promises. In such an environment, mathematical impossibilities of zero-interest loans or even negative-interest loans are possible (compare to a real loan: I borrow your car if tomorrow you give me one more; does not make sense, not even if we substitute negative-value 'garbage' for 'car'). Even speculation (overpriced products compared to their intrinsic value) can easily exist, since the money itself has no value and thus a 'fair price' does not exist; the word speculation itself became meaningless as Alan Greenspan rightly told us. I can give you tomorrow as much of valuelessness as you wish. Just tell me which number you want.

With the current bailout of CGD (Caixa Geral de Depositos, a bank in Portugal), no state *money* was used (the state namely doesn't have that; The state runs a constant deficit!), simply government bond promises were made and given to the bank. And, in this case, not even intrinsically worthless money from the bank was given back in return. It is basically a game of mutual empty promises and if the emptiness actually consists of nothingness, there is no essential difference! Note that banks are saved with promises of money of ... the banks that are saved. A Von-Münchhausen

bank-system, named after the flamboyant baron that dragged himself out of the swamp by his own boots. Vying for first place of being most farcical.

In the end we just have to work harder and can consume less. So they tell us. And never explain us why, since there is no explanation. Since money has become equivalent to vacuum, serving just a means to decide who has rights to consumption, such decisions are merely political and are not based in any way on people's productivity. If we are poor, it is because that fate has been decided for us, somewhere in a non-democratic closed meeting.

And a lot of fallacies are circulating in society. Probably the most persistent one is the idea that the macro-economy is the sum of micro-economies, a reductionist point of view. It means that the problem with the entire economy (the 'crisis') is the result of pandemic mismanagement of the individual companies. An idea that "if all companies were managed well, the entire economy will do well". The people that support these views do not understand the concept of money. If we see 'doing well' as 'making profit' (I do not know of any other description in a capitalist economy), then it is mathematically impossible in a zero-sum game that *all* companies are doing well. If one company is managed well – makes profit – another entity *must* make a loss and is thus by the same definition managed badly. The success of the economy is thus not in the management of the companies, but rather in the success of managing the money system.

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To summarize the summary. In a zero-sum economy (without money printing, as in a gold-based money system, or one in which the FRB game has reached its limit) there is a struggle between the classes. The capital vs. labor. Capital, working on a profit basis, can decide to not enter in production. In capitalism capital takes the decisions. It will never voluntarily decide to produce with a loss. Labor, on the other hand, cannot decide to not enter in production, because it does not work on a profit basis. Not producing means death. Producing, even for salaries that are too low for survival, will at least

delay death a little and make it a slow process. This asymmetry in the struggle between these two classes causes eventually poverty and death of laborers. When eventually the system (inevitably) saturates, capital will decide to stop the machinery and nobody will have any wealth. A crisis of overproduction.

In a zero-sum game, the private sector needs to make a constant profit and this is enabled by the rest running a constant loss, both the public sector and the workers. As an example, taxing of capital to give money to human laborers cannot be done; if the profit drops too much, the capital will stop production anyway. Moreover, giving tax breaks to large companies (in a form of prisoner's dilemma trying to attract foreign capital), will cause an unfair non-level playing field. If large companies pay less tax, in a zero-sum game (or close to it), it makes it as good as impossible for other companies to survive, whatever nice start-up-company help-programs government may have. The system is on the road to winding up in a political system – oligarchy – in which there are seven companies that are guaranteed 5% profit, with the public sector running a constant deficit and laborers getting ever poorer.

In a positive-sum game, with money printing, to keep the capitalist system running, it must therefore be the consumers that get the freshly printed money somehow, for instance through salaries of (overpaid) state employees. It is utterly useless to give the money to the capital, as in quantitative easing, since the capital will still continue to decide to not produce anything, even when its pockets are full of money. If there is no profit to be found, i.e., taking the money from consumers, production will stop and consumption will drop to zero, yet again a crisis of overproduction, now in the presence of money printing. As long as consumers are destitute, production will stop. And the more destitute the consumers are, that is, the more demand there is, the less production will actually be done and the more supply will drop. Capital decides to produce not on basis of necessity of products, but on basis of an outlook on profitability.

Chapter 11

Alternatives

"We have gold because we cannot trust our governments."

– Herbert Hoover (1933), President of the United States

It all seems rather gloomy. Are there no alternatives or solutions? This book is not about solutions, which are more on a political terrain, but some comments are in place anyway. First of all, is there an alternative for money itself? Not really; Money helps trade by creating a countercirculation of a commodity (for example gold) against the circulation of goods. The existence of one enables the flow of the other. More flow of goods means more wealth. (See Picture 1). The alternative would be bartering, trading goods on a one to one basis. Bartering is very inefficient and the flow of goods would be stymied. A world without money is not easy to envisage. Can we use something else as money?

Money was originally based on gold and other precious metals. That means originally money *was* gold and silver. By fractional reserve banking this gold was inflated at banks. Central banks further increased the inflation, but it was still based on precious metals. Many currencies had and have names derived from it. Either directly, the Dutch gulden and Polish złoty directly mean 'golden', to give but examples. Other currencies were measures of weight of precious metals. The United States dollar, the name of which is derived from the German thaler, is a weight of exactly 24.057 gram of silver. Other

currencies even directly mean 'weight', like the Spanish and Mexican peso, and as we have seen, the shekel represented a shekel of barley. The British pound Stirling was (exchangeable for) one pound of silver, exactly 0.45359237 kg. In 2016 the price of a kilogram of silver was 349 pound. A pound thus costs more than a pound. The German goldmark was in 1913 exchangeable for 0.35842 gram of gold. In 1918 this exchangeability was abolished and the new reichsmark and gold soon diverged in the famous case of hyperinflation, which was technically speaking not hyperinflation (prices of goods rising), but hyperdevaluation (buying power of money plummeting); hyperinflation with gold as currency base is as good as impossible.

But why was there a certain ratio between gold and goods. Why did 1 kilogram of grain cost a certain amount of gold? While the real exchange ratio is determined by scarcity of goods – or better, supply and demand – the real underlying determining factor is how much *labor* it costs to produce them and bring them to the market. That is, because at the end, theoretically speaking, one can say, "Well, in that case, I will go and fetch it myself!". The real intrinsic value of a commodity is thus the labor it costs. The 'trouble' of making it. This is now mentioned at the end of the book, while many economists start with it. Adam Smith, for instance wrote: "The values of goods and services depend on the amount of toil and trouble needed to produce them". This is the intrinsic value of goods on the market (and if everything goes well, in an efficient market, this will also be the market price). The intrinsic value of a kilogram of gold is thus the amount of labor it costs to make the *next* kilogram of gold.

In modern times the word 'labor' sounds archaic, and we'd better use the word 'energy'. Energy and labor are anyway equivalent, the unit of the former, joule, being equal to the one of the latter, newtonmeter. To say it in a different way:

The base counting unit in the real economy is energy

A certain product has an intrinsic value that is determined by the amount of energy it costs to bring it to the market. Labor (by humans) or energy (BOEs, barrels of oil equivalent, or BTUs, British Thermal Units). Many economical book start with this observation (see for instance the texts of Adam Smith and Karl Marx in the intermezzo).

It is mentioned here only at the end to not confuse the readers and distract them from the narrative.

Value is energy

The base unit of value is energy (or labor, unit: joule) and economy and trade is the exchange of value (joule per second, or watt). This has been said by many famous economists, for instance Ricardo, or Adam Smith. The latter wrote the following in his *Wealth of Nations* about value and the reasons for trading:

"Whatever a man has produced, is worth to him the toil and trouble of producing it. Rather than produce anything to be disposed of for some other object which he wants, but which has cost another man less toil and trouble, he will himself produce that other object, and so obtain it with less toil and trouble. This is the law of competition. It follows, that when the law of competition has free play, the exchangeable value of different objects is determined by cost of production.

"If, therefore, every object desired by man could be produced without limit as to quantity, and the greatest, with the same proportionate toil and trouble as the smallest quantity, the question of exchangeable value would be extremely simple; all commodities would exchange for one another in exact proportion to the toil and trouble of producing them at market. In that case, what had cost so much labour, or capital and labour combined, in any one employment, would exchange for what had cost the same amount of labour, or of capital and labour combined, in any other employment."

Marx, in his *Capital, A Critique of Political Economy Volume I. Book One: The Process of Production of Capital*, writes:

"By our assumption, the coat is worth twice as much

as the linen. But this is a mere quantitative difference, which for the present does not concern us. We bear in mind, however, that if the value of the coat is double that of 10 yds of linen, 20 yds of linen must have the same value as one coat. So far as they are values, the coat and the linen are things of a like substance, objective expressions of essentially identical labour. But tailoring and weaving are, qualitatively, different kinds of labour. There are, however, states of society in which one and the same man does tailoring and weaving alternately, in which case these two forms of labour are mere modifications of the labour of the same individual, and not special and fixed functions of different persons, just as the coat which our tailor makes one day, and the trousers which he makes another day, imply only a variation in the labour of one and the same individual. Moreover, we see at a glance that, in our capitalist society, a given portion of human labour is, in accordance with the varying demand, at one time supplied in the form of tailoring, at another in the form of weaving. This change may possibly not take place without friction, but take place it must."

Intrinsic value is energy. The rest, if a product is sold – traded – for a price that is relatively higher than its intrinsic value, then is speculation, which can easily happen on a free market where price is determined by (apparent) supply and demand. If a kilo of potatoes costs 1 megajoule to produce and a kilo of pears 2 megajoule and they are not traded in a ratio 2:1, then that is a form of speculation on the market. The most extreme cases of this are in real estate. The price of a house on the market is nearly solely determined by speculation. It is namely mostly determined by location, and location does not change the intrinsic energetic value. A house gets more expensive if it is located near other (expensive) objects. This is similar to the speculation on shares on the stock market, as we have seen before, where the price was determined by a function of the price itself, in

Table III: Different concepts of value

Concept	Meaning
Intrinsic value	How much energy/labor it has cost to bring it to the market
Trade value	For how much it can be exchanged on the market. Also known as 'price'
Use value	How much it will increase my production
Enjoyment value	How much it increases my welfare
Nominal value	The *guaranteed* exchange value (written on the note, in the good old days)

that case the so-called transient of price, price as a function of time. For real estate, not only the transient, but also the gradient of price, price as a function of location enters into the speculation function. For shares, $p = f(p(t))$, while for houses $p = f(p(x,t))$. This is the general definition of speculation, where a price is a function of price itself. Such functions will show exponential behavior, saturation, and collapse.

See Table III for a summary of some types of 'value'. Note that fiat money has no intrinsic value, nor nominal value, since it cannot be exchanged for anything in a guaranteed way, although in other definitions found in other books the nominal value is what it names, so the nominal value of a 10-euro note is by definition 10 euro, because that is what is written on it. Remarkably, if I make a paper and write 10 euro on it, I go to jail for counterfeiting, while there is essentially no difference between the two pieces of paper.

Considering the fact that most energy in our economy comes from fossil fuels rather than labor, the latter being ever more insignificant, we can conclude that the value of a product is based on how much petroleum, or BOE (barrels of oil equivalent), was used to produce it. The economy is thus based on fossil fuels. The term 'petrodollar' has been coined quite adequately. By the way, looking back at the table of useless professions (page 26), we see that they all cost only human labor and little to no natural resources.

The art of business is to make products for less energy than the competition does and thus be able to stand a lower price without

making a loss. Others, our trading partners, in their turn, may have lowered the production cost of their products and we will want to make a deal, each of us getting the most out of it.

This all brings us to an important conclusion that might seem counterintuitive at first sight: Economical growth is an increase of energy consumption. The economy and welfare of a country are directly related to the amount of energy that is consumed. The more energy is consumed, the higher the welfare. This unless the rest of the world can be fooled, by means of speculation especially in inefficient markets, to buy the products for more money than what is expected on basis of the consumed energy, making the market value higher than the intrinsic value.

If an economy does, as many Western economies do, only deliver financial services (that cost no energy) and trades them with China – the only country in the world that does still make tangible objects – for products that did cost energy to produce, then that economy is busy swindling money (energy) out of China.

The intrinsic value of a product is thus energy. Apart from that a product also has market value and use value but they are not relevant in view of the narrative. What is important to remember is that means of payment were normal commodities and thus the same applies to them. If we go back to the first chapter on money, Chapter 2, there it was seen that gold was initially a trading commodity that circulated in the opposite direction compared to normal trade goods. (Picture 1). Gold, just like any other product, has an intrinsic value that is determined by how much energy it costs to bring it to us. Namely the energy it costs to bring the next kilo to the market. Also banknotes represented an energetic value. Their intrinsic value was zero (paper is basically worthless), but their nominal value was high, namely the amount that is written on it, "Exchangeable into ... (fill in the dots)". This way we have a couple of distinct concepts of value. See Table III. Use value is like an investment: how much does it augment my production. With a hammer I ram nails ten times faster into the wall, therefore the hammer has a large economical use value or investment value. The use value of a kilo of gold is a kilo of gold, but that of an iron trowel can be much higher, because I can use it to find hundreds of kilos of gold. Finally, enjoyment value is how much my pleasure and well being in life increases. A bottle of wine has nearly no use value,

even so I buy it every now and then. We may even go so far as to state that the final goal of economy is to increase the enjoyment value in society, with all the other things but means to the goal. A high-use-value trowel for finding kilos of gold is useless if it is only about finding the gold and no enjoyment value is created. Gold cannot be a goal, it can merely be a means to a goal. This King Midas already found out when everything he touched turned into gold. Gold cannot be eaten or drunk; the enjoyment value is close to zero. The only value of gold is to make use of it in the economy and trade it for something useful, like a bottle of Dona Ermelinda Touriga Nacional.

If the market is efficient, then the trade value will be equal to the intrinsic value. It is in the interest of an individual trader to make the market inefficient, and to get more (energetic) value for his products. This can be achieved by creating a (pseudo)scarcity of the product, the idea of a scarcity. A monopoly is always a good tool for that. Make it seem that the products are hard to get. If, for instance, each and every asset of the public sector will be privatized, it would be a very good idea to invest heavily in the water utilities. Then close down the taps and raise the price per cubic meter. The money will be gushing in as the water is dripping out.

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To come back to the main subject, money was directly or indirectly (by promises) representing energy and energy is the basis for the economy (see Timothy Garrett, Adam Smith and Karl Marx). Money was part of economy as an easily tradable non-perishable commodity circulating in society. The gold standard was effectively an energy standard. If we want to have an alternative for money, it needs to be linked again to a commodity that is non-perishable, lightweight, convenient, and, most of all, somehow linked to energy, so that no swindling can be done, as was done with the dollar and from there on with all the international currencies through the Bretton Woods monetary system. This system effectively transferred all the power from the individuals to the governments and then to the central bankers, especially in New York. This fully goes against the intellectual heritage of Adam Smith as well as against Karl Marx and it is basically an oligarchy, where a select group is managing and profiting from the entire economy.

Money has thus no intrinsic (energetic) value, no nominal value (cannot be exchanged for anything; look at a typical banknote and see

what it promises, just above the signature), and no enjoyment value (you cannot eat money, as the Cree Indian saying goes). The only thing that remains is market value. But market value can be (and in this case for sure is) subject to speculation. If no basis for the money is present, and the value of money is only determined self-referentially by the value of money itself, then the money is fully 100% speculative. Compare Equation (16) for shares on page 164, the first term that represented the intrinsic value of a company per share, A/n, is absent, while the second term is causing all the speculation by its self-referential nature. Money is thus a completely speculative commodity. As shown there, and in the appendix, speculative systems grow exponentially, but plummet like a stone instantly. We are in for a monetary catastrophe.

Money is still linked to the economy (it has a market value): Since it is on the market, it is linked to (energy of) goods and services because money buys you things. Like the idea of a petrodollar (dollars are used to trade in oil). However, this is a non-causal (!), accidental correlation. (Correlation is not causation). It is not that energy is the basis for money, but money is merely accidentally linked to energy. This link can be severed instantly.

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It is remarkable that Greece is called having immoral behavior when it borrows money and does not manage to keep its promises of paying it back. First of all, no country ever pays back its loans, since that is impossible (see the intermezzo at the end of the previous chapter). Moreover, the borrowed money itself is empty promises. This makes the promises of Greece in a transitive way empty. Empty promises of governments are used to create new money by the central banks that promises nothing. The money is then given to governments that promise to give it back one day. Well, as I always say, "1 day, but not 2 day" (One day, but not today). It is all about *believing* it will work out OK. Such speculative belief systems have the intrinsic property that they can burst instantaneously.

The obvious solution would be to go back to an energy-based monetary unit. Some countries, like Libya, threatened to reintroduce the gold standard. These countries were smashed into oblivion (and are still being smashed) by the New York Wall Street money syndicate. It would namely undermine their hegemony in the world.

Are there other commodities that can be used? They should be lightweight, based on energy and easily tradable. Well, one thing springs to mind. BitCoin. Exactly because it meets these requirements, including its link to energy.

A bitcoin is a monetary unit that has to be calculated. Every bitcoin requires a certain amount of arithmetical operations, like solving a mathematical puzzle. In fact, the bitcoin is auto-calibrated (since calculations can be done for ever less energy because of technological innovations). The bitcoin system keeps track of how long it took to calculate the bitcoins, and then decreases or (mostly) increases the level of difficulty of the puzzles.* In the limit, with the ideal computer, a single bit of information costs $k \times T = 4 \times 10^{-21}$ joule of energy. The bitcoin is thus linked to energy, and because work has to be done to make it, the description 'bitcoin mining' is very adequate. It is also lightweight. In fact, it is zero-weight. Moreover, it is easily tradable because no intervention of banks is needed. Everybody with a computer can join the bitcoin system. It is fully distributed and that blocks out any form of central (bank) interference. It is thus to be expected that bitcoin will be outlawed by central (bank) government.

It would be a nice alternative if not for two important facts. One is that Marx will be back in full force, and second, banks will interfere in the system anyway. (Why? Why does a dog lick his balls?).

Because the bitcoin is limited (the last bitcoin is projected to be delved in the year 2140, with every next bitcoin, just like every next kilo of gold, ever more difficult). Then, remember the accumulation of wealth. Traders that enter the market for quantitative gain will use trading of commodities (C), endeavor in economic activity in general, to accumulate bitcoins (B),

$$\text{B} - \text{C} - \text{B'}$$

Even worse, some – let's call them bitcoin banks – will start hoarding them and issue bitcoin *promises*. Initially backed up by a reserve of bitcoin, but increasing the amount of promises for every bitcoin in

*There are 21 million possible bitcoins. Every bitcoin, BTC, consists of 100 million 'satoshi'. The 'block reward' (puzzle solving reward) halving frequency is four years. According to math and knowledge that there are 32 halving events, in 2136, the block reward will yield 0.00000168 BTC per day, which is 0.00000042 BTC per block.

possession enormously stimulating the economy into a new economic boom. Yet, sooner or later they will reach a natural reserve limit of 20-40, which makes them put their heads together, form central bitcoin banks to extend the FRB ratio, which will extend the game, but anyway the economy will crash because the bitcoin and the reserve ratio are limited. Then they'll abandon the bitcoin standard. When the monetary system saturates with only empty promises circulating, the economy crashes, with Marx laughing his head off, "Told you so!". Using bitcoin as a payment system is just a form of reinventing the wheel. Nothing more.

Moreover, government will interfere and put tax on bitcoin transactions, for instance 21% bitcoins on produced added value, and 30-50% tax on payments of labor paid by bitcoins. Moreover, the state will finance its own activity by going to the markets – that is, the bitcoin central bank – and get bitcoin loans. We will be back to square one.

It thus seems there is no alternative. If we invent a new monetary standard that is based on energy, then this resource is limited because energy is limited. It will sooner or later deplete and the system will saturate and the economy will crash in a Marxian way. Even if we forbid by law the nefarious game of making false promises, then the system will crash (even at an earlier stage, actually). Moreover, we would be more catholic than the pope. Every time we go to a bank, we borrow money, based on promises to pay it one day, while we do often not have any money whatsoever to back up these promises. Remember that these loans are fully symmetric. The bank and I promising each other things we do not have. Hue and cry because of the immoral behavior of banks, while most are hypocrites and play exactly the same game, hoping to make profit. Since money is debt and debt is money, anyone that has ever borrowed money to buy something, is guilty of money creation and guilty of keeping the diabolical game running.

To make it even more explicit, a client that knocks on the door of a bank plays exactly the same game of fractional reserve banking. In a normal loan, a client has to bring in some money in order to get the mortgage for buying the house. If the bank demands a contribution of 10% of the selling price of the house, then my FRB is 10:1. If I bring in 10 thousand euro, I can FRB multiply it to 100 thousand and buy a house for that money. It is maybe only immoral, because of its

mathematical insanity, to have banks finance more than 100% of the house price. The reserve ratio is then namely not a mathematically sound figure, it enters the virtual realm of mathematics. What is my FRB ratio if I put up minus 5 thousand euro (that is, the bank gives me 5 thousand as well) and receive 100 thousand to buy a house? My goodwill (possibility of future earnings) is used as a collateral, but I have an imaginary FRB ratio (negative reserve ratios do not make sense). So, future earnings – or mere illusions of them – are used to pay today's consumption. We all play the FRB game.

Well, in a Smithian society, everybody can do what he or she wants. But that also means that if things go wrong, everybody is only responsible for him or herself. No bailouts or bail-ins, or Geithner support programs, or central bank manipulation. Let the things nicely go bankrupt. For sure it is unethical to let some pick up the gains when things go well and others to pick up the losses when things go bad. If we managed to (let them) create a system where things exist that are too big to fail, then we have failed big time. If small players, like individual persons are 'too small to care about', then we are doing something wrong, since the small players are human and big capital isn't. Capital should serve humans and not the other way around.

We could start by making all financial institutions (those that have the right to create money) public. The right to money creation should belong democratically to all. There are no logical reasons to not have them. Many countries do indeed have state banks, and they do not give bigger problems than other banks. At least if things go well we ourselves get to benefit, and if things fail, we, again, are the ones that are responsible and held accountable. It is of immense quality in life if you have the freedom and are responsible for your own deeds and actions, instead of slavishly waiting for what the masters decide for you in some meeting somewhere. As Varoufakis informed us, for instance, the meetings of the euro-group (the ministers of finance of the countries of the euro-zone) are not democratic – not even discussions are allowed between members, for fear of having to ratify everything by national parliaments – and are secret – no minutes are made public, other than the final 'decisions' (which are simply imposed by the president of the meeting, Jeroen Dijsselbloem). Even worse, a new financial mechanism is created, the European Financial Stability Fund (EFSF), that can demand from the adhering states *any* sum of money they need, and

no communication is ever made to them, nor do these states ever have anything to say. This is fully and utterly unacceptable in a world that claims and strives to be liberal and democratic.

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There are no alternatives for money, but there are some alternatives to the non-democratic monetary system. Are there solutions to the other problem mentioned here, namely that of the economy and its seemingly inevitable Marxian crisis of overproduction?

Karl Marx, in his other famous book, *Manifest*, suggested a political solution of confiscation of the means of production by the workers who make from then on all the decisions of production. Communism. However, we have seen that in practice it never worked.

Nor will ever a centrally-governed economy be a solution. That is because such large complex systems, when centrally-led, always turn out to be fragile, according to Nassim Taleb in his book *Antifragile: Things that gain from disorder*. Things get strong and robust by having them constantly and intensively exposed to small problems. This will avoid major systemic problems.

We can make small steps towards this goal of decentralization and putting the means of production effectively in the hands of workers (and consumers alike). First of all, we could abolish patents. Patents and copyrights now serve the protection of (intellectual) capital. Originally they were meant to encourage inventors and artists to invent and create things, see the so-called Statute of Anne or Copyright Act of the United Kingdom of 1709. In the 21st century the copyrights and patents have become an instrument of protection of capital interest. The patents and copyrights, like any capital, accumulate and no longer incentivate anybody to develop anything anymore. Only by the circumvention of the copyright by modern technological illegal means such as Napster, BitTorrent and Kodi (formerly X-Box Media Center) did a proliferation of cultural products such as music and movies take place again. If it was up to capital, they'd prohibit and exterminate all of these means. They simply want to make profit on patents and copyright, there where an artist mainly wants to make art.

An example is the copyright of things created by Walt Disney. He invented Mickey Mouse and was rewarded and protected for it through a copyright, receiving royalties for the use of the cute little mouse by

others. First until his death (who needs money in his grave, right?) Then until 25 years after his death, with an argument that the widow should also be guaranteed an income. This gets already more iffy, also because a thing that is already invented no longer needs incentives, right? Whatever you decide, it should apply to future inventions and creations and not retroactively to those of the past. It even got worse. After the widow died, the Walt-Disney corporation lobbied for an extension to 25 years of the copyrights. Then an extension to 50 years after the death, and because this period now also expired, they are lobbying for further extensions. Obviously only intended to protect the interests of the Walt-Disney capital. What would serve a 100-year-after-death-copyright to an artist? Would this serve as an incentive? I would rather think not at all. Yet, they manage to get such absurd copyright laws through parliament.

The abolishing of copyright laws will bring the intellectual capital (at least) in the hands of all. And, recent developments have shown that it will not diminish the amount of art being created. Rather to the contrary, but this may also have been helped by liberalizing and democratizing the distribution channels, namely internet.

The same phenomenon we see happening with patents. A movement is taking place of Open Source technology, of both software and hardware. The Open Source paradigm means that anybody can freely use, copy, distribute and even alter it, as long as it remains Open Source. One would think that there is no market for such products, but reality tells us otherwise. In fact, most technological inventions are done in the Open Source domain. In hardware there are things like Arduino and Raspberry Pi, both have commercial counterparts but none that are as successful as their Open-Source equivalents. Other Open Source hardware is 3D printing. Since the patents expired some years ago it really is taking off, showing that patents actually block innovation. The same happened in Open Source software products. An example is VoIP (Voice over IP, a.k.a. internet telephony) which only became significant when the patents expired. A VoIP telephone conversation is covered by some 200 patents. The industry was basically waiting for them to expire before entering business. Patent-protected commercial capital of course, is trying everything to prevent Open Source development, up to the point of slander, as we have seen in the Heartbleed case, where social media and mainstream media were in-

undated by ridiculous accusations of the "lousy quality of Open Source products". In fact, the Open Source Heartbleed software (used for internet routers), that had a security issue, was fixed within 24 hours after detection of the bug, there where companies like Microsoft left their security loopholes exist for decades in their software. Moreover, Microsoft was running a department specially aimed at destroying Linux, the mother of all Open Source projects, because it directly competed with their monopoly. At the end, Microsoft had to abandon this projects, because Open Source (and specifically Linux) is here to stay. There is a market for it, as shown by spin-offs such as Android and MacOS. Windows, the operating system of Microsoft, is rapidly losing territory, there where it had effectively a full monopoly some years ago. That is because for products like Windows, the company *must* make profit, so they have to issue new versions of it (basically all the same, give or take a desktop clock or two) in an accelerated way. So fast, the head biting the tail, that Windows 10 was released before Windows 9. On the other hand, Linux does not need to release anything. It is not profit driven. Releases are not based on 'what can be sold', but 'what is needed by users'. It is made by and for users. It thus has an incentive for (useful) innovation and no incentive for profit. A pull-economy compared to a forced consumption push-company. Note that the latter needs a huge amount of advertisement. Did you ever see an ad for Linux? No? I rest my case. Now, the capitalism is also failing at Microsoft level, and they are now migrating towards a conversion of their operating system as a 'distro' of Linux too. This is inevitable.

The advantage of all this is that the workers can continue to afford the products made by themselves. It is moreover completely in the libertarian spirit of a free market. Is this a solution to the failing capitalism? Some sort of Celtic organization of society. Maybe. Future will tell. Note that the Celtic society once was very successful; it stretched from Ireland to Turkey, without there ever having been a central power (hence the absence of it in most history books; it cannot be attributed to an empire of a single city or person).

On the other hand – the capital does not give up that easily – a tendency exists to patent ever more things. The most poignant example is the patents on genetic material. One of the most important companies in this respect is Monsanto that uses genetic manipulation

to create new crops. Because nature itself, and sometimes helped by farmers that use age-old crossbreeding techniques to optimize yield of their crops, exchanges genetic material when reproducing, eventually all crops in the world will have some Monsanto-copyrighted genes in them. Monsanto will thus own *all* food production. This doesn't seem to be a very desirable situation and one that we should avoid as best as we can, irrespective of the discussion if genetically modified crops (GMOs) are desirable in the first place.

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Can wealth be redistributed by blind leveling? This means that government does not levy tax in order to steer society – trade does not need interference, thus spoke Adam Smith – but simply taxing the wealthy and giving it to the poor. Together we decide what is an optimal (not using the word 'fair') distribution of wealth and rigorously, without regard for people, take and give until we reach that distribution. This would still leave incentives for people to invest and produce, which avoids communist situations in which these incentives were fully absent. The world fares better with motivated toilers.

A simple way to do blind leveling of wealth is by high taxation of heritages. This has been done before in history and turned out to be a perfect tool for redistributing wealth without regard for the persons. Whatever somebody accumulates while alive, this is confiscated at the end. It thus keeps the incentives for accumulation, but reduces the effects of concentration of capital.

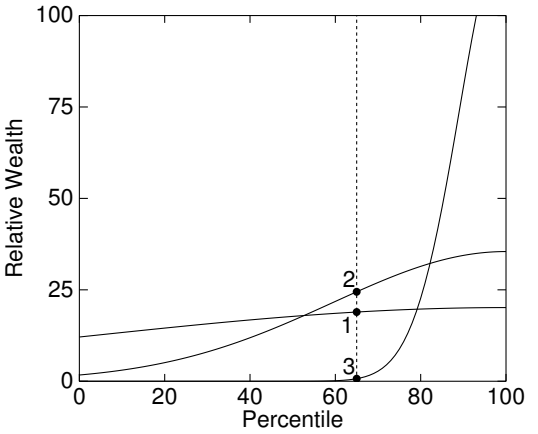
Democratically it is easily implemented, more so since it can easily be explained why it is necessary and how actually most people (the famous 99%) benefit from it. That society is actually moving in the other direction shows how democracy is slowly dissipating from it. We are being informed that liberty is to let the rich get richer. Needless to say, the channels of communication bringing us these ideas are owned by the ones that benefit from them. They tell us we are free and then send us back into poverty and into our intellectual prison, (Goethe: *"Niemand ist hoffnungsloser versklavt als jene, die fälschlicherweise glauben, frei zu sein"*. "Nobody is more hopelessly enslaved than those that falsely believe to be free").

These things have to be implemented on an international scale. It does not make sense for a single country to implement them, because

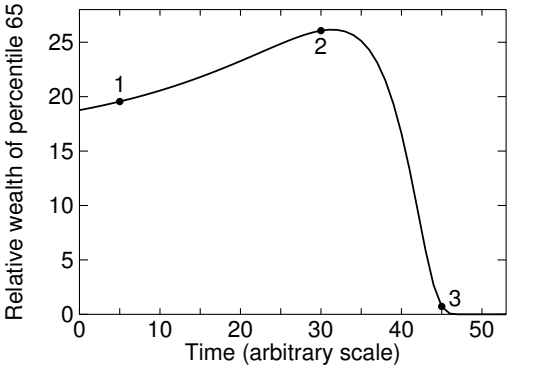
capital will simply flee, as we have seen with the Panama Papers scandal. Maybe some, especially in the wealthier regions of our continent, think that things are not so bad, things seem to be working out, but appearances are deceptive. If capital indeed concentrates, then people that are close to the center of concentration will actually at first see their wealth increase before they unavoidably see it drop. See Pictures 21 and 22. If wealth is concentrating, a relatively rich person, for instance at the 65th percentile, will first see an increase of wealth (and ascribe it to his own qualities such as intelligence, education, hard work ethics, etc.), see the increase from situation '1' to situation '2' in Picture 21. But at the end also he will see his wealth decrease, when the skimming by the ones above him starts to outpace the skimming of those below him. See situation labeled '3' in the pictures. The concentration has nothing to do with one's qualities, but uniquely by one's actual possession of capital. This is a positive-feedback system that will wind up in a situation where one person has everything.

This is obviously undesirable, since it will actually lead away from the goal of highest average pleasure in life. In a democratic system this is the preferred goal, preferred over a goal of maximizing total pleasure since in the latter eventually most will wind up without any pleasure in life and would vote against it. Therefore this concentration effect should be addressed if democracy is to be stable. This should be attacked in the entire market and not only locally. Some people advocate a 'social' government inside a country and a quite hard liberal policy between countries. An example is the European division of North and South, the former blaming the latter for having lived beyond its means and deserving poverty now. That while the fact is that the wealth and poverty are a mere effect of concentration of wealth and no highly ethical behavior will thus invert the tendency of impoverishment.

Sometimes other myths are circulating, as if the North is throwing money at the South into a bottomless pit. While it is true that a lot of money is borrowed to the South, the fact is that the North is making profit on it. Germany manages to borrow money at 0% interest and then lends it to Greece at 7%. Fully without risk, because when push comes to shove, any signs of bankruptcies are avoided by taxpayers (in both North and South) to bailout the Northern investors. An example is the bailout of Portugal. 78 billion euro was lent to it, but with the



Picture 21: With concentration of wealth, a relatively rich person, for instance one at the 65th percentile as shown, will see his wealth increase initially (from situation '1' to situation '2'), but eventually will also see his wealth shrink (situation '3') when the concentration effect continues. In this picture the total wealth is assumed to be constant (zero-growth economy); the area below the three curves is equal. Evolution of wealth of 65th percentile shown in Figure 22



Picture 22: The evolution of the wealth of a person of the 65th percentile over time. Situations 1, 2, and 3 described in Figure 21

high interest rate (more than 7%), the entire sum will have been paid back in about a decade. The weight on Portugal and the Portuguese economy is some 8 billion euro per year; no economy can stand such a heavy burden and it shows all signs of buckling. It would be much better if Portugal were left to its own devices and allowed to enter into default. A default which was already factored in when the high interest rates for the loans were determined anyway.

The high risk of bankruptcy of some countries explains the Lucas paradox. Capital flows from (high risk) poor to (risk-free) rich countries, in spite of the fact that the ratio of capital to worker in poor countries is much lower and capital can thus get higher yields there. Yet, on average capital is taken out of poor countries and deposited in rich countries, often remaining inactive there. (Better low yield with low risk rather than high yield with high risk, see Picture 10 where the psychology of Kahneman was presented).

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A redistribution can be achieved by taxing the wealthy, but this cannot be done on capital profit, since profit is needed to make the system work. Moreover, capital would flee to low-tax countries. Some countries even give effectively negative tax rates to big corporations; they are net receivers from the state. A heavy tax on wealth would be good, for instance on heritages. Also, a small tax on financial transactions can be levied. If not for being an effective redistribution tool, it at least discourages speculation in the form of high-frequency trading. Imagine we put 0.1% tax on every bank transfer. An average worker with salary of 20 thousand euro would lose 20 euro per year. Peanuts, and it can also easily be compensated by lowering tax on wages. On the other hand, financial transactions of the high-frequency type found on stock markets, where shares can change hands thousands of times per day, are taxed into oblivion. Speculation is one of the core problems of our financial system and such a speculation tax might be a good tool against it. Everything that is merely sluicing around money and does not contribute to wealth is affected by it.

It is obvious that the financial industry will be strongly opposing such taxes. Moreover, they'll send their lobbies to the governments threatening that they'll pack up their shop and go somewhere else and rightly so. It would be disastrous if they indeed would go, just like the

departure of the Sephardi Jews from Spain and Portugal wrecked both these economies. The same would happen if the financial institutions would simply pack and go. Besides, government, with the help of those high-frequency transactions, can show their citizens nice economical figures, because virtual economy is also economy, at least in numbers. People will simply be told how well things are going and each and every citizen is thinking that it must then be his neighbor that is doing well, with the absence of any personal increase of wealth.

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A lot of the problems are caused by a lack of democracy. Our system of democracy – once every four years elections – enables corporate fascism, where effectively (big) corporations run the show. That is because of the asymmetry that politicians confer with citizens only once every four years – they put up a show – while they have daily contact with industry lobbyists. This has been made worse by the centralization of government with a transfer of power to Brussels, which increases the logical distance between citizens and governor. The documentary *Brussels Business* nicely shows how this works. Factually all European Union treaties are written (!) by the ERT (European Round Table of Industrialists; a club of the biggest companies of Europe, see Table IV). They use, moreover, fake (pseudo)scientific disinformation techniques, like the information coming from the Intergovernmental Climate Change Panel (IPCC), to justify their policies.

The citizens, who begin to be utterly fed up with the disrespect of basically all politicians – the trust basis for politicians is all but gone in society – organize referendums where they clearly show their displeasure. Each and every referendum is simply shoved aside and ignored. The latest example is the British referendum about leaving the EU. They voted for the Brexit, but cunningly this is put on the back burner and it is expected that it will be canceled altogether. They just wait until the storm blows over and then execute their corporate fascist plans anyway, like imposing the Transatlantic Trade and Investment Partnership (TTIP) or other policies that only benefit the corporations. None of the politicians realize that it merely accelerates the Marxian catastrophe; it will increase capital gains, but cause lower consumption and wealth of the average person.

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Table IV: Members of the European Round Table of Industrialists (ERT) that writes the European Union treaties and laws. Note the presence of big oil companies, which is remarkable considering the fact that the ERT is a big advocate of the climate change ideas. This sidelines some conspiracy thinkers. Note also that there are non-European companies on the list. Thus, politicians signing the European laws should be tried for treason for serving foreign powers. (`http://www.ert.eu`)

Air Liquide	Fra	A.P. Møller-Mærsk	Den
Vodafone Group	UK	Telefónica	Spa
L'Oréal	Fra	Sonae	Por
AkzoNobel	Ned	Royal Dutch Shell	Ned
BASF	Ger	Heineken	Ned
STMicroelectronics	Ita	Norsk Hydro	Nor
Nestlé	Swi	Saint-Gobain	Fra
Solvay	Bel	Centrica	UK
Rolls-Royce	UK	CIR	Ita
Eni	Ita	voestalpine	Aus
KONE	Fin	FCA	Ita
F. Hoffmann-La Roche	Swi	Iberdrola	Spa
Deutsche Telekom	Ger	Capgemini	Fra
MOL	Hun	Thyssenkrupp	Ger
Royal Philips	Ned	Inditex	Spa
Ericsson	Swen	Siemens	Ger
LafargeHolcim	Fra	Umicore	Bel
Volvo Group	Swe	SAP	Ger
Wolters Kluwer	Ned	ENGIE	Fra
ArcelorMittal	UK	Titan Cement	Gre
Rio Tinto	UK	TOTAL	Fra
BMW Group	Ger	Orange	Fra
Sabanci Holding	Tur	Nokia	Fin
Smurfit Kappa Group	Ire	ABB	Swi
BP	UK	E.ON	Ger
Investor AB	Swe		

In conclusion, there are no easy alternatives for money, but there are some ways the concentration of wealth may be avoided. Namely the introduction of the Open Source paradigm and a rigorous blind leveling of wealth through specific taxing instruments that are primarily aimed at taxing wealth rather than income and other taxing tools that attack directly some detrimental behaviors of the financial industry. Moreover, it seems a good idea to nationalize all institutions that are allowed to create money and bring them in the democratic environment. After all, they affect us all and are of the utmost importance. Too much importance to let them be managed by a commercial enterprise. Amazingly, ideas are circulating to do the exact opposite, namely introducing a paperless money system, where all peoples buying power are merely numbers stored on accounts and chips. The money system completely out of sight, there where the FRB system still emanates some clues to its nefarious nature for all of us to see, those of us that are willing to open their eyes. This paperless fully-electronic money system is horrendously dangerous, and should be fought with all our might, since it basically hands over all power to the money syndicate.

Chapter 12

Closing statements

> "I am afraid the ordinary citizen will not like to be told that the banks can and do create money. And they who control the credit of the nation direct the policy of Governments and hold in the hollow of their hand the destiny of the people."
>
> – Reginald McKenna, president of Midland Bank, in a speech to shareholders in 1924

> "It is well enough that people of the nation do not understand our banking and money system, for if they did, I believe there would be a revolution before tomorrow morning."
>
> – Henry Ford, founder of the Ford Motor Company

We have seen in this book how the system of liberalism, free capitalism, has an intrinsic problem of concentration of wealth, which leads to a point that the workers can no longer afford the goods they made themselves. All rights to consumption at the end go to the owners of the capital. This is caused by the profit-driven character of economical activity in a free society. A worker in a factory *must* produce more than he gets paid in the form of consumption rights, if not, he would

be fired because the capital (that takes the decisions of production) loses money on him. The necessarily positive difference between what is produced and what is consumed is – and can only be – new capital. As Marx wrote, "What the bourgeoisie therefore produces, above all, are its own gravediggers", which we can call the Marxian Catastrophe, which is a form of the Malthusian Catastrophe of saturation caused by the limited character of nature.

It winds up with capital producing only new capital because the slice of the pie for workers at the end gets smaller, even those that are now still relatively well off, like those in wealthy countries close to the capital (see Picture 22). The capital will wind up being and making useless capital.

As we have seen, this problem can be circumvented by lending the necessary money to the consumers. That makes these people *technically* living above their means (they spend more *money* than they earn), but is morally correct (they consume the same amount of products as they produce). The money, however, cannot be paid back, ever. It would namely invert the solution to the Marxian catastrophe and bring the Marxian catastrophe back in full force. The moment the word 'austerity' is uttered, the economy collapses.

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On the other hand, we have seen how money – gold in the first instance – had its own problems. The problem that it carries in it is that it is being loaned in a game where everybody is seemingly making profit. The depositor gets interest. The bank charges (more) interest to the entrepreneur who also works on a profit basis. That while the amount of money (gold) in the world is constant. The solution to this is fractional reserve banking (FRB) in which gold was effectively multiplied because only a small amount had to be kept in reserve (the so-called reserve ratio RR, typically one thirtieth of the amount promised). However, this just postponed the problem, since the reserve ratio is limited – naturally or by law – and thus the total amount of money promised is limited. The problem is that when money is created in this way it is done by creating debt and the amount of debt, that what has to be paid back after a while, is always larger than the money emitted. With the borrower not allowed to print this money to give back to the lender, paying back the money is a mathe-

matical impossibility, where we have seen just now that it was also an economical impossibility because it would crash-land the economy.

Also the introduction of central banks did not solve anything. It just upped the FRB game by reducing the reserve ratio. Again, this merely causes a delay. Adding as collateral damage that political power – running the country – was now left in the hands of a money syndicate.

A real solution came by abolishing the gold standard. Basically canceling the idea that money actually promises something. Fiat money. This makes the amount of money that can be created virtually unlimited. From pure gold (1:1), the FRB game has made the multiplication first a factor 30:1 and now it is about 1800:1; 99,995% of all the money is air. It can even be infinite, as long as people trust it. Yet, the self-referential character of money is a form of speculation. Such systems tend to grow exponentially and then plummet like a stone. It can burst like a soap bubble.

Intermezzo: Soap bubble money

The analogy of a soap bubble with money is very adequate. A typical soap bubble has a diameter d of some 10 cm (volume $V = \pi d^3/6 = 0.5$ liter) and can be made from a drop of soapy water of about 0.05 ml. The ratio air:soapwater is thus about the same as air(money):gold in the modern monetary system. The thickness of the bubble wall is then about half a micron. It can be estimated from its color, which is proportional to the wavelength of light that makes interference patterns and we can see the bubble go from red to green to blue just before it bursts. Likewise, we can now also see the 'colors' of the financial system go haywire, from Austerity to Quantitative Easing. From Portugal's economical disaster to Iceland's banking fraud. From mathematically insane negative interest rates to LIBOR interest manipulation. The colors are beautiful.

That the monetary bubble will burst is thus inevitable. Imme-

diately underlying problems will be exposed. Namely those of free liberal capitalism and its tendency to wind up in an eternal crisis of overproduction. Workers will not have enough money to survive, in spite of the huge amounts of infrastructures to produce things enough to satisfy everyone on this planet.

Thus, the imposing of austerity will stop the money creation game and will unveil a Marxian Catastrophe. Because the game was suddenly stopped, we are back to a zero-sum game, in which the profit of some is the loss of others. It means that some entities must go bankrupt. For instance a country like Greece, or Portugal. No money-saving or austerity will stave off this fate. It may indeed save a country like Greece, but that will then be to the detriment of Spain, or another country that is then pushed off the cliff. It is a game of musical chairs; less chairs than players. The music now stopped and all are fighting and killing each other to find a safe seat. It is like a building on fire, where everybody runs to the exit and this way actually causing even more damage.

Something must go bankrupt? But what? Banks are not allowed to go bankrupt, they get bailouts and bail-ins. Companies are not allowed to go bankrupt, they get relief by quantitative easing. Countries are not allowed to go bankrupt, they get financial support when handing over all political sovereignty and state assets. Note that the selling of assets will not avoid any crisis. It does namely not change anything of the fact that there is a mismatch between amount of money circulating and amount of debt to be paid. Selling of state assets is therefore just a swindle. Nothing more. The citizens are swindled out of their possessions in exchange for empty promises that moreover next day will be taken away from them again with the speed of light. (One day I explained it to a colleague, who was in favor of Portugal being bailed out – receiving money – in exchange of relinquishing sovereignty. After having given him a 5-euro note, I said, "OK. Now I am in power. My first action will be to confiscate your 5-euro note. Any questions?". That sunk in). This is what basically happened to all the countries 'helped' by the IMF and European Central Bank.

In the current economical situation of stagnation it would be much better if things were allowed to go bankrupt. The real libertarian advocate of Adam Smith lets things go their natural way. If we have a system where things can exist that are too big to fail, we have a

big failing system. If we had listened to Nassim Taleb in his book *Antifragile*, this situation would have been avoided. Letting small things go bankrupt avoids a systemic crash of everything. Compare the banking system with the restaurant system. Constantly restaurants go bust, but it does not destroy the restaurant system.

In the meantime stress tests on banks are done. They are too silly for words. Apart from the fact that the outcome is known beforehand ("They are doing well") and that the tests are performed with theoretical exposure to events seen in the *past*, which makes Nassim Taleb laugh, since the unknown events of the *future* (the black swans) can by definition not be used. Banks are thus robustly prepared for the past. Worse is that the 'reserves' required to pass the test are actually the air on which the system is itself based: i) (Air) money from the central bank, ii) (Double-order air) money of member banks, iii) Shares and obligations of companies that were inflated by this (air) money of banks. iv) real estate bought with (air) money from such banks. Basically everything except gold and real physical commodities. Only speculative self-referential non-tangible articles. In other words, the stress tests are self-referential and are therefore no tests at all. Fully disconnected from reality. Yet, they can be used to pressurize managers and governments in a blackmail scheme. "Your bank runs the risk of not passing the stress test if you do not recapitalize".

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Even when we think optimistically and appreciate the necessity of the current monetary system, there exists the fundamental problem, apart from the problem that their usurping of power is immoral, that all bankers (and the politicians that serve them) see the economy as a machine that can be managed by tuning it. By turning knobs and doing slight interventions, stability can be guaranteed. Even the most learned academics, such as Keynes and Friedman, follow this procedure by developing theories and tools to manage the economy. This is naive, as Nassim Taleb explains in his book *Antifragile*, and doomed to fail. It straightens the small imperfections, but does not make the system resistant to big problems. An economical black-swan event will buckle the entire system. The metaphor of Bertrand Russell is adequate in this respect: A turkey reaches the conclusion that the butcher is the nicest guy in the world. Free food and no need to work. All day fun and

pleasure. The turkey makes a prediction of a continuing nice future on basis of the past. His model shatters to pieces on Thanksgiving Day (or Christmas). The same for the banking system and stress tests. Using the past to make tests for the robustness of banks for the future is silly. Banks cannot be tested. Only future will tell.

Even worse is that these financial usurpers, instead of being tried for immoral and irresponsible behavior, have managed to bypass governments and all democratic principles, shutting out entire governments, as was the case in Greece and Portugal. Entire populations were lambasted. Unrest and opposition to these pseudo-politicians – frontmen – are growing in society and populism is on the rise again. We seem to be making the same mistake as before World War II: a failed economical structure (created by the banking cartel), corporate fascism, pandemic poverty, and a rising social unrest, which all leads up to war. Not even instigation of wars – the creation of an Orwellian external enemy – in far away places all over the planet manages to stymie the unrest. Not even the reinvention of the archenemy, Russia, with Putin as its monstrous leader, manages to thwart this unrest. It must either end up in war (and auto-destruction of capital), or conquer new markets to extend the game for a while.

The course of action of politicians is now to turn away from the electorate and decide things behind closed doors. Turning an ear to the banking syndicate, solutions are presented without explanations. The nationalization of the ABN-AMRO bank in the Netherlands was accompanied by the statement that it would be privatized as soon as possible. Because "it is not in the interest of the country to have a national bank". No-one explained why. People remain with questions, "Why not?!". A legitimate question. After all, we wound up in this mess just because the bank was private. If the bank will be sound again, isn't that proof that a national bank is better? Remarkably, not even journalists seem to be asking these questions and the populace is starting to wonder whose side they are on. (Top German journalist Ulfkotte wrote a book admitting that actually he and most of his colleagues work for the CIA. Yet, now *he* is ignored by the media).

Why banks cannot be public? Actually, the three biggest companies in the world, ICBC, China Construction Bank and Agricultural Bank of China, are banks of the Chinese state. So, apparently it is possible. (By the way, the first non-bank is only 6th placed, namely

Exxon Mobil).

As a side note, sometimes the argument is used that companies have to be privatized because that would make them "more efficient" and this is often accompanied by stories of obvious inefficiency of state companies. But this is a cheap sophism. Private companies have other goals than public institutions. Public transport may serve as an example. It has the goal to transport as many people as possible for as low price as possible. That because that is what we have agreed to, all of us together in a democratic way. The owners are the consumers and are the ones that make the decisions about it. If the company makes a loss, it is not really a loss, because it is paid by us. We might simply raise the price of a ticket (paying more to ourselves!) and we would not have a loss (as owners) anymore, but then us the clients would have more loss (the total in this is always exactly zero). A private company, on the other hand, has as a goal to transport as little people as possible (cost) for as high price as possible (income). The price of a ticket should be kept as high as possible; loss of clients is only a second-order effect in determining the price. The difference is that the high efficiency of a private company means high loss for the consumers. They are two different parties.

Even worse is that in the wave of privatizations the public companies are often sold to ... yes, states. An example is EDP (Electricidade de Portugal) that was sold to the Chinese state company Three Gorges. The rationale of privatization then is gone. Now, instead of the profit of the electricity company – it never made any loss, in spite of it being "a state company and thus inefficient" – flowing back to our (state) coffers from which we can make useful things for us citizens, the profit disappears to a foreign country where they couldn't care less about our welfare. Moreover, we can now expect increase in price and decrease in quality, since that is the paradigm of a private enterprise.

This system of accelerated privatization, the bringing of economic activity into the realm of capitalism, is enabled by the centralization of government. These politicians are keeping close ties with corporations and banks in particular, there where they should have close ties with the electorate. Politicians in government often after being ousted in elections get fancy jobs in banks or companies. An example is Gerrit Zalm, Minister of Finance of The Netherlands getting to be president of DSB (a bank that went bankrupt) and ABN-AMRO (a bank that

was bailed out). It is often a matter of rewarding the incompetent. Vítor Constâncio, the Portuguese politician was, as president of the Banco De Portugal (Portuguese Central Bank), responsible for the financial structure in Portugal. During his shift (from 2000 to 2010) Banco Português de Negócios (BPN) went bust, the bailout of which cost the taxpayer a lot of money. To give an idea, it cost me personally and permanently my holiday allowance and end-of-year 'bonus'. (Thus, two of the fourteen paychecks, 14%. "We are not amused"). Mr. Constâncio was punished by ... promoting him to the function of vice-president of the European Central Bank, directly under the inspiring leadership of president Draghi, the former managing-director of Goldman-Sachs International. If the monetary system is based on trust, this does not seem to be a good idea, if the one responsible for the failure is promoted; it seems quite predictable that he will now rob by the same scheme two paychecks of all other European citizens. In any case, maybe we should not be too harsh, since his successor simply continued the scheme: In 2014 Banco Espirito Santo (BES) went bankrupt and we fear for the other 12 paychecks. Banks are dropping like ripe plums. In 2016 Caixa Geral de Depósitos is threatened. As I repeatedly say, ever more timely, "I'll not accept salary cuts more than 100%. No way!"

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If we stop the game of eternal refinancing, many things will go bankrupt and that would be a desirable natural effect. If no extra money will be printed the system is a zero-sum game. Somebody has to go bankrupt. If it is not the governments, it must be companies. The average profit must be zero. So, if x interest is charged, then this is also the risk (and rate) of bankruptcy. To be more precise, if x interest is charged by the lenders, a fraction y of the borrowers goes bankrupt, with y such that no profit is made,

$$(1+x)\times(1-y)=1, \tag{20}$$

or

$$y=\frac{x}{1+x}. \tag{21}$$

If, for instance 100% interest is charged ($x=1$) then half of the companies goes bust, $y=50\%$. At a certain moment Portugal paid

13.1% interest on treasury notes and thus had a risk of 11.6% per year to enter into default. It is therefore strange that there was so much hue and cry when Portugal started to slide into bankruptcy; it was factored already into the system.

The above equations do not include money creation, which makes it a positive-sum game. If money is created with a rate of z, the above equation becomes

$$\boxed{(1+x)\times(1-y)=(1+z)} \tag{22}$$

In this case interest can be charged *without* risks of defaults. Or, generally speaking, the risk is much lower. Note the strange mathematical singularity if money creation z is faster than the interest rate x, the bankruptcy rate is namely

$$y=\frac{x-z}{1+x}. \tag{23}$$

which for $z > x$ is negative, which does not make sense.

If things are not allowed to go bankrupt ($y = 0$), it means that no interest can be charged ($x = 0$), or that money is created that is in step with the interest $z = x$. This explains why central banks everywhere all over the world lowered their bench mark interest rate to zero, since capital is not allowed to go bankrupt, and even some profit margin should remain. See Picture 23 for the evolution of the ECB rate. Yet, the question arises, who will invest, give their money, at no-profit zero interest rate. We have seen that investment is controlled by psychology and at even at zero risk some profit is wanted. We can only conclude that the alternative, that is, not investing in state treasury notes but in the real economy, must have a predicted loss (of about 5%) or have a higher risk, or the profit is in the form of deflation of money (of about 5%). It is obvious, money is simply parked at 0% at the central bank waiting for the economy to change its outlook. The economy has stalled for lack of investments. The economy is failing because of a structural problem of the monetary system.

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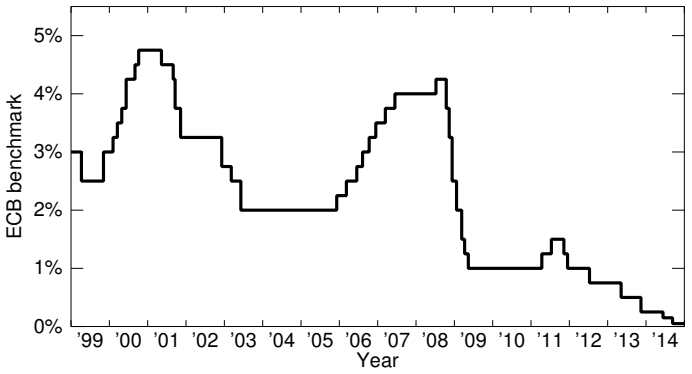
Pseudo-solutions were found by austerity. This is fundamentally and morally wrong, since now a committee somewhere far away is deciding in a meeting how much consumption rights people have, without



Picture 23: Benchmark interest rate of the European Central Bank. A tendency exists to go to zero, the only sustainable rate if bankruptcies are not tolerated. (Source: European Central Bank)

this being based on their productivity. What have these people done to deserve it? It also takes away any motivation from the people to work hard, since it is all to no avail, if tomorrow another meeting will undo all the sacrifice, hard work and dedication. In any case it is obvious that people's consumption rights are mainly based on their proximity to capital and money, while investment and industrial development of companies are not based on business acumen, but rather on the ease of getting financing. This explains the exponential growth of some companies like Google and the demise of the competitors like AltaVista. Likewise, in the close-to-zero-sum-game economy, special tax deals to large-capital (such as for instance Apple in Ireland), make it an unfair non-level playing field, in which the smaller companies are rowing against a strong current, with business success as good as impossible and bankruptcy imminent for all but the strongest businesses. This is unfortunate. People would rather see, and society at large would hugely benefit, if business success is based on good ideas and innovative entrepreneurship instead of being close to capital and managing financial deals.

As could have been expected, these solutions did not even result in anything positive. They simply wrecked the economy and made the

debt grow even faster. To give an example, the debt of Portugal skyrocketed after the introduction of IMF and ECB mandated austerity. From the 90% that triggered the Reinhart and Rogoff alarm bells to 136% in 2015. Yet, the market seems to not be worried about it; interest rates dropped from 7% to 3% and are still dropping. Before the crisis the interest rate was 3%. In the middle of it, it was 7%. Now 3%. But the interest payment remains more or less equal: 7% of 90% of GDP or 3% of 136% of GDP. It seems simply a skimming of the country is taking place; Portugal is fleeced some 8 billion euro per year. For ever and for always.

The scheme of empty money creation is used to transfer real physical assets such as state-owned companies and real estate. In this way, the scheme can be called a swindle. The selling of assets, however, is not even a solution but makes the game even more problematic. The assets of the states are sold well below the market value, because the states are forced to sell them (by IMF and ECB). The equity of these states thus drops below zero, and many countries are technically insolvent. That will drive up the interest rates for these countries even further. And the lives of their citizens further wrecked.

The question is, How is it possible that more than 50% of the citizens vote for maintaining this scheme? Why democracy is not working? Why most of the 99% vote to make the 1% richer? How can it be that the European Union is conspiring with the ECB and IMF and together, in the so-called Troika, go and wreck the lives of their own citizens? Why is all opposition, like the attempt of the Greek people, vehemently stifled? Why no national political discussions are held about the subject? Why the media don't start any discussion? Why constantly dogmatic sophisms are used to convince people? Examples are easy to find. Things (like pension) are becoming "too expensive; we don't have the money". Well, that is a fallacy, since, as we know, money can be created to your heart's content. It is just a matter of *who* gets it. So, the text "it is too expensive" means "we don't want to give a better life to them". Pensions should be reduced because we don't want pensioners to survive, they had better die because they do not serve the system anymore and are only parasites (which from a liberal economical point of view is true). In reality there are enough goods for everybody and pensioners do not have to work for them, because there is no need for so much labor in the production process

anyway; only a tiny fraction has to work a tiny part of their time.

Money just serves the purpose to do the bookkeeping of who has the right to consume the produced goods. If, as we can see now, obviously the money does not serve this purpose anymore, we have to think about alternatives. Don't forget that if no democratic solutions are found, the system will find a solution itself. The system can only continue in one of the following ways: war (capital destruction), revolution (capital transfer), eternal crisis (of overproduction), socialism (wealth transfer) or money printing.

❇

Let me finish here with the famous last words of banker Nathan von Rothschild: "And all of this because of my money".

Many sources were used and many discussions with many people were held for this book. Most relevant are the following:
My friends from my class of Physics at the University of Amsterdam: Alan Hollander, Frank Sarlemijn, Klaas Bakker and Mark de Langen. They all hold remarkably different and mostly orthogonal points of view which creates an inspiring intellectual environment.
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The documentaries *Money as Debt I & II.*
The documentary *History of the Federal Reserve, 100 years of money for nothing* (The basis for Chapter 8).
The book *The Ascent of Money* of Niall Ferguson about the history of money.
The book *Europe: A History* of Norman Davies about the history of Europe.
The book *Capital in the 21st Century* of Thomas Piketty, that tested the theories of Marx and found them to be correct.
The books *The Black Swan: The Impact of the Highly Improbable* and *Antifragile: Things that gain from disorder* of Nassim Nicholas Taleb, that show how ridiculously shortsighted the financial experts are.
The movies *The Four Horsemen* and *Brussels Business.*
The subtitle "In gold we trust" (also found by Incrementum Liechtenstein) is a parody on the text that can be found on the dollar, "In God we trust", as well as on the former Dutch guilder that had on its edge written "*God zij met ons*" (Let God be with us; the title of the Dutch version of this book translates to "Let gold be with us").

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Appendix A

State debt and deficit

I: State income
S: State spending
D: State debt
Y: GDP
A subscript n indicates the year.

Imagine state spending S is consistently a fraction d higher than the income I,

$$S_{\mathrm{n}} = (1 + d) \times I_{\mathrm{n}} \tag{24}$$

and the GDP grows g year to year,

$$Y_{\mathrm{n+1}} = (1 + g) \times Y_{\mathrm{n}}. \tag{25}$$

Debt grows with the difference between spending (S) and income (I) of the previous year:

$$D_{\mathrm{n+1}} = D_{\mathrm{n}} + (S_{\mathrm{n}} - I_{\mathrm{n}}). \tag{26}$$

This increment is equal to the deficit and that is d times the income as we find directly from Equation (24):

$$S_{\mathrm{n}} - I_{\mathrm{n}} = d \times I_{\mathrm{n}}. \tag{27}$$

Substitution of this in the equation above it results in a growth of debt equal to

$$D_{\mathrm{n+1}} = D_{\mathrm{n}} + d \times I_{\mathrm{n}}. \tag{28}$$

Now we put the boundary condition that the debt D with respect to the GDP Y stays constant and see if that gives a solution:

$$\frac{D_{\mathrm{n}+1}}{Y_{\mathrm{n}+1}} = \frac{D_{\mathrm{n}}}{Y_{\mathrm{n}}}. \tag{29}$$

Substitution of the growth of the GDP (Eq. (25)) and the growth of the debt (Eq. (28)) gives

$$\frac{D_{\mathrm{n}} + d \times I_{\mathrm{n}}}{(1+g) \times Y_{\mathrm{n}}} = \frac{D_{\mathrm{n}}}{Y_{\mathrm{n}}}. \tag{30}$$

Reshuffling this expression results in

$$\frac{D_{\mathrm{n}}}{I_{\mathrm{n}}} = \frac{d}{g}. \tag{31}$$

In words: The final steady-state debt relative to income is equal to the ratio of percentage deficit to economical growth.

Appendix B

Client and profit elasticity

Picture 4 (page 44) shows the profit per client (w) and the total number of clients (K) that both are a function of the price that the producer asks for the product. This defines the relative effects – elasticity – of raising prices on the profit per client (β, how many percent more profit is made per client at a 1% price increase) and the number of clients (α, how many percent clients are lost at a 1% price increase). These are slopes of the curves in the picture.

Imagine that at a certain moment there is a certain price p_0, at which the producer makes w_0 profit per client and has K_0 clients. The producer can raise the price, or lower it. For price reductions the amount of clients will in first order increase linearly (especially for small changes in price) and the profit per client will drop linearly. The total profit W is the number of clients multiplied by the profit per client. The thing thus boils down to the question whether the number of clients grows relatively faster than the profit per client drops. The total profit W as a function of price p and slope of this profit (W') are

easily calculated:

$$\begin{aligned} K(p) &= K_0 \left[1 - \alpha \frac{(p - p_0)}{p_0}\right], \\ w(p) &= w_0 \left[1 + \beta \frac{(p - p_0)}{p_0}\right], \\ W(p) &= K(p) \times w(p), \\ W'(p) \equiv \frac{\mathrm{d}W(p)}{\mathrm{d}p} &\approx \frac{K_0 w_0}{p_0}(\beta - \alpha). \end{aligned} \tag{32}$$

This defines the relative effects of price increments on profit per client (β) and number of clients (α) relative to a situation before, K_0 and w_0 at a price of p_0. The derivative (slope) of the total profit is proportional to the difference between client decline and profit rise. If the derivative is positive, the producer is well served by raising the price. If, on the other hand, it is negative, it would be better to lower the price of the product. Just to the point that the derivative is zero $W' = 0$, when $\beta = \alpha$.

Appendix C

Production, an exponential system

The formula (9) on page 60 determines the production and consumption per unit of time, and is mathematically not well written down. The correct form, in which the increase in capital and time step are also replaced by mathematically infinitesimal tiny steps, $\Delta \to \mathrm{d}$,

$$(p_{\mathrm{n}}N + p_{\mathrm{k}}K)\mathrm{d}t = C\mathrm{d}t + \mathrm{d}K. \tag{33}$$

In this C is the consumption speed and $p_{\mathrm{n}}N$ and $p_{\mathrm{k}}K$ the production rate of labor and capital, respectively. This results in the differential equation,

$$\frac{\mathrm{d}K(t)}{\mathrm{d}t} = p_{\mathrm{n}}N + p_{\mathrm{k}}K(t) - C(t). \tag{34}$$

If consumption is a constant fraction α of the total production, then we get

$$\frac{\mathrm{d}K(t)}{\mathrm{d}t} = (p_{\mathrm{n}}N + p_{\mathrm{k}}K(t))(1-\alpha). \tag{35}$$

The solution of the differential equation is

$$K(t) = K_0 e^{p_{\mathrm{k}}(1-\alpha)t} - \frac{p_{\mathrm{n}}N}{p_{\mathrm{k}}}. \tag{36}$$

We thus recognize an exponential growth with a speed given by the productivity of capital, corrected by the fraction that is consumed. The production is given by Eq. 9 on page 60 of the main text,

$$\begin{aligned} P(t) &= p_{\mathrm{N}} N + p_{\mathrm{k}} K(t) \\ &= p_{\mathrm{k}} K_0 e^{p_{\mathrm{k}}(1-\alpha)t} \end{aligned} \tag{37}$$

And the consumption a fraction α of production,

$$C(t) = \alpha P(t) = \alpha p_{\mathrm{k}} K_0 e^{p_{\mathrm{k}}(1-\alpha)t} \tag{38}$$

If α is big, then we have a lot of instantaneous welfare, but better is to invest, keep α as small as possible (barely survive), because that gives a lot in the future. That is the power of exponential growth.

Finally, the equation can be translated into more human-readable format when we realize that e^{at} is equal to $(e^a)^t$. If we take for t a year, then $e^a - 1$ is the year-to-year percentage growth. If, for instance, we have 5% growth $[p_{\mathrm{k}}(1-\alpha) = \log_{\mathrm{e}}(1.05)]$ and number the years with the discrete variable n instead of the continuous variable t, we get, for the production in a year n,

$$P_{\mathrm{n}} = P_0 \times 1.05^n \tag{39}$$

what had to be proven (page 61).

Appendix D

Fractional Reserve Banking money creation

M is the monetary base unit, for instance a troy ounce of physical gold. M' money are promises thereof, for instance the ECB bank money. Either can be used to pay for goods and services and is therefore money. By law, or through a natural limit to keep trust in the system, a fraction of the money, so called 'reserve ratio' RR, must be kept in cash. For instance, at a FRB of 10:1 this reserve ratio is $RR = 10\%$.
The creation of money by FRB goes in two steps of two types of FRB:
1) M $\Rightarrow$ M'.
2) M' $\Rightarrow$ M'.

Type I, qualitative change: With 1.0 unit M deposited by a client A, $1.0/RR$ units M' are made ('$\rightarrow$' means 'claim on'):

Bank balance:

Assets	Liabilities
1.0 cash (M)	1.0 A$\rightarrow$bank (M')
$(1.0/RR - 1)$ bank$\rightarrow$B	$(1.0/RR - 1)$ B$\rightarrow$bank (M')
$1.0/RR$ (M, M')	$1.0/RR$ (M')

Type II, quantitative change: With 1.0 unit M', deposited by client 1, in total $1.0/RR - 1$ new units M' are made by lending it to

client 2, that buys something from client 3, that deposits it on the bank, that lends it to client 4, that buys something with it from client 5, ... At every step a fraction RR remains:

client	M' deposit	in cash	lend out	to client
1	1.0	RR	$(1.0 - RR)$	2
3	$(1.0 - RR)$	$RR \times (1.0 - RR)$	$(1.0 - RR)^2$	4
5	$(1.0 - RR)^2$	$RR \times (1.0 - RR)^2$	$(1.0 - RR)^3$	6
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$
Σ	$1.0/RR$		$1.0/RR - 1$	

The total readily available amount (for all odd-numbered clients, 1, 3, 5, ... together) is

$$\sum_{n=0}^{\infty}(1.0 - RR)^n = \frac{1.0}{RR} \tag{40}$$

This way, in the two types of FRB a single unit M can be multiplied by FRB to $1/RR^2$ derived units M'. For instance, at a FRB ratio of 10:1 (RR=10%) one ounce of gold can be used to make gold promises with which things can be paid as if they were 100 ounces of gold. Both types of money creation did and do occur in our society. The qualitative step M (gold) $\Rightarrow$ M' (central-bank money) no longer exists, because the gold standard has been abolished; it has simply become vacuum into money: $\Rightarrow$ M'. The step from CB money to bank member money can also be done in these two ways (M being central-bank money and M' being member-bank money). The first step changes the quality (type of money), the second step multiplies the quantity.