Money, Debt, the Economy and the 2008 Financial Crisis explained for Nerds and other interested Mortals

Pavel Mayer

pavel.mayer@gmail.com

Created 19.11.2008

Revised 19.4.2009

Version 1.8.2009

This Version is not supposed to be the final version,
but is published in its unfinished state without references
to sources in order to collect comments and criticisms,
and also to make it available to the public now.

It has been reviewed by a small number of
people, but does not claim to meet the requirement
of a scientific publication yet.

It may also be published as a book or microsite
in the future when there should be interest.

Content

About

It sounds ridiculous, but except a few experts, most people have a very vague understanding about what money actually is. And as it turns out, even the experts don't agree with each other when it comes to money. Economics is a social science, so there is a lot of philosophy, politics and religious belief involved in economic theories, although economics makes heavy use of math and formal models, and uses its own very special terminology.

All this contributed to my impression that almost everything I heard or knew about the nature of money seemed to be just phrases. I did not really have the feeling to grasp the concepts. So I started to dig, search, read, think and ask questions, and I decided to write down what I learned in order to better understand it. This is the result, and if you want to know what money is, how it is created and destroyed, how debt is traded, what derivatives, futures and short selling is, why "hedge funds" promise to deliver "alpha", and how investment bankers created and sold "Collateralized Debt Obligations" to Fireman's Widows and Orphan funds, you might want to read it.

Common Knowledge about Money

Most people have learned in school that money was invented as a token to store value and exchange it for goods and services. It later evolved into a unit of account and deferred payment. In the past it was mainly issued by the state or by banks, mostly in form of tokens forged from more or less precious metals, and later it took the form of papers and certificates that represented a particular amount of gold or silver. Ownership of money was also recorded in books, creating accounts representing book money.

Today, some money is issued by the reserve banks, and people deposit money in banks who can use it to make loans. In this process, somehow more money is created by the banks because they lend out more money than people deposit in the bank. Money is used to buy stuff and ends up in the hand of companies, who pay their workers and shareholders, who again spend it so the money circulates through the economy. That basically sums up what seems to be consensus and what I knew before looking deeper into the details.

Many Mysteries

However, this model gives rise to more questions than is answers: Where does the value of money come from? What is behind the money? Why is the U.S. federal reserve bank a private bank? How is money technically created? What is role of the gold reserves? Why can't a government create as much money as it needs? Or can it? How can a bank become bankrupt when it can create money? Or when it can't create money, where does all the money come from? Is the banking system a huge conspiracy to defraud the common people? And why are so many banks in trouble right now? How is money related to debt? Is is the same as debt? Or is it the opposite? How can there be such a huge economic crisis, when all the factories are intact, all the workers are healthy and the consumers willing to consume? Was there a war or natural disaster we all missed that mysteriously destroyed a large part of the world's wealth? Or has every-

one just gone crazy? How bad is the crisis really? What are the reasons? And why does everyone seem to be so helpless, and no one seems to have a clue what to do?

With so many open questions and contradicting answers, I had to resort to a good old enlightenment tradition and put my own mind to use. It turned out to be an interesting endeavor, and I have found all the answers I wanted. And this endeavor also confirmed my skepticism against social sciences and economics in particular. I would not go as far as saying that economics is a pseudoscience, but it suffers the same great deal from unfounded beliefs, fashions and oversimplifications like other sciences at the bottom of the hierarchy, although it makes more use of math and formal models than other social science.

If you look into economics, you will find many proponents of contradicting theories that are probably all more or less wrong, but even failures to predict or control outcomes using these theories do rarely invalidate them because the proponents can always say that they were not applied properly or there was not enough information.

Anyway, one might think that economics would at least agree when it comes to the question what money actually is at its core, but even this is not the case.

The intellectual model of what money is at its core that I found to be the most plausible is one that I derived from observing how our financial system technically works, and it seems very obvious to me.

To my surprise, it turns out that this is *not* how mainstream economics sees money, although many economists in the last hundred years made the same observations and came to the same conclusions. However, these ideas and models were mostly ignored or dismissed by mainstreams economics.

What I came up with corresponds to the known *credit* or *debt theory of money*, while the mainstream still embraces the *metal theory of money*, mostly ignoring the fact how today 90% of the money supply is obviously and undisputedly created.

I am convinced that the *metal theory* compared to the *credit theory* is what geocentrism is compared to heliocentrism in astronomy: You can work with the obvious assumption that the earth is the center of the solar system, but you get better results if you put the sun in the center.

Types of Money

In economics, the term *money* is used for everything that can be used as money: Commodities like metals, craftwork, food, drugs or spices can be used as *commodity money*. In this case the commodity itself is the money. When instead of the commodity a token like a coin or paper representing a fixed amount of the commodity is used as money, it is called *representative money*. And then there is *fiat money*, which is money that is legally declared to be money by a governing authority. And then there is *credit money*, which is any future claim that can be used for the purchase of gods and services.

Today, commodity money and representative money are only of historical interest and do not have any significant role in the world economy.

And fiat money today is only a special form of credit money, so when we talk about money in our present world, the term money is equivalent to credit money. This is the reason why we can focus on credit money when we want to explore the nature of the money that makes the world go round. Credit money is the only money that matters in our economy.

Money

The "money" most of us usually deal with is currency, bank notes, coins and numbers on our accounts, but they are just *representations* of or *symbols* for money. The map is not the territory, although when talking about money it is often convenient to treat the symbol as the real thing, like saying “this is Germany”, when in fact pointing to pixels on a computer screen. So what is the “real” thing when we talk about money? Is money something real at all?

Money is obviously something that is valuable. We also measure the value of *assets* in terms of money and call it *price*. Money is also an asset. But money itself is intangible, like a license or a contract. The value of a license, as the value of money, does not come from the paper it is printed on. A bank note is a kind of contract, and one contract clause on a dollar note says: "THIS NOTE IS LEGAL TENDER FOR ALL DEBTS, PUBLIC OR PRIVATE". Did you ever think about what that means? And did you understand it?

Most people know that in the past, money was backed by gold that was held by those issuing the money, but most people also know this time is long gone. After World War II, Great Britain was unable to restore the gold backing of the pound because the war depleted their reserves, so the world turned to the dollar as “reserve currency” which still was convertible to gold, but even the gold backing of the dollar was abandoned when France actually started to convert large amounts of dollars into gold and tapped into the U.S. gold reserves. Also, all the official government gold reserves in the world amount to just 30.000 tons, representing a value of about 565 Billion Euros or 750 Billion dollars. The value of the U.S. gold reserves, who owns more than a quarter of them, amount to just 200 billion dollars. Compare this to the currently 13.000 billion of the current U.S. M3 money supply.

So what is behind the money? What makes money valuable? It is definitely not gold, although most countries still have gold reserves, and gold still seems to be a psychological factor.

Many people believe that it is the government or the state that somehow guarantees the value of our money, but this is false and true at the same time. We will later see why.

How Money is not created

It is easier to understand what money is when we look into the process how money is created. Most people believe that money is something that the government creates, but this is not true. The government or the state does not create money, at least not in countries with a modern financial system. Period. Most countries have a *central bank*, also called *reserve bank* or *monetary authority* that is to some degree independent from the government, and while this bank issues *currency* and *central bank money,* it also can not create money just by decree, although it seems so. We will look into this issue in more detail in the “Money revisited” chapter. Here the short answer: The monetary authority can create money, but someone has to *buy* it, otherwise it won’t become part of the money supply. But when we have to buy money with money, nothing would be gained, so we need something else to make it work.

And we also have heard that the central bank only supplies a small part of the money supply, so where does the rest come from, and how?

In our financial system most of the money is created by commercial banks, but the process there is actually the same like in the central bank, so we can just say that money is created in a bank. A bank is basically an institution with a license to create new money. But a bank can not create money on it's own, otherwise it could never go bankrupt, like Lehman Brothers. As we will see it needs help from another entity outside the bank to perform the magic process of *Money Creation*.

A Quantum Physics Analogy

Now, how does this miracle work? On the basic level it is a miracle that has some similarity with processes that happen on quantum level, at least according to the currently accepted theory of quantum physics.

The universe is very strict to preserve many properties of matter like spin, charge and energy. When new particles are created, the sum of spin, charge and energy in the universe must not change. But how can new particles be created under this circumstances? Fortunately, the universe allows to create particles with opposite properties that cancel each other out. For example, when we look at the electric charge, we can create a negative and a positive particle out of a particle with zero charge.

Interestingly, the universe can also create energy out of nothing, called *vacuum* in physics. The sum of the total vacuum energy in the universe is assumed to be zero, but due to the uncertainty principle it can not be perfectly zero everywhere all the time, a process called vacuum fluctuation.

This causes virtual particle pairs to appear out of nothing. They normally exist only for a very short time and annihilate back into nothing, but they can interact with other particles, and this might hinder them from annihilating. As these new particles now have energy and mass, someone has to pay the energy bill. In this case to my knowledge the bill is “paid” by the gravitational potential energy, which can be considered negative en-

ergy because we have to add energy if we want "dissolve" the local clump of matter by moving it apart to perfectly distribute it again over the whole universe.

Now what has this to do with money creation? First of all, money is as real as all these quantum effects - you can not really see it, but if you believe in it and understand the theory, you have a powerful intellectual tool to predict and control future outcomes of your actions.

But the analogy goes a bit deeper: In order to create money out of nothing, we create not just money, but the appropriate amount of anti-money, also called debt. With this simple but ingenious trick we keep the financial universe and its books in balance. And these books work with high precision; bookkeeping of amounts of money and anti-money is basically what our financial system is about.

And it gets even better: By creating this money/anti-money pair, we also have created some kind of force, an obligation to pay back the debt, which in the world of finance can produce something known as *money stream*. Every debt carries the obligation to be paid back in one sum or partially over time, and every payment made against the debt reduces the debt, actually destroying money and debt in the process. When money and debt meet each other, both are destroyed.

But here the analogy ends. In the quantum universe, there is no interest to be paid, at least none I am aware of. [At this point I have to admit that for most people the quantum physics analogy is probably more difficult to understand than actual money creation, but as I like physics better than economics, it was at least helpful to me.]

Now, as we know, the process of money creation does not involve *vacuum fluctuations*, so what ingredients need to come together to make it happen?

Real Money Creation

Basically, there are two parties that must come together and agree on a contract. In our financial system a creditor, typically a bank, and a potential debtor that wants to accept the debt and the money must get together. The problem is, that in order to make the money creation happen, the bank must have the trust that the debtor will be able and willing to repay the debt.

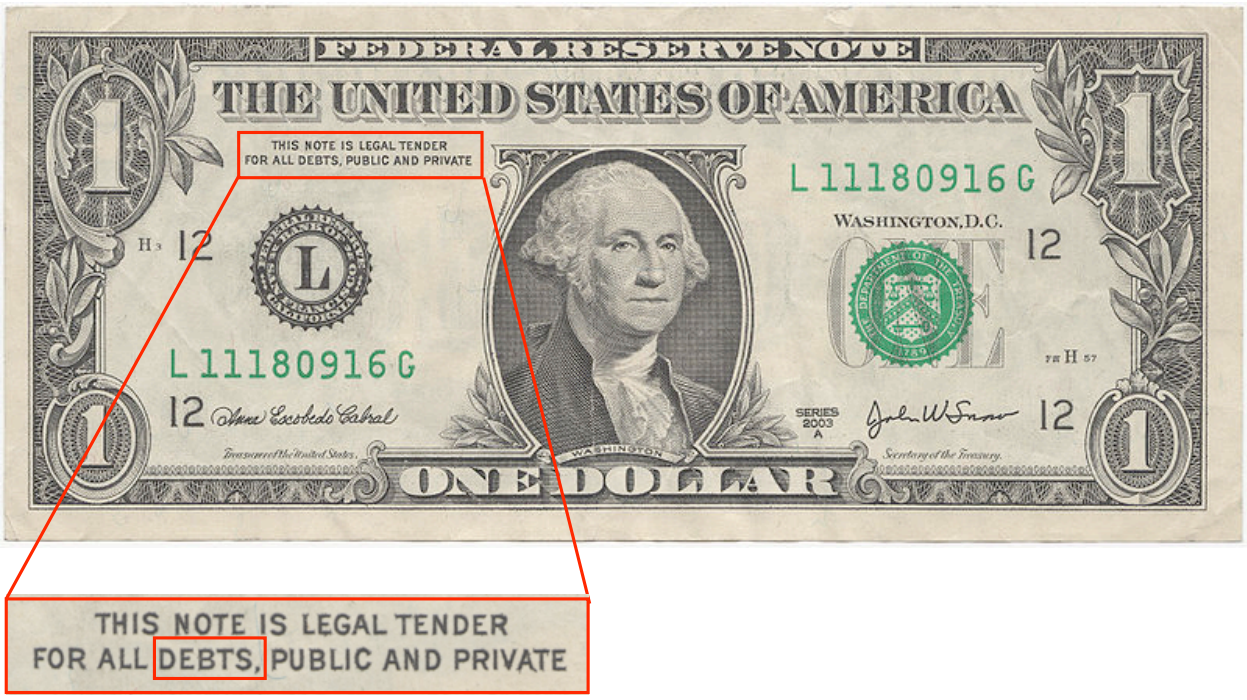
Trust is the critical term here, also known as *credit*. Without sufficient trust, the money/anti-money creation just won't happen. No trust, no money, no debt, no interest, no profit. And without a debtor who is willing to accept the terms, any bank notes printed or numbers created in an account are nothing more than sheets of paper or meaningless numbers.

But when the two parties find each other and agree, the bank can just create the money and add the balance to an account. Yes, a person in the bank just types in the numbers into the computer system, and voila, money is born. It is as real money as money can be, and it is backed by the debt contract. Often the debt contract also involves something called *collateral*, an asset owned by the debtor that can be seized by the creditor

in case the debtor will not fulfill his commitment to provide the *money stream* agreed on in the debt contract, but this is just a secondary thing that helps to build trust, and is not generally required to create a money/debt pair.

Destruction of Money

Money is not only created, but also regularly destroyed. The normal case is, when debt is repaid, money and anti-money cancel each other out and both cease to exist.



Now, does the term "THIS NOTE IS LEGAL TENDER FOR ALL **DEBTS**, PUBLIC OR PRIVATE" make more sense?

The fact that money gets destroyed when a debt is repaid is a bit hard to grasp, but there is no other way to keep things balanced. Otherwise the bank would end up with owning money that is backed by nothing, because the debt contract is void and no longer an asset. However, the bank won't burn any bank notes they receive when debt is repaid. When you pay your debt with legal tender, it is turned into book money, and it is the book money that is destroyed.

And there is another case when money is destroyed: Debt will cease to exist when the issuer of the debt turns out to be unable to repay it. In this case, when a debt is destroyed by bankruptcy or partially destroyed by *restructuring*, the same amount of money has to be subsequently destroyed because we are not allowed to cheat on the financial universe.

The unpleasant thing about it is that the money that is destroyed is not the money that was created with the debt - this money is long gone and the creditors won't get it back. It is other, actual money that belongs to someone else that has to be destroyed, typically

the bank's or investor's money. And it is as real money as money can be that disappears, and this makes the whole thing quite undesirable for a bank. However, even under the best circumstances this will happen from time to time, and this is one of the justifications why you have to pay interest when you borrow money: As as debtor, you are supposed to repay the debt of those who don't.

We also talk about *money destruction* when the stock price goes down, but the stock price directly has nothing to do with money creation or destruction. Indirectly however, equity is an asset of the owner, and the loss will be reflected in the owner's balance sheet. But money has not been destroyed because it changed hands when the stock was bought, it just belongs to someone else.

Equity often serves as collateral, and a devaluation of collateral can have many consequences, among them so called *margin calls*, where a creditor has to come up with more collateral or terminate the contract, in financial lingo called *liquidate the position*. In this case in the first step also someone looses money, but someone else owns it.

But as a indirect result of falling stock, actual money is destroyed because in practice a large amount of money is created and destroyed every day through short term lending, so devaluation of stock quickly can have a severe impact on the money supply when less short term lending is possible because of less existing collateral.

The Path of Money

In order to illustrate things a bit more, we can look at the path money and debt both take after the creation: Money is ideally spent to build or buy something that has real value, like a house or a factory, which can subsequently also serve as collateral, or money may be spent on consumption, trusting in the ability of the debtor to acquire enough money in the future, by consuming less or earning more. In either case, a part of the debtors future income will be diverted into a money stream repaying the debt. But the newly created money is generally spent by the debtor and released into general money circulation, the sea of money called *money supply*. The newly created money will still exist as long as the debt is not repaid, and very soon we won't be able to tell who actually owns it because it passes through many hands, but in most cases it will end up as a deposit in a bank somewhere.

What happens in our system when money is deposited in a bank? Originally banks were thought to be institutions that collect money from the people, and hand it out to other people who want to borrow it. But how does this fit together with the assumption that a bank just creates the money when handing out loans? What are the deposits then required or used for?

The deposits are mainly required to compensate for fluctuations in the money flow; they are just a kind of buffer, like a local water reservoir that levels out water supply when the consumption fluctuates. Like with the water supply it would be very annoying when the tap always runs dry during times of high demand, it would make banks almost useless when you could not rely on that the bank will pay out your money when you need it to

pay your bills. Therefore every bank is supposed to maintain a buffer of money large enough so the supply of money always matches the outflow. As a nice match to our water supply metaphor, the term for this is *liquidity*.

In order to keep the banks from creating too much money, there are several limits built into the system. One limit is that the amount of credit a bank can hand out has to be in a healthy relation how much capital the bank owns. Interestingly, the amount of credit a bank can hand out does not directly depend on the amount of money deposited at the bank.

Instead, the bank must put a fraction of the money deposited into an account at the reserve bank. This however has the same effect: When a bank creates new money, it immediately becomes a deposit, so also a fraction of the freshly created money must be deposited at the reserve bank. This is called fractional reserve banking.

In this case, U.S. banks are allowed to create ten times the deposited amount of money, and Eurozone banks fifty times the deposited money. In practice however overall money creation is rarely limited by the reserve requirement, but mainly by the number of credible debtors who apply for a loan. This way the central bank exercises a kind of "soft control" on money creation by adjusting the interest rates for money deposited at or loaned from the central bank. High rates throttle money creation, while low rates boost it, because more people are willing and eligible to get a loan when the interest rate is low.

Hierarchy of Banks and Money

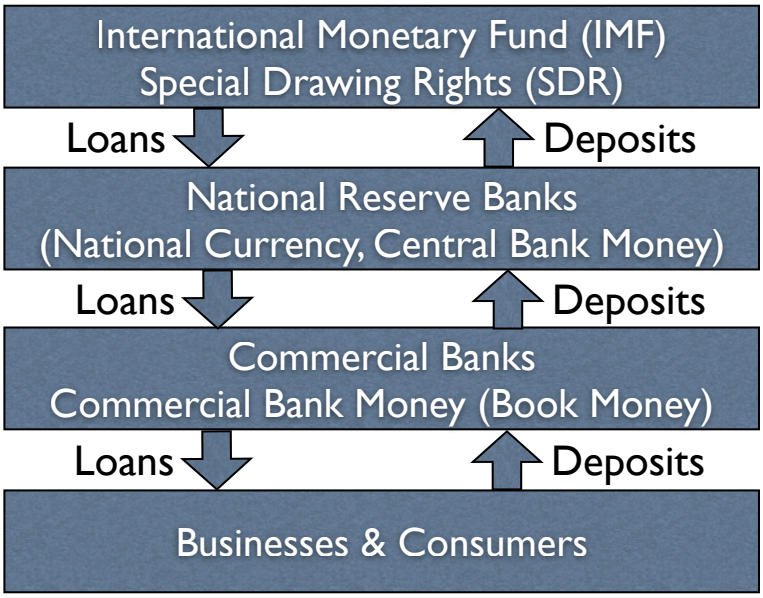
For businesses and consumers, only one type of money exists, and their money is completely fungible, which means that one dollar in the bank account is the same as one dollar in the pocket. Banks however have to keep track of many different types of money in their books, and one important distinction is the amount of central bank money and cash the bank owns, which divided by the demand deposits defines the central bank reserve ratio.

Above the national reserve banks there is some kind of world reserve bank, where the national reserve banks also maintain deposits and can make loans: The *International Monetary Fund* (IMF). It also has a kind of own international currency, the *Special Drawing Rights*, based on a basket of U.S. Dollars, Euros, Pounds and Yen. However, the IMF is not really a full featured central bank, and it is dominated by the United States who have exclusive veto power. The SDR is also not a real reserve currency, but China recently proposed to turn it into one. Between 1981 and 2008 also no new SDRs have been created; their amount was only 21.4 billion during that time, and first world countries also refrained from loaning from the IMF because an IMF loan usually comes with the condition to heavily cut domestic spending. In 1976 Britain was the last first world country that asked the IMF for a loan, and they never did it again. So before 2008, the IMF was mainly known for handing out loans to many countries ruled by dictators who heavily expanded the international debt of their respective countries.

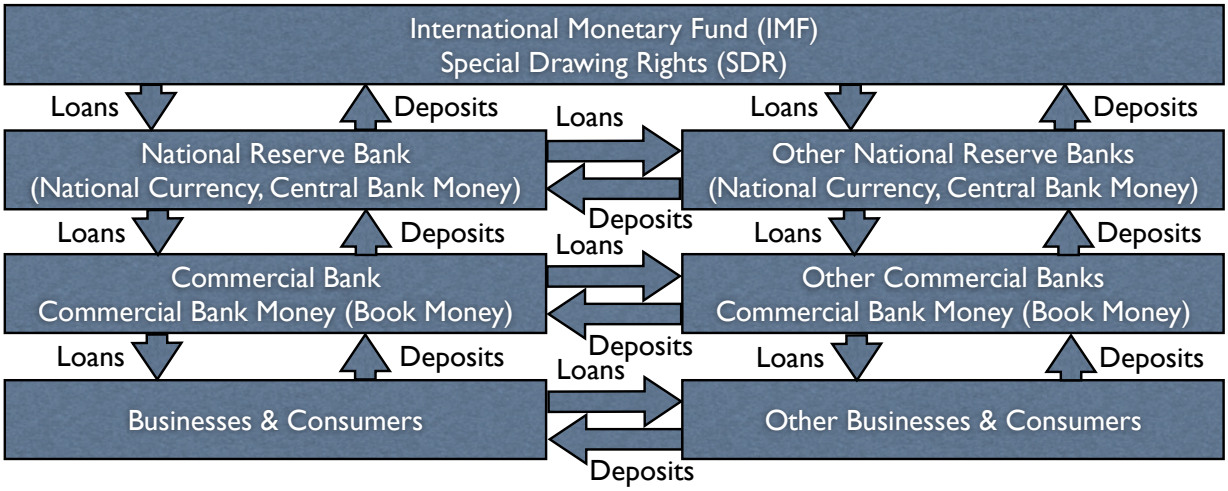
In the wake of the current crisis however the G20 decided to issue 250 billion new SDRs to “augment” the the foreign reserves of the IMF members. In November 2008 new IMF bailout programs were announced for Iceland, Hungary, Ukraine, Serbia and Pakistan, and Turkey and Latvia will probably also receive help.

The track record of the IMF and it’s economic development support relative, the World Bank, is not exactly pleasing. Most countries that received aid in the past mostly were not better off after substantial loans, and people in the countries had to endure a lot hardship, so it is not exactly a good sign when more and more supposedly wealthy countries must turn to the IMF for help.

A very simplified hierarchy of money and banking looks like follows:



However, in reality banks on each level also loan and deposit or invest money horizontally:



Why do *Banks* create money?

Now why and when did the government outsource money creation to private banks? First of all, originally the government was not involved at all in money creation, it was more a private thing anyway, but money embossed with the face of the ruler seemed to be more trustworthy, and a government imposes taxes and needs a lot of money for administration and war, so the government necessarily became involved. And people prefer to put their money into a bank rather to hand it over to the government, so money was always a kind of public-private partnership. And the small scale creation and subsequent elimination of debt is a major management effort, so you need a specialized entity to handle that, and a bank is just that.

Whether a bank is private, owned by public authorities (state, city) or by the customers of the bank (cooperative) is a political issue and does not affect the role of a bank. In many countries all three types of bank ownership models coexist quite successfully, so the image of banks being a private tool of the rich to exploit the poor masses is not exactly true.

Banks are just instruments to facilitate the creation and flow of money, no more, but no less. As such, they are indispensable for an economy that is driven by money flows in time and property space. This is also the problem with banks: When they do not operate properly, everyone is adversely affected, and this is the reason why the banking sector is traditionally heavily regulated. Banks are too important to operate on their own, and they also suffer from many internal conflicts of interest requiring "Chinese Walls" inside the bank and other regulations to avoid exploitation of confident information gained from their credit business (insider information), manipulation of markets due to biased equity analysis, and exploitation of privileged market access, like "front running", the practice of executing stock orders for their own account before executing their customers orders. All these practices are criminal, but often difficult to detect and hard to prove.

From a systemic point of view, banks are something different, a different kind of player in economics, called *financial intermediaries*. They are supposed to be like neutral umpires, interpreting and executing the rules in order to take and distribute money. They are not meant to influence the outcome of the game by favoring a party and shooting goals. This is reserved for the investors, the real players in the game. One problem and source for many conflicts of interest is the fact that in our real economy, banks try to shoot goals themselves. The United States tried to solve this problems by creating different kinds of banks: In the U.S. only *Investment Banks* were allowed to be directly involved with the capital markets, while *Commercial Banks* were handling deposits and accounts for their customers. In other countries such a distinction did not exist, and now it is history even in the United States after the last two major *bulge bracket* firms on Wall Street, Goldman Sachs and Morgan Stanley converted to traditional banking institutions on September 22, 2008.

In contradiction to the “umpire theory” above, in practice it turned out that banks who own a part of a company are more interested in the long term value of a company and exhibit a more responsible behavior. In Germany this was practiced and criticized as “Deutschland AG”. Such an intermingled economic structure is undeniably more inclined to corrupt behavior, but the disadvantages to the practiced alternatives did not seem to work better in the long run. For example, the practice of buying companies with their own money currently endangers the existence of many companies and banks as money has become more scarce.

Businesses

"A business, also called firm or an enterprise, is a legally recognized organizational entity designed to provide goods and/or services to consumers."

This is the encyclopedic definition. The important aspect here is "legally recognized entity", which means that a company is a subject of its own, in many respects like a human being. A business has the right to own things, it can sue and it can be sued. The difference to humans is that it can be owned, but this does not imply that humans have full control. Especially with large corporations, no single person is actually in control, neither the owners, nor the management because the management is responsible to the owners, which is usually a group of shareholders, most of them also corporations. But let us also put this problem aside and look a the functional aspects of a business.

In economics, a business does not consume. It invests and produces.

A business can be owned, and equity of a business is an asset. It also interacts with markets, it buys, produces and sells goods and services. In order to do that, it also needs to own assets and put these into use, and to be profitable is must sell its products at a higher price than it buys the required labor, material and means of production.

The important result is that equity in a business also produces a money stream.

The value of the equity mostly depends on the money stream it produces (*return on investment*) in relation to the amount of money that is "frozen" inside the business, the

factory, machines, licenses and money that is needed for operation. This “frozen situation” is reflected in the *balance sheet*.

Stocks and Balance Sheets

A balance sheet is something that makes a normal human brain cringe when confronted with the concept. But once you get it, it is not that difficult at all.

A balance sheet is a kind of snapshot that describes the financial position of a company at a specified point in time. But what does this sheet actually balance? A naive view would be that it just balances its assets against liabilities, and you better have more of the former than the latter, but that is just a part of the picture.

What probably makes the normal brain cringe is that the owners equity, the money that the owners of the company did put in, is added up with the liabilities, and is supposed to perfectly match with the assets side of the balance sheet.

A common explanation is that the right side, the liabilities plus owner’s equity shows where the money in the company has come from, and the left (asset) side shows where it ended up inside the company.

So when we want to know the "static" *book value* of a company, we subtract the liabilities from the assets, and get the owners' equity, which means that this would be what is left when the company is liquidated ("unfrozen"), meaning all assets were sold and all liabilities paid back.

A company is bankrupt when the owners equity is zero or negative. How can that happen? Typically this is the case when the value of the assets drops, either by operating losses, or by adjusting the value of the assets because their value declined, a process called *depreciation*.

A company is also bankrupt even when there would be still equity left, but the assets can not be turned into money to pay the liabilities in time. This is called *insolvency.*

Normally this should not happen because assets can be used as collateral to secure a loan from a bank, but the bank can just say no if it deems the risk is too high, and bang, the company is required to legally declare bankruptcy.

It is notable that it is typically much easier for a company to loan money for a short time than for a longer time because the bank might be convinced that you very probably can repay the debt next week by lending somewhere else, but it is not sure whether you will be able to do so next year.

The ownership of a company is something that also can be traded. Such an ownership, also a partial one, is called equity. Normally, equity in a company entitles the owner to receive a part of the profit and exert some influence on decisions of the company, but a contract may specify otherwise, creating special types of equity. However, in most cases

equity creates a money stream, and this money stream depends on the performance of the company.

Now, when equity in form of stock is traded on a stock market, the price of the stock rarely correlates with the book value of the owners' equity from the balance sheet. Normally it is much higher, but it frequently happens that it is lower, which normally should never happen when the stock market would be driven by rational decisions.

In fact, when the total price of all shares, the market capitalization, is lower than the owners' equity means that the market assigns a negative value to the fact that a company exists and operates. I have personally seen companies where the market cap was well below the amount of cash the company had, so that buying all shares and liquidating the company would have turned out a sure profit.

One of the currently richest persons in the world, Warren Buffet, built most of his wealth just by comparing market cap with the owners' equity and buying shares from companies that were definitely undervalued by the stock market. One might think that people investing in stock would consult balance sheets, but in reality chart analysis, weird algorithms, rumors, expectations, hype and hysteria probably drive these decisions, and for short term investment in stock this is also the only way to possibly succeed: If you are convinced that all those idiots are going to buy, the stock will rise in the short term, no matter what the balance sheet says, and if everyone is panicking, it will drop. So short term speculation in the stock market is not about judging about a company, but judging about all the idiots and computers in the market. In the long run however, a solid business will prevail, no matter what the stock price does in the short run.

The funny thing is that under normal conditions, a company does not directly benefit from a high stock price because the stock price does not affect the amount of capital the company has to operate. To benefit from a high stock price a company has to issue new shares. A secondary effect of a high stock price is however that a company can buy a competitor with a low stock price, possible paying with own shares, but often this drives the price for the own stock down. A high stock price also may improve the credit rating and as a consequence lower the capital costs.

Houses

We all heard that the collapse of the "Housing Bubble" is responsible for today's financial crisis. Normally it is a quite prudent thing to create money and debt in order to build or buy a house. A house has a well defined intrinsic value because it covers one of the basic human needs, the need for shelter. And it has a long-lasting value. A typical U.S. house lasts 30-50 years, a typical german house hundreds of years. And the associated land will last potentially forever. This is the reason why real estate is very good collateral for debt. However, house prices are also subject to market conditions, so the question whether real estate is a good investment is as always, a question of the price.

So what is a reasonable price for a house? The question is not that difficult to answer.

You just have to ask yourself: How low does the monthly rent for the house have to be so that you will always easily find someone willing to rent it? And when you have that number, then you can do one of two things: If you are pessimistic, multiply this value by 150, and you get what it is really worth.

So a house or flat that is rented for 1000€/month, is worth 150.000€.

Shockingly low, isn't it? But that's the way a diligent bank or investor will estimate the real long term value.

The more optimistic way to look at the price from the owner's perspective would be:

Check the rate for a 10-year fixed rate mortgage credit of the house price. Will the rent cover the monthly interest rate, tax and insurance plus a safety margin of at least 5-10%? If you can answer with "yes", you can sleep well, at least for the next ten years. Even if you lose your job, the rent will pay the bank, and in thirty years the house will be yours.

In this case, with a 5% interest rate, a house that brings in 1000€/month, will pay the interest for a 240.000 Euro credit. Deduct 10-20% to cover for tax, insurance and risk, and you can spend up to 200.000 - 220.000 for the 1000€-house without feeling bad.

So in general it is a good idea to buy or build a house when the price is right, and you may even sell it for a good price after ten or twenty years when the market is good. However, if you pay too much, you are going to pay for a long time and you may lose a lot of money you don't have.

So what went wrong in the U.S. was not alone that the banks gave mortgage credit to people with insufficient creditworthiness - when the price of the house is reasonable, you can do that with little risk. There is still the house. The problem was that also the prices the houses were sold for were not reasonable, and that the banks gave credit based on the current market value, and not based on the long-term intrinsic value of the house. Now that the market value went down closer to the long-term value *and* many debtors defaulted on their payments, the creditors are fucked. But to get into this mess, it required to ignore not one, but two basic principles of mortgage lending.

Consumers

In an economy, there are four distinct groups of participants: The public sector, the banks, the firms, and the consumers. To me, it seems slightly derogative to be called a "consumer", as if I would be just sitting there and consume stuff other people have produced. But in economics, by definition consumers can only consume and save. Consumers are not supposed to produce things. When they do so, they become (part of) a business. The part of the income saved can to either be hoarded under the mattress, or it can be invested. To *invest* literally means to put things into others' pockets, expecting a *return on investment*.

In fact, as a german consumer, I actually “produce” on average 10% more than I consume. People in China actually produce 45% more than they consume. Americans on the other hand might be rightly called consumers because they consume slightly more (about 2%) than they produce, but they still produce almost everything they consume.

However, even just 2% over 20 years accumulate into a lot of debt, and it is obvious that this can not go on forever. And now it finally looks as if we may have hit the turning point. On the other hand the U.S.A. are a very rich country, where people have on average 30% more income than Germans, and I don't think Germans have a bad life overall. So in theory it should not be such a big problem for american consumers to reduce their consumption by lets say 10%, and everything would be fine.

But why is the american consumer often called the "Motor of the World Economy"? How can excessive consumption in one country be good for the world economy? In economics, there is a well established theory that saving money is bad for the economy, and it is probably true. Savings are good for the individual, but bad for the economy as a whole, because you can not really save money. Lets assume the world as a whole would save ten percent of the money created and not spend it. What does that mean? As we have seen, this money is backed by debt. As a consequence, not only money, but also debt would pile up. But how can debt pile up when everyone is saving money? Thats the problem. Money can not be saved, it must be invested or consumed. So when the Chinese, German and Japanese consumers refuse to perform their duty as consumers, at least the American consumer came to the rescue of the world economy. But this seems to be history. So when we want to keep our economy running, and the companies refuse to invest and the consumers refuse to consume, the government must take away the money from consumers and companies by raising taxes and invest or consume it on their behalf.

Gross Domestic Product

The GDP is defined as sum of consumption, gross investment, government spending and exports minus imports. The GDP per capita is often used as a measure of living standard, but this is rightly criticized as misleading. First of all, "gross investment" does not include depreciation, so when a country invests into short living goods, the actual net investment might be much lower or even negative. Second, it does not take destruction or exploitation of finite natural resources into account. Third, and this might be dazzling for germans who are world champions in export, the amount of exported goods is a plus in the GDP, but actually leaves the country and does not improve the life of germans today. And fourth, it does not take into account the income from foreign investments, for example when Americans own businesses in Africa or Asia. There is a number that takes this the latter into account, the Gross National Income (GNI), but as it turns out, even in our globalized economy, GDP and GNI are close together, at least in developed countries. Developing countries usually have a significantly lower GNI than GDP, despite of all development aid, so developing countries actually support rich countries, although developing countries will typically also benefit from foreign investments compared to not investing, at least when the investment is not about exploitation of finite resources.

Economics

Economics is a social science and uses many popular terms in a different way as normal people, and many things are defined in a special way in order to simplify reality, like the consumer that only consumes, and the business that does not.

There are numerous schools of thought in economics, and it would take a lifetime just to determine in what they differ and on what they agree. “Schools of thought” have been already suspicious to Goethe, who wrote in 1817: “*Every school of thought is like a man who has talked to himself for a hundred years and is delighted with his own mind, however stupid it may be.*”

All those schools of thought have different theories about how the economy works and should be politically organized, and the proponents fall in many different camps that fight each other with almost religious fervor.

In the western mainstream of the last two hundred years there seem to be basically two main camps who influence the ruling politics: *Supply-side* economics, and *demand-side* economics. Western politics seems to alternate between them, and they switch every couple of decades, usually after an heavy economic crisis. Supply-side economics is associated with the attributes classical, liberal, business-friendly and right-wing, while demand side economics is also called neoclassical, *Keynesian*, state interventionist and more left wing, but this is a gross simplification.

Modern political economy started with *Adam Smith*, a famous scottish nerd who lived in the 18th century and is depicted today on every 20£-Note. Adam Smith put down the theoretical foundation for capitalism, like Karl Marx did for communism. Smith introduced the word *industry* and emphasized the role of specialization, division of work and free markets for the wealth of nations. In Adam Smith’s private life, none of the women he proposed to wanted to marry him, and he kept a close relationship with his mother.

Supply side economics were “invented” in the 19th century by *Jean-Baptiste Say*, a french businessman and economist. He formulated what is called *Say’s theorem*, stating that "*Supply creates its own demand*". This means that when politics stimulates production by creating a business friendly low-tax environment with little regulation and government spending, more interesting products will created, and people will subsequently demand and buy them, and the market will make everyone happy and unemployment go away. Say also stated that the money supply in an economy does not really matter because when it is increased, the value of the money will adapt in a process he called *inflation*.

During the 19th century, the industrialization in the U.S. and Great Britain were flanked by a policy based on this classical, liberal supply side policy. Germany at that time was quite similar to China today, ruled by autocrats, underdeveloped, eager to catch up with Britain, and did mainly manufacture cheap copies of British brand products. Germany’s later economic success was based on embracing new upcoming technology, building a chemical, electrical and machine construction industry the British were reluctant to in-

vest into because their textile and heavy industries were turning out comfortable profits. In Germany traditionally the role of the government was always stronger than in Britain and the United States, and Germany has never experienced their eras of laissez-faire capitalism.

At the beginning of the 20th century *John Maynard Keynes*, a famous gay british economist, turned Say‘s theorem upside down and stated that "*Demand creates its own supply*". He overturned the idea that free markets are more efficient at allocating resources than governments, and stated that markets will stabilize at multiple equilibria, some with permanent unemployment, so the role of the government is to regulate markets and spend tax money in order to selectively stimulate the economy by subsidizing specific actors. Regarding the money supply, Keynes observed correctly that changes in the money supply *do* affect the economy because some prices are “sticky” and do not change as fast as the value of money. From that he derived the theory that in a recession or depression, the consumption has to be stimulated first, giving consumers more income to increase the demand which will stimulate the economy until the “sticky” prices finally catch up.

The western governments turned to Keynesian policy as a reaction to the Great Depression, which started in 1929. From 1933 until 1979 mainly this *Keynesian* demand-side politics were favored and practiced in the United States and after WW2 in Europe, causing periods of elevated inflation in the order of 10-15% per year, which we would regard as very high today. In Germany and some parts of Europe, mostly northern Europe, this mixed well with the practiced *Ordoliberalism*, which is the theoretical foundation for Germany’s social market economy. Social market economy is a middle path and rejects both socialism and laissez-faire capitalism and emphasizes the role of the state to maintain healthy market conditions.

With the begin of the Reagan era, the pendulum of the favored economic policy turned back to supply-side economics, as a response to the economic crisis of the 1970s and the oil shock. This “new” demand side economic school is associated with the work of Milton Friedman and is called *Monetarism,* and in its revised form, the *New Classical School* of economic thinking.

Monetarism oriented policy basically aims at controlling the money supply to keep inflation within healthy bounds by steadily and predictably increasing the money supply by 3-5% per year, generally refraining from increasing the money supply to stimulate the economy. But monetarism also means to increase the money supply when it gets too low to meet the target in times of recession, and decrease the money supply when the economy “overheats” and shows signs of inflation, which however never was done in the U.S. because of the fear of causing a recession. The german federal bank was the first central bank to embrace monetarism in 1974, and it was regarded to have served quite well across a wide political spectrum, at least until the current crisis.

Monetarism was being followed for the last three decades by politics in Europe and to some lesser degree in the U.S.A. since the Carter era. It is the basis for *Economic and Monetary Union of the EU* under the Maastricht Treaty. Alan Greenspan, the former

head of the United States Federal Reserve serving for almost 20 years under four presidents, was also regarded as monetarism-oriented, although monetarism was never practiced as stringent in the U.S. as in Germany, where the much higher share of government expenditures to the GDP constantly stimulates the demand allowing a more pure monetarism oriented central banking policy.

In essence however it is hard to find out what the monetarist school actually comprises because it is not as clearly defined as for example roman catholicism, and you will find even contradicting definitions or assumptions under the label of monetarism. For example, some monetarists say that the velocity of money circulation is constant and predictable, while other treat it as a variable that needs to be controlled, so arguing against monetarism by pointing out flawed assumptions is impossible because you will always find some monetarist or new classical economist that probably agrees with you.

But all this is not hard science, it is more like philosophy or religion combined with math, and you can believe in it or not, but the theories are almost impossible to falsify using scientific methods because none of the theories have ever been applied in its pure form, many variables can not be properly observed or measured, and for every rule there seems to be an exception.

Both Monetarists and New Classical thinkers argue against active monetary or fiscal policy on the grounds that they are useless and can only bring short relief, but cause more harm in the long run.

In this respect monetarism it is quite similar to homeopathy: In the 19th century homeopathy had great success in the treatment of patients because the remedies the doctors had at that point were were often more harmful to the patient than just giving placebos and keeping up the spirit of the patient.

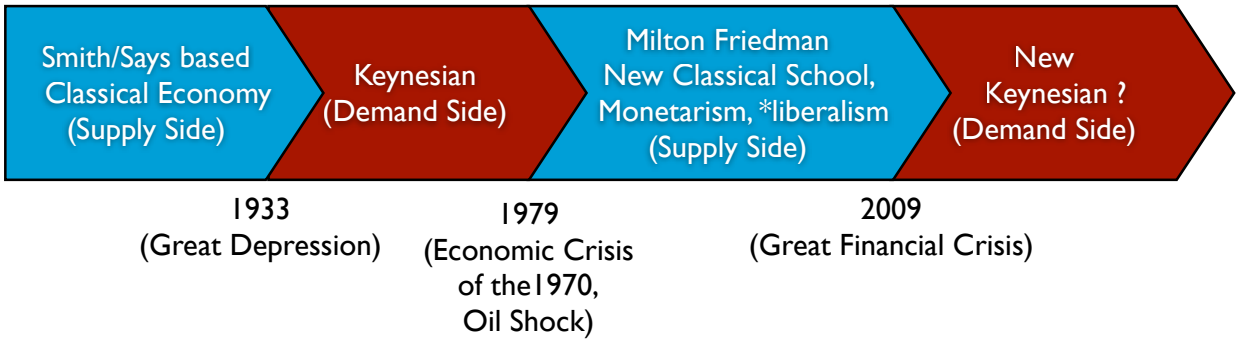
Monetarism may be successful for the same reasons.

That obviously both camps, demand- and supply-side economics are somehow flawed has also been observed by economists when trying to apply the theories to the whole economy did not produce the expected results. There is however disagreement about where the problems lie; proponents of failed theories argue they have not been properly applied and we have to try a harder and more pure form, while opponents typically argue that the theory itself is the problem.

The 2008 Nobel Laureate in Economics, Paul Krugman, has stated that the current state-of-art in economics shows that every market is potentially different, and that it is necessary to decide case by case whether a market will benefit or suffer from more or less regulation and government intervention. But this is obviously too complex to sell it to the voter, or even the average politician. Politics require simple answers to complex problems. So what we will see now is swinging back to demand side politics, with the German “Abwrackprämie” being a prominent example, repeating the errors of the 1970s. For the Obama era, there is talk that the “new” economic policy will follow the so

called “New Keynesian” economics, not to confuse with “Post Keynesian” or Neo-Keynesian” economics.

Here is the simplified timeline of the favored economic policies of the last century:



It seems that every 30-40 years a heavy crisis hits the U.S. economy and subsequently the world economy that is severe enough to change the prevalent economic policy.

However, it seems to me that Germany and the Scandinavian countries were following a very successful economic policy closer to a middle path, although Germany did move a bit too much towards the U.S. role model in the last decades. That the U.S. economy and political system is suboptimal can be seen just by looking at the poor state of the public infrastructure, the shacks the americans call a house, and the trash cans americans call a car. In the United States, many roads and bridges are in a similar state like in communist eastern Germany before the reunification, most houses are built from cardboard, and most cars built in the U.S. are so bad that even americans don’t want to buy them any more, let alone people in other countries. And a state where the roads, cars and houses suck is a failure, no matter how large the fridges are or how many cars a household can afford.

I my mind, a modern social and ecological market economy would be the best model for the world, but the U.S.A., China and India will have a long way if they want to get there.

The Path of Debt

Now we are prepared to look into the interesting abyss of the inner workings of our financial system. We saw that money is a simple thing and flows easily from hand to hand. It is the most liquid asset you can own. But what happens to newly created anti-money, the debt? Does is stay at it's birthplace in the bank where the money was created? Obviously not, otherwise this chapter would be short and boring and we would never experience this interesting current financial crisis. Debt is much more interesting than money, and we will see why.

The main difference between money and debt is that debt obviously has two sides: A positive and a negative side. Most people associate debt with its negative side: the obligation to pay it back. For a bank in the role as creditor, debt is actually a valuable asset,

and most people also hold the positive side of debt: Basically all their invested savings, life insurances and pensions are in fact positive debt.

The other positive aspect of debt is associated with the word *credit*, which literally means trust.

So creating debt by giving credit sounds like a great deal for everyone, and actually it is:

When I come to a bank, the bank creates money out of nothing and hands it over to me. After that, the bank owns a new asset, the positive side of the debt. And I walk away with the money, but I also own the negative side of the debt. Good for me, and even better for the bank. The only negative thing the bank holds is the credit risk, but it gets paid for it and has probably even secured collateral. So in theory and in practice, it is a good thing for everyone and the society when there is as much credit as possible, at least when the credit is justified and appropriate.

But let us further follow the path of debt. The bank could just keep the new debt in its books until it is fully repaid, but this would pose problems when very large amounts of money are needed because a lot of credible customers apply for a loan. It would also severely limit the amount of money a single bank would be willing to hand out to a single corporate client. In traditional banking, a number of banks would have probably formed a consortium and split the debt.

In modern banking, this seems to be too slow for the demands of turbo-capitalism. And finally, why keep something if we can sell it with profit? So what the bank today usually does with debt is to sell it, at least until 2008. And to ease the transaction and distribute risk, many small debts are bundled. This process is called *securitization*. It started in 1970 with U.S. mortgage loans and was applied to other asset classes starting in 1985, and at the end of the millennium it was being applied to all possible classes of debt and also became common practice in Europe.

Technically this is often done by transferring the debt into a new company founded only for the purpose of holding debt. Now, how is the debt sold and paid for? The new company, often called *Special Purpose Vehicle* or -*Entity*, buys the debt from the bank. But in order to raise the money to pay for the debt, the SPV issues *bonds*, which are basically a standardized form of debt contract. So the new SPV borrows money to buy the debt from the bank. This may also cause the debt to move "Off-Balance-Sheet", at least the bank's balance sheet. To make things more difficult to understand for mere mortals, new terminology is used for this debt. The debt is now called *bond*, the debtor becomes an *authorized issuer*, and the interest becomes the *coupon*. By this process the debt pool gets split and can be traded on so called *capital markets*, and terms of the bond contract can be very different from the underlying original debts, which can be a source of additional profit and risk, depending how the deal is *structured*.

Larger short term debts come in the form of so called *commercial papers*, *Treasury Bills* (T-Bills) or *Banker's Acceptances* and are traded on the *global money market*, not to

confuse with the *currency market*, where actual money ("currency") from one country is traded for other countries' money.

There are also two different ways debt is traded: *Over-the-Counter* or *OTC* means that it is a direct transaction between two parties. Bonds are usually traded OTC. The other way is *exchange trading*, where a neutral third party acts as a mediator to facilitate transaction between many partners, imposing rules and improving trust.

If all this already sounds confusing, brace for the next sections. The reason for confusion probably lies just in the many unfamiliar terms, but actually it is simple if we always keep in mind that there are still only three basic items: Money, debt and assets. Money is simple. It is just a number. An asset is everything that can be bought or sold for money ("converted into cash"), so almost everything in the world, tangible or intangible, can be an asset. This also includes money and debt. Looks like fun to apply set theory to this. Not much specific can be said about assets, they can be anything, as long as they can be *owned*. If you can not own it, you obviously can not sell or buy it.

Debt is slightly more specific, but it can be arbitrarily complex, given that it is actually a contract. A debt is often unique, but there are also thousands of different standardized types of debt “contracts". However, in essence all these contracts just specify at what time what amount of money under what circumstances has to be paid against these contracts, and what happens when the obligation is not met.

To sum it up: Using intermediary companies, every debt can be transformed into any other standardized or unique debt contract, and sold “over-the-counter” or on financial markets. Every financial market deals just with a very limited specialized subset of debt contracts, and also with different market participants like governments, banks and all types of companies.

Banks participate in all these types of markets, although not every bank participates in every market. The service of a bank is also to participate in these markets not just for their own business (*proprietary* or *prop trading*), but also to act on behalf of other companies or people that can not directly participate in a specific market. For their own purposes, banks aggregate, fuse, split, distribute and transform debt in various ways. So while the path of a specific debt is something that in theory must be traceable, the associated money stream and the credit risk is actually rerouted, mixed, split and aggregated multiple times so that the final holder of a debt is hardly able to really trace it back to the original contract.

Derivatives

Other *financial instruments* for debt transformation are so called *derivatives*, traded on the *derivative markets*. Derivatives are also contracts, and their purpose is to hedge against risks that arise from changes in the market price of any traded asset, be it currency, debt, stocks or commodities like metals or oil. One interesting fact of debt is that the value of a debt will also vary over time. The value of a debt mainly depends on the difference between the agreed interest rate and the current interest rate for comparable

new debt and on the credit risk, but when debt is traded on a market, the price will be determined by demand and supply.

Derivatives is a generic term for a large variety of financial instruments that separate, concentrate, transfer or distribute risk. Two simple forms are *futures* and *forwards*, which are contracts that specify a future price for something. The main difference between futures and forwards is that forwards are not due before the settlement date, while futures are balanced daily, involving a potential daily money flow between the two parties, to maintain the so called *margin*. So futures have much less credit risk than forwards, where the guaranteeing party might have to pay a very large amount on the settlement date.

Many types of derivatives are called *swaps*. A swap is basically a re-routing and reshaping of money streams. Many debts are not re-payed in one sum, but in tiny pieces over the time, creating a money stream. However, this money stream can vary, e.g. when a contract specifies a variable interest rate, or results from a package of small debts where some of the debts can default, or is a stream of different currency where the exchange rate varies. To smooth things out, you can swap a variable interest rate for a fixed interest rate stream, or swap a stream of dollars with a stream of euros, or both at the same time - the only thing you need are two parties agreeing on the terms.

A category of derivatives is called *credit derivatives*, among them also some swaps. Credit derivatives derive their value from an underlying credit. They can be used to split off the credit risk from the actual debt, and used as an insurance. There are different credit risks you can insure against: bankruptcy, obligation default or acceleration, moratorium and even against a *restructuring* of the underlying debt. The euphemistic term *restructuring* in this context usually means to waive a part of the debt in order to avoid bankruptcy of the debtor and loose it all.

Both the notorious Credit Default Swaps (CDS) and Collateralized Debt Obligations (CDO) are credit derivates, and we will now look into them a bit deeper.

Collateralized Debt Obligations Illustrated

Among all those types of debt one became especially famous, the *Collateralized Debt Obligations*. A CDO is a quite clever invention, at least in theory it sounds quite sophisticated. A CDO typically is a kind of company, also called *Special Purpose Vehicle* (SPV), that transforms debt in a special way: It buys debt and hires rating agencies to divide it into three tranches of debt: risky high yield debt (equity tranche), medium ("mezzanine") risk debt with medium yield, and low risk debt with low yield (senior tranche). This correlates pretty well with the standard way MBAs judge magnitude: high, medium, low. Very simple. The surprising idea now is *not* to simply blend them all together, but to give the customer also a choice between buying into high, medium and low tranches.

So if you buy into a CDO, you have the choice: high yield, high risk, medium yield, medium risk, and low yield, low risk. The crucial thing is: The buyer decides, and the decision is his: more yield or less risk. So when you read in the press that someone in-

vested into CDOs, this information is mostly useless without the information into what tranche the investment was, and whether it was *leveraged* or not. What that means we we will see later.

But there is one more thing, and this is where the CDO power comes from: When a loss occurs, it is first taken from the high yield equity tranche, then from the mezzanine, and only when both other tranches' money is destroyed, the low risk senior tranche will suffer. A CDO in fact acts as a risk/yield amplifier. The yield and risk of the equity tranche gets higher, and the risk of the low risk senior tranche gets lower.

Now what about the yield of the middle and low tranches? The math behind pricing CDOs suggests that the risk/yield ratio between the tranches is actually fair in theory, no matter into which tranche you buy. In order to market all tranches of a CDO, they all need to look appealing, so how is (was) a typical CDO actually structured and marketed? In the following example I combined information obtained from the U.S. federal reserve and some internal bank training documents.

As an investment banker marketing your new CDO, you first sell the mezzanine tranche, which is the easiest part. The mezzanine tranche is typically only 7% of the CDOs capital, so we do not have much of it. The yield is typically 3 percentage points higher than you can expect from U.S. or German treasury bonds, and the risk seems moderate because a long line of losers from the equity tranche is in front of you before you will start to suffer, which gives you a comforting feeling of security combined with very high, but not suspiciously high yield. Who could resist that?

Then you sell the super-secure stuff, the senior tranches. Although one might think that there would be high demand in super-safe papers, those who mainly want safety can just buy bonds from a major government. German and U.S. Bonds are considered to be without any measurable risk, there is no investment with less risk in this world. But extra low risk comes with low yield, and who wants to buy low yield papers? In the case of CDO senior tranches low yield means about plus 0.1% or 10 basis points above the interest rate of treasury bonds, which indeed sounds not very attractive to me. But there is a solution to make the yield higher. The bank, with a right to create money, can simply introduce a multiplier of 5x or 10x, the so called leverage. This means that if you invest 10 millions, the bank can easily create 90 millions as credit, which should lead to an interest that is 0,5-1% higher than treasury bonds. And the bank will guarantee it.

So where is the catch for the investor with these leveraged senior tranches? It is in the fine print: When things don't go well, the contract can and will be terminated by the bank, and the underlying assets can and will be immediately sold at market price, even if at loss. To never ever let that happen, *super senior tranches* were invented that sound to be so super secure that the risk seems very remote, and even this small risk was secured using another type of credit derivative, the *Credit Default Swap*, which we will look into later. Now we have a great product: Ultra safe leveraged super senior tranches with moderate, but still very attractive yield - who could resist that, when the risk of loss seems to be lower than the sky falling down or the next nuclear power station blowing up? In fact, the actual risk with highly leveraged senior tranches can be even higher

than the risk of the equity tranche, which is well known and was publicized by the U.S. treasury years ago, but it does not sound or look risky, and who could possibly say something against "leveraged super seniority"? To me, the math must be flawed, because the cost for “insuring” the debt should be even higher than just going with the uninsured CDO, eating away all the higher yield, so probably the insurers must have been screwed in this process by getting too little for the risk, and as the AIG trouble shows, this was indeed the case.

But back to our CDO tranche marketing. After selling the mezzanine and senior tranches, we are left with the equity tranche, a highly dangerous paper for every investor buying into it. But hey, no risk, no fun. And the promised fun looked like follows: Equity tranche investments fetched interest rates in the order of 10-20% above treasury bonds, doubling your investment in 3-5 years.

Now what about the risk?

It turns out, no surprise, that the expected loss of all tranches depends heavily on the economy: With the equity tranche, during a boom phase you cash in your 12-25% interest p.a., and the expected loss is in the 1 % region. In a normal economy, expect to lose 90% of your investment in the equity tranche. In a recession, you loose it all. 100% of the time.

However, selling the equity tranche is made easier by several means: First the composition of a CDO: The equity tranche is typically only 3% of the CDO size, so it is not such a high volume to sell.

Second, you can argue that only a small part of the whole investment should go into this high risk equity tranche, and even sell another, safe investment along with it. And you can sell an additional service: Strategic management by dynamic asset allocation, moving investments between different risk groups depending on performance monitoring. Sounds great, doesn’t it?

Now, while we know that buying into the high risk tranche is only a good idea when you expect a boom, what is the risk of the other tranches supposed to be?

Mezzanine tranches are supposed to be designed in a way that you can expect insignificant losses (below 1 %) during a normal economy, and loose 50-70% in a recession, while yielding about 3% higher interest than you can expect from U.S. or German treasury bonds. But with only 3% of the capital in the equity tranche, the line of losers in front of is not as long as you might think.

The senior tranches are supposed to be almost safe from loss even under recession, only about 0.1 % loss is expected. But this is only the case with "pure" senior tranches, not with leveraged ones.

Risk of CDOs Expected Losses of Investment Capital	Recession	Normal Economy	Boom
Senior Tranche (90%)	<0.1-1%	0%	0%
Mezzanine Tranche (7%)	50-70%	1%	<0.1%
Equity Tranche (3%)	100%	90%	1%

Sounds like a perfect fit: Boom, normal growth and recession are perfectly correlated with equity-, mezzanine- and senior tranches.

Btw, the mezzanine tranche would typically account for 7% of the capital in the CDO, while the majority of 90% is made up from “safe” AAA investments of the senior tranche. However, nothing will stop the bank from creating "atypical" CDOs, even CDOs with only one tranche, although this sounds like selling a tricycle with just one wheel.

Isn't this a great product? The investor can exactly choose what he wants, but the choice is limited down to three options. And for those who want more safety or more fun, we can cascade CDOs. The results are called CDO^2 or CDO^3 or CDO^n. Now you can supercharge your investments while still appearing reasonable.

The bank is also happy - it charges a fee upfront, and also fees for managing the CDO, which is actually a fund, and it can even sell additional products and services along in order to manage such a complex investment where the investor has to choose between three different alternatives.

But the really great thing is that a huge amount of new money is created in the process, and the banks can offload riskier debts from their books. This is not necessarily a bad thing: In a booming economy it allows to fund risky endeavors, which is good for society when taking a higher risk also pays better return, and in a boom it is justified and can be afforded.

Problems with CDOs

The main problem is that there was very little regulation involved with CDOs. They are a great instruments in theory, but it all depends on one crucial parameter: That the risks involved are correctly estimated and priced. The task of judging risks is done by rating agencies; they employ highly complex and sophisticated models to do so, but in the end it it is not pure math, it involves also human decisions in setting the thresholds.

Because the credit originator does not bear the long term risk and immediately profits, he has less incentive towards credit quality than mere loan volume, so in practice soon greed takes over, and ratings will be slightly biased towards the optimistic side, and the prospect to make profit influences the decision making of all participants, up until the point of corruption.

And corrupt they are, the rating agencies. Their models were flawed, some of them probably intentionally, so instead of using all their powerful math to allow informed decisions, they used it to "prove" that mixing toxic waste with piss yields medicinal water.

I suspected and got now confirmed that actually the "senior tranche", which was supposed to be made up of AAA debt would not have been rated AAA outside the CDO. So what the rating agencies and their models did was to turn mediocre debt into AAA senior tranche debt by securing it with even more risky debt in the other tranches, and additionally splitting off credit risk using Credit Default Swaps (CDS), which are explained later. And that the models and calculation were flawed can be seen at the current losses of AAA-rated senior tranches which are already in order of 10%, where the models predicted less than 1% even in a recession. But probably the models were made just for a theoretical “normal” recession, and not the one we are actually experiencing. It also seems to me that all those people responsible seem to actually *want this crisis to be as bad as possible* just to have an excuse why all their predictions were bullshit, and get bailed out by the government instead of bearing the responsibility for their bad decisions.

If they were just mixing good debt with bad, the problem could be solved in the long run by "unbundling" the CDOs, but when you sell nicely packaged shit as gold, removing the shit from the package does not raise the value, on the contrary: Now you can even smell the shit. CDOs per se are not a bad idea, they can be useful financial instruments when used responsibly, but what happened here was just fraud on an unprecedented scale, defrauding hundreds of billions from communities, pension funds and many other institutional investors who are normally not allowed to invest in risky debt. But once the rating agencies put their AAA rating on the shit, the path was clear to tap into the savings of a billion people around the world. This was probably the largest organized heist in human history, and those who committed it might even have a good chance to get away with it.

The rating agencies argue: Oops, we had some minor bugs in our models, but we fixed them, and it was the banks who handed out the debt and invented and sold the CDOs, so we are sorry, but not responsible.

The banks say: We are the victims, look how much we have lost, if we had known, we would have never done it, and the rating agencies said it was fine, so we are sorry, but shit happens. And the investors demanded investments with higher yield. No one forced them to buy CDOs.

And the investors say: We were screwed, you told us everything is safe and nothing could possibly go wrong.

And finally even some technical problems involving the handling of CDOs occurred: Because of poor documentation and bookkeeping, holders of CDOs ran into problems actually proving that they own debt and collateral. In many cases, the signed originals of the mortgage contracts simply were lost and could not be presented in court when they were required to foreclose mortgages.

Today, the once $2 Trillion market for CDOs is practically dead; it is unclear whether it will be ever resurrected. Many banks sold the left over Senior AAA tranches for prices between 8 and 30 cents per dollar nominal value to hedge funds and other investors willing to take the risk. This does not really correspond with the “less than 1% loss under recession” expectation for these tranches, but those buyers may have made a good deal in the long run when it turns out that the banks who sold the CDOs so cheap just have panicked.

The problem for the economy is that CDOs have been an important and widely used instrument for securitization, and all those who now accuse the banks of being tight with credit miss the point that the banks have just lost some important instruments they were using to make possible many of those loans of the last decade. And also many banks may have problems to hand out credits when they can no longer offload the risk to someone else. This forced return to “ancient” banking practices where banks kept their loans in their books seems to be painful for everyone.

Credit Default Swaps (CDS)

Another noteworthy financial instrument is the *Credit Default Swap*. At first it looks just like a normal insurance for credit risk, but what makes a CDS special is that you can insure debt you do not own. Yes, a CDS is nothing else than a bet that some company will not be able to pay back its debt in time. What makes the CDSs also dangerous is that in 2000 President Clinton signed a law that not only made CDSs legal, but also illegal to regulate them. As a consequence, CDSs became the most widely traded credit derivative with estimated 60 trillion dollars of CDS "insured" credit risk at the end of 2007.

Buying a CDS is a bit similar to short selling of stock because you also have a gain when some else experiences a loss, only that a CDS is related to the debt market, which dwarfs the stock market by almost an order of magnitude. Another problem of CDSs is that they are only traded OTC and there is no exchange trading that could provide some level of transparency, so no one knows what is actually out there. And because of all these unknown entanglements, there is the danger of a domino effect when a seller can not pay in case of a credit event. Also CDSs are part of many CDOs, creating a complex mess that won't be untangled anytime soon.

For many years however, CDSs were a nice source of income for many insurers, because bad “credit events” were rare (about 0.2% per year), and the huge amount of insured debt created a great premium income for insurers. The insurer AIG with 116.000

employes had small unit in Ireland with about 1000 people selling CDSs, and this small unit for several years contributed more to AIGs profit than the other 115.000 people in the group, and per employee income in this unit was 1 Mio. Dollars per year, totaling in over one billion of bonuses every year. So everyone was happy until the crisis came, when AIG turned out to have “insured” over 60 billion dollars of credit risk, which would have killed the company and many others if the U.S. government would not have bailed them out.

After looking at the path of debt and the world of debt trading, we will look into other financial dealings and mechanisms that did or did not appear in the mainstream press as being involved as potential culprits for the crisis.

However, we should always keep in mind that the shady world of debt trading, which is strangely unknown to people outside the field, is by far the largest area of global financial activity, about ten times as large as all stock trading in the world.

Short Selling

There are several ways how to make profit from falling asset prices: A futures contract, where you agree to sell an asset for the current price in the future, and you have a gain when on the *final settlement date* the actual price of the asset is lower. A similar thing is true for *put options*, only that your risk is different because the option holder can decide whether to exercise the option, which he won't when the price has gone up.

Another notorious and often criticized way of profiting from falling stock prices is the *short selling of stock*. This is something that was forbidden for large periods in the past, but has been subsequently regulated and permitted. It uses a kind of regulated "loophole" called stock lending. Originally intended to be a kind of last resort when a broker can not deliver a promised share to a buyer, it became a regular instrument with interesting market dynamics.

Stock lending works like follows: A broker sells stock, but instead of buying it he loans the stock from a third party, typically a bank or specialized stock lender. Because the lending bank does not want to be at risk of not getting it back, the investor must deposit the current value of the stock at the lending bank. At a later date, the investor will buy a share, return it to the bank and get the deposited money back. However, when the stock rises, the lender has to deposit more collateral because the lending bank does not want to carry any risk. When the price of the share falls, the broker has a gain. But owing stock when the price goes up can be an expensive endeavor and draw a lot of liquidity, because the lender has to match the current stock price with collateral.

However, stock lending is so attractive because at the time when the investor places the bet and loans the stock, it does not require much capital, if any at all because the investor immediately gets the money deposited as collateral back from the buyer of the stock, so the investor can do this with a minimum of own capital, potentially creating a large *leverage*.

The term *leverage* here just means multiplier, typically of both potential yield or loss.

There are some systemic problems with short selling of lent stock. First of all, it magically increases the supply of stock, because one lent share becomes actually two: One in the hand of the lending owner, who is still entitled to the dividend, and the other in the hand of the new owner to whom the share was sold, who will also receive dividend. As the company of course will pay only one dividend, the other must be *manufactured* by the lender, so investors will probably try to refrain from lending shares in times when dividend is paid.

The problem with this “manufactured” increase in the supply of stock is that it might cause the price of shares to drop, opening the doors for stock manipulation. Investors practicing massive short selling can drive the price of a stock down without investing own capital, and when other stock holders also start to sell because of the falling stock price, the goal is achieved and the short selling turns out profit

But this game is not a sure win, it can also backfire, because at a later point, when the shares are returned, the opposite effect turns in: The demand increases because the lender has to buy the shares back, driving the stock price up.

Now, when the short sellers miscalculate and overload the market by creating too much "virtual shares", and other real buyers join in because they regard the stock undervalued, the supply of real shares will become grossly insufficient when shares need to be bought to return them. This will drive the price up, and when there are too many “manufactured” shares out there, the supply of real shares in the market may be grossly insufficient to meet the demand. Now when the price goes up, pressure mounts on the borrowers to return the shares as soon as possible because they have to put in more collateral as the price rises, which further increases the demand for real shares, driving the stock price to insane heights. This effect is called a *short squeeze*, and this is what has happened twice with the Volkswagen shares in the wake of the Lehman bankruptcy.

What probably happened: Lehman Brothers was a major shares lender, and some hedge funds did loan many Volkswagen shares from Lehman and sold them short, but as a part of the liquidation proceedings these shares had to be returned and were no longer available for further lending, so the hedge funds suddenly had to buy a large number of shares in a very short time. Normally buying back shares is distributed over longer periods of time, weeks or even months, but in this case there was pressure to do it in a short time. At the same time Porsche, who was interested to expand its share in Volkswagen was another potent buyer, created additional demand for Volkswagen shares and drove prices up.

So the hedge funds had no other choice than to buy at any price to get out, because when staying in they would have to come up with large amounts of collateral ("margin calls") they probably did not have, potentially facing bankruptcy. It is possible that at some point Porsche stepped in and even sold Volkswagen shares for a high price, probably drawing a lot of money out of the pockets of hedge funds, in fact practicing short selling them self.

The funny thing is what happened one month after the squeeze: Everyone thought the squeeze was over, but the VW stock price was still very high compared to other automotive shares that suffered heavy losses in the wake of the Lehman bankruptcy turbulence. Because the VW shares seemed overvalued, many investors regarded it as a good opportunity to sell VW stock short, and did exactly that extensively.

But then Porsche disclosed its positions in the market, holding a staggering amount of options on 31.5% of Volkswagen preferred stock. In the wake of this announcement the price of Volkswagen shares went through the roof gaining 600%, and shares with a value of almost 4 billion euros were traded on one day in Frankfurt alone, ten times the amount of shares of any other DAX company traded on that day. Some parties must have earned a lot of money on that day, while others must have been drained of a lot of cash, among them many hedge funds. Among those who lost a fortune in this game was Adolf Merckle, head of the 30 billion Euro revenue “Merckle Unternehmensgruppe”, who tried to make good for speculation losses he already experienced during the downturn of the economy. He lost several hundred million Euros and killed himself on January the 5th 2009.

Hedge Funds

Everyone has heard about those evil hedge funds that were supposed to destroy the world economy before credit derivatives assumed this role. Hedge funds are not yet the culprits for the current crisis, but their role currently is not exactly a stabilizing one. They were probably the reason for the extreme volatility of the major stock markets in the wake of the Lehmann collapse. During several weeks, major stock indices like Dow and DAX were jumping up and down in the order of 5-10% per day, a behavior that has never been observed before.

Now, what exactly is a hedge fund? A fund is usually a company that collects money from smaller investors and hires professionals to invest the money. Normal investment funds are operating under a lot of regulation because everyone can invest money in regular investment funds.

Hedge Funds are basically *unregulated funds for rich people*. Over 90% of the hedge funds are located in tax havens like Cayman Island, Bermudas and british tax havens like Virgin Islands, Isle of Man and Mauritius.

If you want to invest in a hedge fund, you have to own at least a million dollars, and sign a contract where you promise that losing all of your investment won't get you into trouble.

Originally hedge funds were supposed to *hedge* risk, but today the only thing that hedge funds have in common is that the fund managers get a large pie of the cake, typically between 20-50% of the performance. A general rule is 2/20: The fund managers get 2% management fee on the invested money, and 20% of the gains as performance fee. It has been joked that "a hedge fund is a remuneration structure, not an investment strategy".

Over the last years, leading hedge fund managers regularly earned up to 3 billion dollars per year. However, the best hedge funds also regularly have reached 50% annual return on investment. On the other hand, many hedge funds did not manage to outperform the market or have even produced heavy losses.

Now what do hedge funds do to be so potentially successful? They do all those things that normal funds are not allowed to do, they don't have to publicly report what they are doing and they often use high leverage in their investments. They use the fund's money to borrow 10 to 50 times the investment capital, meaning that a decline of asset prices in the range of 2-10% can wipe out the whole fund. Due to their unregulated secretive nature and the complexity of their actions they are also ideally suited to pursue strategies on the border of legality. They are also known for heavy use of short selling, which means betting on falling asset prices. But what "officially" makes them exceptional is that they suppose to do very clever "cherry-picking" in the markets by constructing highly complex bets on the performance of specific assets, and they usually focus on highly liquid assets so that they can act very quickly when conditions change.

An example of classic hedging is so called *pair trading*. The funds' investment managers pick a stock of two specific companies that operate in a highly volatile market, at the moment, lets say banking. Now they have some good information that bank A will fare much better than bank B, and so they structure their investment that they will profit when the difference of the value between bank A and bank B increases. If this is the case, they will make money even when both bank shares fall, as long as bank B falls more than bank A. Or even when both bank shares go up, as long as bank A goes up more than bank B, there is still profit.

How do they construct such a bet? They simply buy shares of bank A, *going long*, and loan the same amount of shares of bank B and sell them short. The same thing can be of course done using using groups of shares on either or both sides, betting the performance of one company against an index, or betting pharma against the IT-business, companies with square blue logos with short names against those with round reddish logos with long names, or whatever selection of companies you might come up with.

There are many other types of bets, for example *binaries*, where you can bet that some price will or will not reach an upper or lower threshold; then you will either get an agreed sum or get nothing.

And as at the roulette table, you can also bet on red and black at the same time, called *selling short against the box*, holding a long and short position on the same asset, actually "locking" the value of an asset. This is supposed to hide rather than to avoid a taxable event, which would be obvious when selling assets with profit, but when the IRS finds out, you are in trouble.

Hedge funds are the fast elite of investment companies, and they try out highly complex, unproven and high-powered strategies. To dive even deeper into the world of hedge funds, we will have a look at some of their greatest buzzwords.

Alpha and Beta

Alpha is the holy grail of investment, a buzzword in the investment community like "Web 2.0" in the internet community. Alpha is a cult. Conferences were named like "Portable Alpha Asia 2007" , "Tapping into Alpha", "Absolute Return/Alpha Conference", and many hedge funds carry it in their name, like "Goldman & Sachs Alpha Hedge Fund", "SALUS ALPHA", "Absolute Alpha", and because more alpha sounds better, "Double Alpha".

But what the fuck is alpha? It is surely not the greek beer or the microprocessor, and neither the transparency channel on my graphics card. Wikipedia says: "*Alpha is a risk-adjusted measure of the so-called active return on an investment.*" and "*The alpha coefficient (α_i) is a parameter in the capital asset pricing model (CAPM). It is the intercept of the Security Characteristic Line (SCL)*".

Don't be bothered if you don't understand the lingo, even most fund managers probably don't know what they are talking about. The CAP-model is a model to calculate an adequate price for investment risk. It was introduced in the early 1960s, and a Nobel Prize was handed out for this contribution to economics. The risk is determined statistically by retrospectively analyzing the history of gains and losses of specific investments and portfolios. The CAPM has been heavily criticized from many sides not properly reflecting investment reality, and makes many assumptions that are known not to be true. Nevertheless it is the centerpiece of modern portfolio theory.

It is easier to explain alpha if we start with *beta*. Beta is a measure of how a specific return on investment is correlated to the whole market. It is 1 when your investment is perfectly correlated with the market. The market in this case is an arbitrarily chosen basket of investments, like the Dow Jones, S&P 500 or the DAX, but it could also be just a basket of pharma, banking or automotive shares, or any other securities. So when a stock moves exactly proportionally to the chosen index its correlation or beta is 1. If it is completely independent from the market, beta is 0. If it moves opposite to the market, beta is negative. For example, Procter & Gamble who sell basically soap has little market correlation and thus a beta closer to 0, and companies specialized on bankruptcies and foreclosures should have a negative beta compared to the broad economy.

This means that when your investment has high beta, you will gain when the market moves up, and you loose when the market goes down. Beta is not bad, though. In the long run, the return on investment in DAX or Dow has been 8-10% per year on a thirty to fifty year average. However, when you enter or exit the market at a bad time, you might lose.

But a clever investor does not want to lose when the market goes down. He wants absolute return under any circumstances, no matter, if the market goes up or down. And here comes alpha. Alpha is a measure of how risk relates to return. An alpha of 0 means that your investment brings the adequate return for the risk you have taken, in relation to the whole return and the whole risk of the basket.

So for example, if you invest in DAX index papers related to the DAX, your beta is 1 and your alpha is 0. A positive alpha means that your return was higher than the risk you took, and a negative alpha means that you earned too little for the risk. This has nothing to do with the absolute return, even if you got 20% return, alpha might be negative because risk was so high that you should have gotten 50% because you invested into a highly leveraged international tourism fund investing in Afghanistan, Iraq, Sudan and Somalia.

Now, a fund promising high alpha means that you get more return than would have been "fair". The thing is, the total amount of alpha in the world is exactly 0. So when someone gets positive alpha returns on his investment, someone else will get negative alpha. Alpha is a zero sum game. When a hedge fund promises you "Absolute Alpha", it means the investment is supposed to have high alpha and close to zero beta. You get more return than you deserve, and you get it no matter what the market does. This is the ultimate dream of the investor.

So how can alpha be achieved? There are basically only two sources for alpha: Security selection and timing. So in theory, it can be achieved, but it is very hard to find out whether a fund really has a strategy that delivers it. And as every fund is seeking it, on average half of them will deliver a negative alpha.

In addition, seeking alpha is expensive, especially when hiring hedge funds. Remember 2/20? On the other hand, just living with beta and zero alpha is not that bad, and beta is practically free to get. Just buy index funds.

Another problem is that even retrospectively it is almost impossible to find out whether a given fund really has delivered alpha, and how much beta is in the strategy.

A strategy containing beta is especially a problem for hedge funds, because due to high leverage, when their strategy yields too much beta, it might wipe out the fund when the market behaves unexpectedly.

So while alpha and beta can be computed through statistic correlation, you will probably know it too late what a strategy really produces. And with 12000 hedge funds some of them will have a great track record even when their strategy would be just throwing dice.

Martingale

This wonderful word is the name of stochastic (random) process with special properties, and martingales are also used in the analysis of investment strategies. Martingales got the name from a gambling strategy used in coin tossing or roulette, that looks at first glance like a sure way to win. The strategy is simple: If you I lose, you double your bet. At least, with a chance of 50% with each coin toss, you will win sooner or later. The problem in practice is, that you will run out of money easier than you think. On a roulette table, it might happen several times in an evening that you encounter ten or more red or black numbers in sequence, and this means that you have to be prepared to bet thousand times the original bet, and when you run out of money or into the casinos limit, you

lose big time. When you encounter ten red numbers in sequence, the probability that another ten red numbers will follow is not different from the time when the sequence started, something many people usually do not believe when frantically starting to bet against the sequence when they see that ten reds have occurred on the table. There are tales of dramatic losses that happened on Monaco's roulette tables on such occasions.

Some of the strategies of hedge funds seem to have similar properties. They work quite well as long as the market fluctuates within certain bounds, which seem to be set wide enough that in practice the manager will get out of the game before things get too bad.

But sometimes, although it is very improbable and may not have ever happened before, the market will move out of bounds too fast. And that's the point when probability bites back: with the usual high leverage and other market participants running a similar strategy, things tend to blow up in your face. And many of the new innovative strategies employed especially by hedge funds did not yet pass the test of time, so even if they may have worked for ten years, there is no guarantee that they will survive tomorrow.

So I expect that within the next months, the death toll among hedge fonds will be high. We might even get to the point when they bring the system completely down.

On the other hand, the current situation with highly volatile markets is the ideal playground for hedge funds. If some of them are really good, now would be the time when they can make the profit of a lifetime, not to be measured in billions, but trillions. But this might as well break the bank.

Carry Trade

Carry Trade is a kind of financial trading in order to exploit differences in interest rates in different currencies. Japan for example had its basic interest rates to 0% for some time, and the result was that people were borrowing Yen, converting them to dollars and investing them in the U.S. or New Zealand. The problem is twofold: The reason why Japan lowered the interest rate was to stimulate japanese economy, and carry trade effectively causes the opposite, draining money from the country. This means that in practice a low interest rate stimulation must be coordinated between all countries in world, otherwise carry traders will exploit it. The other problem is that carry trade puts a heavy strain on currencies. New Zealand ran into this problem. When the carry traders started there, the value of their currency and the prices went up fast, creating problems for tourism and export. When the carry traders moved on, the New Zealand Dollar crashed by more than 50%, creating problems for consumers in the country, and heavy losses for the traders that got out late. The U.S. did pass some legislation putting extra taxes on carry trade that reduced yen carry trade for a while, but this was not sustainable. The only answer to carry trade is probably to coordinate interest rates on a global level, but the egoism of countries stands in the way here, and also the same interest rate may not be appropriate for different economies, we can see the problem in the eurozone.

Money Revisited

After the tour through the economic universe we are prepared to revisit the topic of money. We have seen that credit money dwarfs every other type of money, and should be ready to complete our understanding what money actually is.

The metal theory of money implies a specific view on our economy and our world. Under this theory,

- Money represents something tangible that has value, for example Gold, Real Estate, goods or factories.
- The economy is seen as a system of production, exchange, distribution, and consumption of goods and services, and money is primarily a medium of payment and exchange and storage of value

Under the debt or credit theory of money,

- Money is mainly a unit of account for mutual trust, risk and decision-making power
- The economy is seen as a system of distributed decision making for allocation of resources and distribution of risk

The “Metal Theory” is not completely false, but it can not be true because otherwise there would be no financial crisis. This ancient theory of money and our economy in my mind covers only about 10% of our reality.

Just ask yourself: How much cash do you withdraw and spend every month, and what percentage is that compared to the money you spend every month? In my case, my family spends between 10-20% of money as cash, but only because I do use credit cards only when absolutely necessary. Other people might even spend less than 5% of their income in cash.

The rest of my income is distributed as virtual money streams. Paying for mortgage credit, insurances, pensions, energy, telecommunication and many other regular payments I have to made. Only about 25% of my income are really “disposable” in a way that I make an individual decision to spend it or not, but this includes also spending for food, clothing and gasoline that can be deferred, but in fact has to be spent anyway sooner or later.

So about 90% of the money I spend is a predetermined money flow, and while I get something in exchange, many things are as abstract as a pension or insurance, and most payments I have to make because of decisions in the past, and the payments will be made until I make a new decision, for example buying or selling real estate, a decision most people make once or twice in a lifetime, and rarely more often than once in a decade.

The point is, that the “metal theory of money” assumes that I make economic decisions all time making the market to work, establishing prices by creating demand or not at a

specific price of goods. And while this happens occasionally, it is more the exception than the rule.

In general, for 80% of my spending I make a few long lasting decisions whether to establish a new money stream or terminate an old one.

So even “microeconomics“ today is 80-90% about money streams, and not about small transactions involving the exchange of money for goods and services. The important difference is that under these circumstances money does feel different and is perceived more a as unit of account, and less like a medium of exchange.

You do not feel the individual loss or gain, but you mainly watch the level of your account at the end of the month. Your bank account is a kind of reservoir, with inflow and outflow, but you only feel the level when it runs dry.

Individual economic behavior amounts to regulate the inflow and outflow of money with a few important and rare decisions. I don’t think that mainstream economics has incorporated this important fact into their models yet, although I am sure that many young economists are aware of this fact. And this is also they way most businesses operate and treat money.

Under all these circumstances it is hard for me to understand how the metal theory can be regarded as the prevailing one. The metal theory is simple and intuitive, but it has no explanatory power and does not reflect the reality of the 21st century. Maybe it is because many economists and politicians would rather live in the 19th century and for them it is just a matter of avoiding cognitive dissonance.

However, when we accept the credit or debt theory as properly reflecting reality, money at its core becomes a very simple thing, and we must ask ourselves how it has come that that such a simple fact has been occluded from our view.

We have seen that the following equation is true:

Money + Debt = 0

which transforms into:

Money = - Debt

Now we have also seen that Debt is not the same thing as money, it has two sides, a positive and a negative one; when we now keep calling the negative side of debt just debt, but try to find a more appropriate word for the positive side of debt, it would be *Credit* or *Trust*, just derived from the word we call the holder of the positive side of debt, *Creditor* or *Truster*.

Now, putting things together, we get:

Credit = Trust = -Debt

and replacing “minus Debt” for Money we get:

Money = Trust

As stupid as it sounds, it really took me the steps described above to discover this simple fact. The story could end here, with a nice, simple and enlightening insight, but comparing trust and money, we get the feeling that something does not fit yet. Money was supposed to be just a number, a unit of account, but trust, like debt, involves two parties. So either money is not really the same thing as trust, or when we accept the fact that it is the same, and we own money, where is the second party? In what do we trust? Whom do we trust? The U.S. dollar says “In God we Trust”, but this is there because it is the official motto of the United States. And God is hardly a meaningful counter-party in financial transactions.

So what is the counter-party we trust in guaranteeing the value of our money? Technically it is the community of all debtors. So who is the community of debtors? The government in most countries is the debtor #1, which means actually the community of tax payers, at least as long as the government is able to collect the tax. The U.S. public debt amounts to roughly 11 trillion U.S. dollars, about 60% of the GDP, which is a typical rate for most first world countries, who have public debt in the range of 40-65% of their GDP. Notable exceptions outside this range are Italy with 104% and Japan with over 170%. Only Denmark (26%) and Luxembourg (6.4%) are well below this range.

Most former eastern bloc countries also have a comparably low debt, Russia for example only 6%.

But let us look at the Situation in the U.S.: Public debt amounts 11 trillion, M3 money supply 14.5 trillion. Does that mean that 75% of the U.S. money supply are backed by government debt? That would be one way to see it, but it does not mean that the government holds 75% of all debt. The reason is that debt creation does not necessarily involve money creation, because for example debt between private parties will not create new money.

So what about our nice equation above we started with, Money + Debt = 0? It seems that this equation can not be true for the sum of all debt and all money in our financial universe. We have in fact two different types of debt: Debt with associated money creation, lets call it Debt1, and debt without money creation, which we call Debt0, so for our financial universe the equations would be:

Debt = Debt1 + Debt0

Debt1 + Money = 0

Debt0 > 0

Debt0 > Debt1 + Money

Debt0 - Debt1 > Money

-(Debt0 + Debt1) > Money

-Debt > Money

Credit > Money

Trust > Money

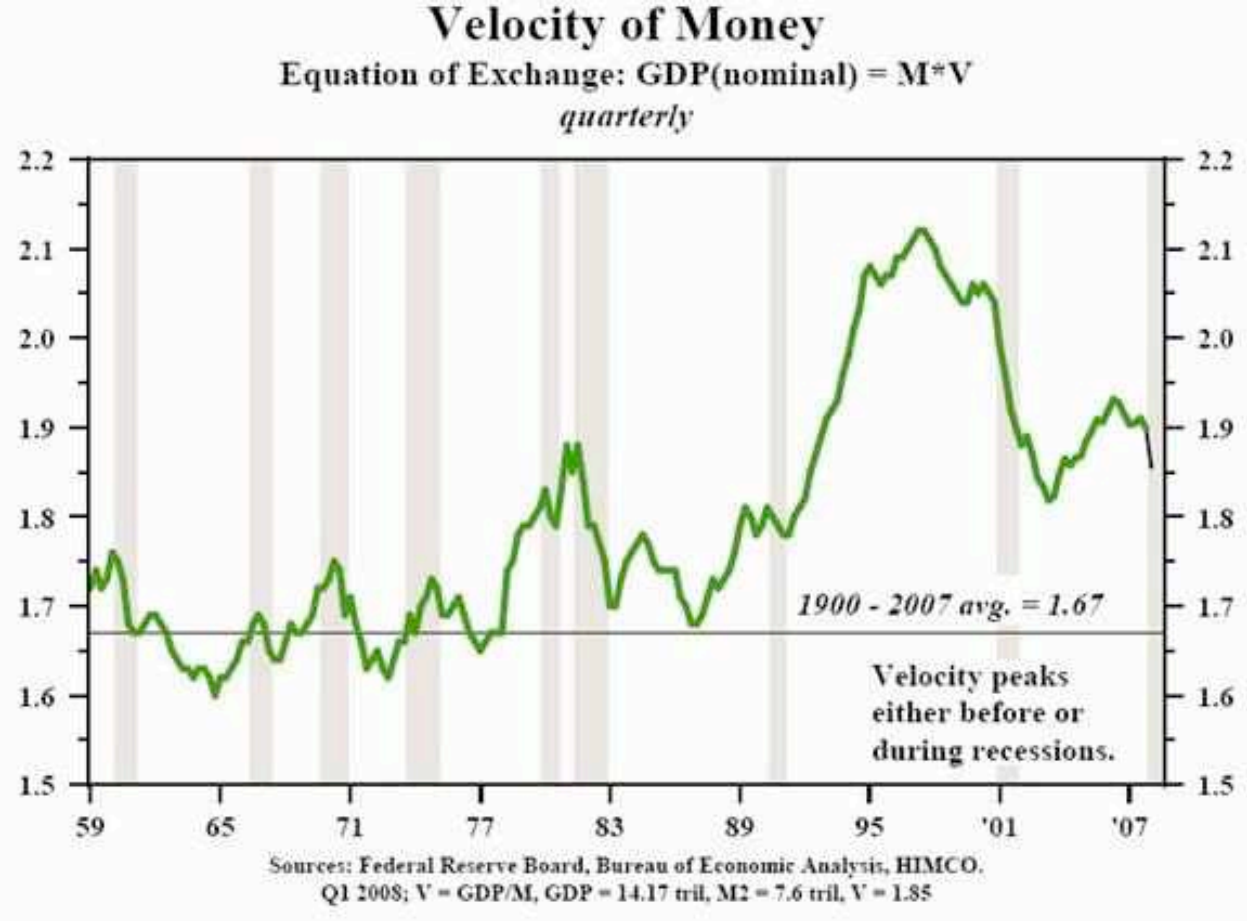
This unsurprising result just formally confirms the fact that there is more credit and debt in the world than money. But how much more?

We already had the current U.S. public debt amounting to currently 11 trillion. The numbers for corporate bonds amounted to 35 trillion in 2005, about twice the amount of all U.S. corporate equity which was to 19 trillion at the same time; current numbers are difficult to get. Outstanding mortgage debt is about 15 trillion. Outstanding consumer credit "only" 2.6 trillion. Adding that up, we get about at least 65 trillion dollars of outstanding debt in the United States, about 4-5 times the M3 money supply. However, this includes debt that appears multiple times because it was resold as "securitized" debt, but legally a securitization creates debt that is a debt on its own because as we have seen, the SPE is a company that borrows the money to buy the original debt.

Now, what does it mean that we have many times as much debt as money? Not much, because money *circulates* and can be used multiple times, while debt typically just *revolves*, which means that a lot of debt on its maturity date is paid back with a new credit, with potentially new conditions. Here again comes the aspect of time, and we finally need to shed more light on some properties of money regarding time.

Velocity of Money

As we know, money circulates in the economy, which means that given a long enough period of time, the same money changes hands multiple times, facilitating multiple exchanges of goods. At first glance it seems difficult to determine how fast money circulates, but the calculation for a whole economy is actually quite easy: You just divide the Gross Domestic Product in a given period by the money supply M2. The long term average in the U.S. is about 1.67 per year.



The concept of the velocity of money plays an important role in mainstream economics, and is a variable in the *equation of exchange* and the *Quantity Theory of Money*. This equation is:

(Money Supply) * (Velocity of Money) = (Price Level) * (Index of Expenditures)

The *Index of Expenditures* is a kind of "real value" of exchanged goods and services, based on the quantity of what is exchanged, like tons of wheat, barrels of oil or work hours. The equation was stated by John Stuart Mill in 1848. Mill was a British philosopher and political economist, and his "*Principles of Political Economy*" was *the* economics textbook in the mid 19th century.

For Milton Friedmann's "New Classical School" and Monetarism the Quantity Theory is also an important basis, and it is used to explain the process of inflation.

The theory says that during a recession, the velocity of money slows down, causing a "shortage" of money. This is usually countered by an expansion of the money supply to keep the left side of the equation in balance. However, when the velocity picks up speed after the recession is over, excess money is in the system, causing inflation.

The dangerous property of inflation is that it can easily turn into a self-amplifying system and even run away, a process called hyperinflation. There are different theories about this, whether it is the increase in money supply that makes the people lose faith in money, or whether the loss of faith accelerates the velocity, but no matter what the root cause is, once the people believe that money will lose its value fast, the try to spend it as fast as possible. Hyperinflation is often associated with war, civil upheaval and heavy economic depression, either as a cause or consequence of hyperinflation.

Usually drastic measures are required to stop this process, often worsening the economic depression, and it is a very traumatic experience for the affected region.

In Germany it happened twice in the 20th century, and this is the reason why the German Bundesbank was the first to embrace monetarism, and also its successor, the European central bank sees its primary goal in fighting inflation.

Hyperinflation is a more common phenomenon that we think; even if we put aside the hyperinflation that occurred in many countries in the wake of the world wars, it happened in Argentina (1975-1991), Belarus (1994-2002), Bolivia (1984-1986), Bosnia-Herzegovina (1993), Brazil (1986-1994), Bulgaria (1996), Chile (1971-1981), Georgia (1994), Israel (1971-1985), Krajina (1993), Madagascar (2004), Mozambique (1977-1992), Nicaragua (1987-1990), Peru (1988-1990), Poland (1989-1991), Romania (1998-2005), the Russian Federation (1993-1994), Turkey (1990-2005), Ukraine (1993-1995), Yugoslavia (1990-1994), Zaire/Republic of Congo (1989-1996) and Zimbabwe, the current world leader in inflation, who has in January 2009 introduced a $100 trillion bill and has an inflation rate of 80 billion percent per month, with prices doubling every 24 hours.

Could such a thing happen again in the Eurozone or the United States, where the last hyperinflation was during the revolutionary war, and later during the U.S. civil war with the Confederate States of America Dollar?

No one can say that for sure. But as we can see with the examples above it seems to depend very heavily on the authority of the government and the trust people have into the stability of their political system. Unless there would be a civil war or political revolution in these countries, we will be probably spared from hyperinflation.

However, we might see increased inflation as a consequence of the current bailout policy, but even this will be stay very probably within bounds. It is more probable that at one point the governments will not be able to sustain the bailout and demand-side policy and central banks will be forced to limit the money supply to counter inflation, which might throw us even deeper into depression before the situation improves.

Another possible outcome would be that the governments will intentionally drive the economy through a hyperinflation and into a monetary reform to get rid of excessive debt and obligations they have accumulated, but this would be an extremely desperate move, and for the United States this would very probably be the end of the U.S. Dollar as world reserve currency and their role as superpower.

In Europe to make this happen would also require major changes of the treaty for the monetary union, which is very unlikely. In Germany the trauma of two monetary reforms is still very present, and no drastic changes in monetary policy can be expected. Also Germany would not be able to get rid of most obligations because the pension and social insurance system are not based on investment capital, but direct apportionment of the payments of the insured.

In the United States however, in theory the pension funds and their obligations could be wiped out, but I doubt any government would survive that without stepping in, and to my knowledge there is even legislation in place that would requires that, which we might see soon for example when the General Motors pension funds will falter. However, the United States could get rid of most of their foreign debt, but that would also mean that they would have trouble for a very long time to attract any foreign capital, which has been an important factor in their prosperity for a long time.

All these things however might happen when we run into the really big economic crisis of the 21st century which will hit us some decades in the future when we run out of oil and do not prepare for that in time, which is highly probable because of another property of money.

Time Value of Money

The concept of the Time Value of Money is based on the assumption that having one million dollars today is better than having one million next year.

The reason is obvious: With one million today, I can build or buy a house now, and don't have to spend the winter freezing and sleeping under the bridge or in the woods.

Or I can rent out the house and have a nice income. Or buy a fishing boat and have a year worth of catch and my family does not have to die of starvation, or I can buy a factory and have one year of profit more, compared to waiting one year before I can use the money.

Or I might not even get to enjoy the million in a year because I am dead, or the million evaporates because those who I am supposed to get it from go bankrupt.

And there is another issue: Because of inflation, I can probably buy more stuff for a million today than I will get in one year.

All these three factors together are the justification for charging an interest when loaning out money: The utility of money (opportunity costs), the possibility of not getting it back (credit risk), and the decline of its value must be compensated (inflation), otherwise there is no economic reason to loan out money.

In fact there may be many other reasons to make a loan, but these lie outside this basic economic theory.

In the past many religions regarded time as a property of god, and charging money for something that belongs to god was regarded as sin. Another moral reason was that in medieval times borrowing was uncommon and happened mostly as a result of exigencies like crop failures or conflagrations, and it was seen as immoral to benefit from someone else's misfortune.

But since the renaissance people became more mobile and engaged in commerce and entrepreneurship, so money became also a mean of business and production and a merchandise itself, which changed the view on the morality of interest.

The idea of the time value of money has been first developed by spanish theologians in the 16th century, known as the *School of Salamanca*, where a lot of groundbreaking intellectual reformation of the roman catholicism was done. They for example reformulated the concept of natural law and derived that every human has the same rights to life and liberty because all humans share the same nature, and that there are not only limits to the legitimate power of governments, but government itself is a consensus of free wills and is only entitled by a temporary transfer of the people's divine sovereignty to the ruler. These guys practically came up with an intellectual foundation for the modern understanding of democracy where everyone has the same rights, unlike Greek and Roman democracy, where slaves, other races and non-citizens could not vote. They also invented the concept of just war, outlawing expansionist wars, wars of pillage and wars to convert infidels. These theologians were way ahead of their time, and in some respects our modern society still does not live up to their philosophy,

I am stating all this because I think it is important to put the question about the morality of interest into some context. Today, there are still people who hold on to the ancient thinking that taking interest is immoral and we all would be better off having an economic system with outlawed interest like under islamic law.

But today even all islamic banks of any significance charge interest in some form. There are however some interesting concepts in islamic banking regarding the share of risk and profit between creditor and debtor, and as islamic banking experiences extraordinary growth rates, western bankers would be well advised to look into some of these principles as an interesting opportunity for creating new and possibly sustainable credit products.

However, it seems to me that all these principles in islamic banking are mainly ways to find loopholes in islamic law to accommodate for the existence of the time value of money without explicitly charging interest.

One common example in islamic banking is to buy the financed asset on behalf of the debtor and sell it to him for a higher price, which is not different from charging interest. But there are important differences in islamic banking how defaulting on payment is handled in most cases: Creditor and Debtor split losses or gains when the asset is sold, and there is no additional penalty for the debtor in case of defaulting, which is substantially different from the western principle where in theory the debtor bears all the losses and additional fees, but in practice often the creditor loses a lot because the debtor is

bankrupt. In islamic banking, the interests of creditor and debtor seem to be better aligned from the start, and although I do not consider the sharia as an adequate basis for life in the 21st century, often artificial restrictions bear interesting solutions.

The problem with interest in general is not that it is charged, the question is how much is adequate. And one problem with the american style turbo-capitalism is that expectations on what an adequate return on investment should be are totally insane.

If you apply the concept of time value of money to these rates, you will easily see how insane this is, and how these expectations can only lead to unsustainable business practices by focussing on short term results, completely ignoring the long term.

Let us assume we have an idea that will bring a company 1 Mio. Euros of net earnings, but it will take five years of research and development before the stuff can be sold. At the same time, the management of the company promises a return on investment of 20% per year. From todays perspective, this 1 Mio. earnings in five years is just worth 400.000, which not only means that such a long term project has to bear the risk that in five years the market will be totally different and we might not be successful, but even if we are successful, a sure success in five years today is worth only 40% of what it will yield then. This makes any long term project even more undesirable.

Here is a table that shows the present value of 1 Mio. € in five years, discounted by different rates of expected return on investment:

Present Value	ROI p.a.	years	Future Value
783.526 €	5%	5	1.000.000 €
620.921 €	10%	5	1.000.000 €
497.177 €	15%	5	1.000.000 €
401.878 €	20%	5	1.000.000 €
269.329 €	30%	5	1.000.000 €
131.687 €	50%	5	1.000.000 €

Therefore, as a rule of thumb you can say: The more return on investment a management sets as goal, the less likely the company will pursue long term projects because future earnings are heavily discounted.

The numbers get really troublesome if you consider even longer time scales, for example 20 or 50 years, which are time scales you might think about when investing into growing trees, education or economic transformation. Depending on your expectations about economic growth and the return on investment, it seems prudent not to invest too much into long term projects. On the other hand, you should invest at least a little as early as possible in your life, because if you are lucky, you might as well get rich without risking too much.

Present Value	ROI p.a.	years	Future Value
672.971 €	2%	20	1.000.000 €
456.387 €	4%	20	1.000.000 €
258.419 €	7%	20	1.000.000 €
148.644 €	10%	20	1.000.000 €
26.084 €	20%	20	1.000.000 €
5.262 €	30%	20	1.000.000 €

Present Value	ROI p.a.	years	Future Value
371.528 €	2%	50	1.000.000 €
140.713 €	4%	50	1.000.000 €
33.948 €	7%	50	1.000.000 €
8.519 €	10%	50	1.000.000 €
110 €	20%	50	1.000.000 €
2 €	30%	50	1.000.000 €

As you can see, and ROI of 10%, turn 8000 € into a million in fifty years, which is something many people could have enjoyed who invested into U.S. stock fifty years ago.

On the other hand, investing now large amounts into sustainable energy when the we run out of oil not until in twenty or thirty years is not justified when you are a company that calculates with 20% ROI. The crux is, not investing now may kill billions of people then.

By the way, Exxon's 2006 ROI has been 32.6%, and has even increased until 2008, when the company announced earnings of $11.68 billion in the second quarter of 2008, the highest quarterly earning any company in the history ever made. In 2008, the operating income was 33.8% of the total assets, and the net income 40% of the total equity. The revenue per employee was about 4.4 Mio. U.S. Dollars. With a revenue of $477 Billion, it would rank #18 in the list of countries by GDP, between Turkey and Sweden.

What confirms that companies with a high ROI do not invest into long term projects: Exxon spends only about 1% of it’s earning or 0.3% of its revenue on alternative energy.

But there is another astonishing number that puts this into other proportions: Exxon only produces 3% of the worlds oil and 2% of the worlds energy supply.

But let us get back to the topic money.

Do-It-Yourself Credit Money

When banks can create money out of nothing, why can’t ordinary people perform this miracle? They can. In many countries there is even a legal framework for doing so. This personal money is called a *negotiable instrument* and comes in two primary types: *Promissory Notes* and *Bills of Exchange*. A Bill of Exchange is what is commonly called cheque, a written order to one’s bank to pay a specific sum to someone, and when the payee is unspecified respectively specified as the bearer, a cheque is like a bank note

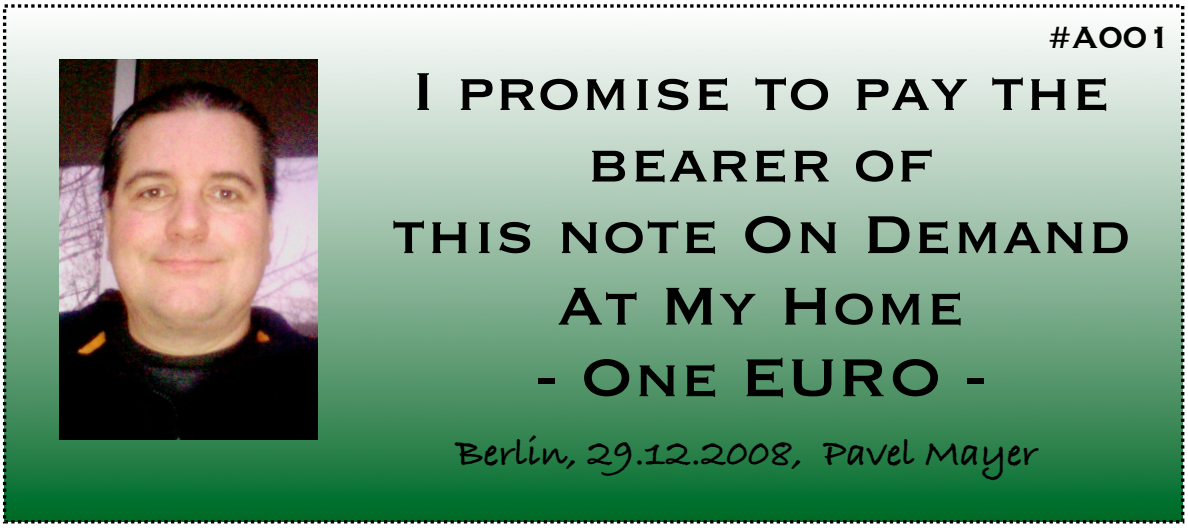
representing newly created credit money as long as it is not presented to the bank. If you want, you could print a truckload of nicely looking cheques of different denominations and circulate them. A promissory note is very similar, except there is not necessarily a bank involved. A promissory note is an unconditional promise of payment of a specific sum. There are also numerous different types of promissory notes, and paper currency is basically a *bearer negotiable promissory note* or *sola bill* when the promising party and the party the note is presented to are the same.

Such promissory notes however are not what is called *legal tender*, which is by law a payment that can not be refused to settle debt. Most jurisdictions are quite protective about using other money than legal tender, and for example outlaw the use of foreign currencies and alternative currencies, or heavily regulate the use of negotiable instruments.

However, in Scotland for example there currently is no specific legal tender. The british 1£-Note is the only legal tender by law, but since it was taken out of circulation in 1988, there is no legal tender any more. But this does not seem to be a problem because scottish law says that “anything reasonable” must be accepted to settle a debt.

In practice however, five scottish banks print their own bank notes, which are just *bearer negotiable demand promissory notes*. These notes are accepted everywhere in Scotland, but you may have problems to pay with them in London, or get them exchanged back at home into your local currency. You may however present them at the issuing bank and exchange them for the amount of British Pound Sterling printed on the note. This is at least what the text on these bank notes says: “CLYDESDALE BANK PLC - PROMISE TO PAY THE BEARER ON DEMAND AT THEIR OFFICE HERE **TEN POUNDS STERLING**” - “BY ORDER OF THE BOARD OF DIRECTORS”, signed CHIEF OPERATING OFFICER.

So here is an example of my personal bearer negotiable promissory note:



This would be real money when I would sign it by hand, and to my surprise and best knowledge, according to german law it seems to be even legal and enforceable, although such a paper issued by a private person is supposed to be illegal in many jurisdictions. (However, as a formality “payable to the bearer” must be noted on the back side). By German law, this note is also only valid for three years from the date it is issued. Now, by printing and signing a truckload of these promissory notes, I could effectively increase the money supply on my own. The only problem is that this is not legal tender in Germany, so no one has to accept it is as payment, and I would not be able to pay taxes with this money. However, if enough people would trust in it and accept it as payment, this should work quite well, and they could even present it in court to get their money when I would refuse to pay. The picture of me btw. is totally superfluous, but it might help to build trust, and it makes it look more like a bank note.

However, it just references the Euro as currency, so it is a kind of “proxy”, and its value is exactly one Euro. It might be worth even less than one Euro when people would factor in the credit risk, but I could even make up for that by promising on the note interest to be paid; this is also covered by the law.

Now, what about this Note?

First of all, instead of my grinning face it has a picture of my daughters cat sitting on my brothers laptop on it, which looks really cute, but that is not the point.

Legally it is not a promissory note because it does not properly specify the amount of money to be paid: “One Fnord” is nothing a court would be able to make any sense of. However, when people would decide that this note for whatever reason has some value, they could use it as money. But in order to build trust for my new Fnord currency, I have a lot more options beside putting a cute cat on the note.

First of all, I could set up a business where people can pay with Fnords, getting something of real value in exchange, organic cat food for example.

Second, I could set up a currency trading exchange where people can post offers to buy and and sell amounts of Fnords for a whatever price in Euros they want; I would just pocket a small fee for every transaction.

Third, I could open up the Cute Kitten Reserve Bank, printing a whole range of notes with cute kitten on it, with different useful denominations. People could also make Fnord loans there against collateral, or deposit Fnords and receive interest.

Fourth, to maintain the value and a good exchange rate, I could publish and enact a responsible monetary policy for the Fnord. I would be careful to not to circulate more Fnords than there is demand for, and the Cute Kitten Reserve Bank would open up a Euro account in a normal bank, maintaining some foreign currency Euro reserves, and daily publish the amount of euro reserves and the amount of Fnords in circulation on the Cute Kitten Reserve Bank’s website.

I could also throw in my personal twenty ounces of gold reserves I own and promise not to touch or sell them except in case of a monetary crisis. Note that I would refrain from

promising people gold in exchange for Fnords, that would be too easy and old fashioned.

And fifth, I could allow merchants to act as Commercial Fnord Banks, maintaining private Fnord accounts for their customers, and make Fnord loans. Of course they would have to deposit a fraction of their customers deposits at the Cute Kitten Reserve Bank.

On the side, I could mint small denomination Fnord coins with cute kitten on it, and pocket the money as seignorage.

Finally I could apply for membership in the International Monetary Fund, depositing Fnords, some of my Euros and a few ounces of Gold there, and get Special Drawing Rights in exchange that I could use to stabilize my Fnord currency in case I get under pressure from evil Hedge Fonds or Carry Traders who engage in speculation against the Fnord, or in case cat lovers flee out of the Fnord because of unsubstantiated rumors about me mistreating our cats.

Looks like a lot of work to establish a new state of the art currency, but it could be done, except probably the IMF membership. And a large corporation or bank could easily establish a new currency. However, there is no good reason to do this, except maybe having notes with cute kitten on it.

Multiple currencies within the same jurisdiction are an unpleasant thing. They change their value against each other, merchants need different kinds of cash and must put multiple price tags on their goods. But the main problem is that smaller currencies will easier come under pressure, causing bank runs and heavy inflation when people move from one currency to another.

And this is not just a theory; in the past, in many countries there was exactly this situation, and in the United States there was the so called “Free Banking Era” between 1837 and 1862, where about thousand different banks issued all their own bank notes, and some of them engaged in so called *Wildcat Banking*. These banks were located in remote areas to make it difficult to redeem the notes against gold or silver. And although the bank notes were supposed be be backed by gold and silver, many notes did not trade at face value because of the logistics involved. Another problem was that the average lifetime of a bank was just five years, and more than a few bank owners screwed the depositors and ran away with the gold before people could redeem their notes.

However, this “Free Banking Era” was not what is really considered as “free banking” by the proponents because the banks still had been regulated by the individual states, and the currency was just representative money backed by specie (Gold and Silver coins). The experience with free banking seems to be generally negative, with the possible exception of Sweden. With free banking, banks are are businesses like any other, without monetary authority, reserve requirement and legal tender, and everyone is allowed to run a bank without special licensing.

Having multiple currencies in one country is like having a 19th century isolated and heterogenous electrical power system with different voltages, plugs and even direct current instead of alternating current in different cities. You were not be able to use light bulbs, electrical appliances or machines in another city, and had to endure long lasting power failures when the local power plant broke down or ran out of fuel.

A central banking system is a bit similar to a national power grid. It makes the power supply more stable and helps to balance load, but when it fails, much larger areas will be affected.

Money Summarized

Money today is credit money, created out of nothing by simultaneously creating the same amount of debt. Money and debt are a product of trust, and money is a unit of account for trust. The government and the state is technically not behind the money, and do not and can not create money. Money is backed by debt, so while technically the government is not behind the money, the value of money is in multiple ways dependent on the government. First of all, governments are very large debtors, normally the largest single identifiable debtor, so when the trust into the government to meet its obligations is weakened, the trust into money is substantially weakened. This alone is able to play havoc with a currency. But there is even more: The government defines the policy of the monetary authority which controls the money supply. And finally, the government enacts legislation that regulates and monopolizes the sort of money that is used by declaring it fiat money and legal tender, effectively banning alternative currencies, which must be considered a good thing as long as the government acts responsibly on the first two issues, being a reliable debtor, and enacting a good monetary policy.

However, when the government fails on these issues, the result is hyperinflation and domestic credit money becomes unsustainable. People then fall back to use a foreign currency and commodity money. Both alternatives pose problems for the domestic economy: Using a foreign currency in such a situation typically results in a way too small money supply, and the use of commodity money just is not up to the task sustaining a modern economy.

Outlook

All those new financial instruments are very clever and useful inventions, like nuclear power plants, but the risks involved, the lack of regulation and the amount of greed, stupidity and hubris in the financial world brought our financial system to the brink of collapse.

What makes the situation especially unpleasant is that our financial system has become dependent on these new financial instruments, and with many of these instruments discredited and inoperable, the financial system in triple jeopardy: Fixing the problems these instruments caused, operating without these instruments, and developing new instruments in a climate when everything new or innovative in this field will be treated with extreme suspicion.

Our financial system is in a state of regression, falling back to old tools and old methods of direct government intervention, which is going to cause new problems on its own. Direct government intervention is inefficient and wasteful, and the decision makers are usually personally isolated from the consequences of their decisions. It is not their own money that is at risk, and in this respect the government decision makers are not much different from the many investment bankers that were playing with other peoples money. The incentive structure however is different, and becoming a politician who decides about billions does not require any specific qualification or even rudimentary economic knowledge at all. And when talking about more regulation, which is absolutely necessary, people often forget that more regulation also means more bureaucracy, which in general does not help to accelerate things.

Under the “metal theory of money” this crisis should be over as soon as the markets will have completed the deflation of the asset bubbles and the losses are written off, but our money and our financial system are not directly based on assets like houses, estate, factories, machines, licenses, commodities, raw materials, weapons, energy and manpower.

Otherwise the only events that should cause real economic problems would be natural disasters, crop failures, overpopulation, nuclear accidents, plagues, wars, ecological disasters or the depletion of natural resources. The latter three may have contributed to the current crisis, as we probably have reached peak oil at the time the crisis began, and the wars in Iraq and Afghanistan did cost some serious money.

But in a world of credit money, with the exception of energy supply, assets do not really matter economically that much, and we live in a credit world for more than hundred years. Take Germany’s economic recovery after the loss of WWII. Unimaginable amounts of resources have been wasted in the war, a lot of infrastructure has been destroyed, large parts of the territory lost, but as soon as confidence into the future was restored, there was a huge economic growth that turned Germany into the third largest economy in the world. The first world countries also have decades ago crossed the point where covering the basic needs of their population poses any problems for the economy. In Germany, Europe's largest producer of agricultural products they contribute less than 1% to the GDP.

The current crisis is a crisis of trust, and because we live in a world of credit money, our economy is mainly based on trust. Unfortunately many participants of the global financial system have made poor decisions that made them less trustworthy.

Without trust, the whole machinery started to deconstruct itself faster than most could cope with, and the strain on some components became too severe, with the threat of cascading failures. If the governments would not have come out to stabilize the whole thing, we might be living of food stamps by now.

Despite cracks and casual implosions, the system did not collapse yet, but the danger of collapse is still imminent, although the situation has stabilized a bit. In April 2009 we

may possibly still not have reached the bottom, but since March 2009 DAX and Dow Jones are climbing for a month now, and crude oil is also on the rise for two months.

The DOW is already below its 2002 low, but the DAX is still above its 2003 low. When the "new economy" bubble did burst in 2000, it took two years to reach the bottom, and one year at the bottom before the stock markets began to recover. Right now we are just one and a half year on the way down, but this does not mean anything. No one can claim to know what will happen in the next years. The consequences of the failures of the new financial instruments are not well understood, and there is still no transparency in the whole market. No one really knows how much he has lost yet.

The outlook is still grim, but there might be also a positive effect of some of the new financial instruments. The markets have become more volatile, so we could get to the bottom faster, and recover faster. And on the plus side, the oil price has fallen by 60%.

But this is not the most probable outcome. Overshadowed by the current financial crisis, we probably ran into another oil crisis, that was stopped by the financial crisis.

The financial crisis can be overcome with time and moderate effort, but the next oil crisis is already lingering on the horizon, and this problem requires substantially more effort to solve. And we still have the global warming, deforestation, overfishing, pollution, population growth in some countries, and unfavorable population pyramids in many countries. These fundamental problems are not only unsolved, they are worsening.

So we will definitely see a *really* bad crisis at some point in the 21st century that will dwarf everything we have seen since WW2, but we don't know exactly when this will happen, but it will happen within a lifetime, very probably between 2030 and 2040. Currently the world population still grows exponentially, but every possible model predicts that we will have at maximum a linear growth in the next decades, with a much higher probability that the curve will turn to logarithmic growth or even decline. Now, when the curve changes, this will not happen because of a voluntary decision of the people, it will be due to famine, plague and war.

The other fundamental problem is the energy crisis. Without a substitute for oil, gas and coal up to 90% of the world population will die when we run out of it. We just won't have enough energy to feed and shelter more than a billion people in the world. Oil, coal and gas account for 85% of our global energy supply. While coal will last for another 150 years at current consumption, at least 50% of the oil and gas consumption need to be substituted by 2050. This will cost some serious money, no matter what will be chosen as substitute. But it is affordable, it will cost us just in the order of one year's world GDP to achieve that, so if the world dedicates annually 5% of its GDP to this cause, it should be done within 20 years. However, this would mean that the U.S. alone will have to invest $700 billion every year into energy supply change.

It is all a matter of timing. Starting too early will make it expensive, starting too late will be a disaster for the latecomers because all the money needed to make the change will be siphoned away from them by a high oil price. At $50 per barrel, the U.S. consume

$365 Billion worth of oil per year, and the oil price is expected to reach $200 in a few years after the current crisis is over.

So is the current crisis just the popping of a virtual bubble caused by greed and stupidity, or do we actually start to feel the "Limits to Growth", approaching a possible Malthusian catastrophe?

Just looking at the numbers of consumption and reserves, judgement day is still a couple of decades in the future. The current crisis even might be godsend by acting as a reminder that the hunt for money is not the purpose of human existence.

And money is no substitution for trust. Money is a product of trust, and to cite WP:
"*Trust is a relationship of reliance. A trusted party is presumed to seek to fulfill policies, ethical codes, law and their previous promises.*"

In our complex world, we have to live with incomplete information about almost everything, and trust is the state of mind that allows us to overcome this problem and act with confidence despite incomplete information and comprehension.

It takes just two seconds to destroy trust, but many years to build it. That is the most unpleasant fact in the current situation. It will take time to rebuild trust, and trust will not come back just by sitting there and waiting for a better time.

Currently people turn to their governments, but the governments around the world are also to blame for the current crisis, with the U.S. government being the economic opinion leader in the world for decades.

The United States are still the most powerful economy and can change faster than many other countries in the world, but from a european point of view, they are a cruel society that ignores poverty, practices the death penalty and has more people locked up in prisons than any other country in the world. And thanks to eight years of Bush Administration, the United States are close to morally bankrupt and did lose a lot of authority in the world. What however speaks for the american people is that they too regarded Bush as the second most unpopular president in history when he left the white house, only surpassed by Richard Nixon.

It is unclear how that might affect the U.S. and the world economy. Money and morale are known to be different things, and countries also do not exist by moral codes.

On the other hand, this crisis has proven that the world has become a small planet, and everything is linked by the flow of money and debt.

The dilemma we all now face is, that in times of scarce money, those who have it become even more powerful, and it is a good idea for every person or business to keep money to itself. For all of us and the economy this is a disaster.

So the only solution I can see is that the society in form of the governments will strongly motivate people to spend and invest their money. There is an easy way how this can be done. The one thing that people hate most when it comes to money is to pay taxes, so when you give people the choice to either pay taxes or invest the money, they will happily invest it and even borrow money and spend much more than they save on taxes, even making totally unsound and risky investments. And this way the government still leaves some control and the execution to the individual, instead of collecting and distributing itself, which is always a problem.

So what are useful investment the government should subsidize by specific tax reduction and deduction?

There are many useful things that can be done, but my list looks like follows:

- Forestry: Planting and growing trees is a long term investment (20-100 years), but you get energy, oxygen, building material, soil, water, a better climate, recreation space and good karma from growing trees, and most of the time you can leave the trees unattended, they know how to grow by themselves

- Education: Also a long term investment, but possibly the next best thing to trees. Invest money into schools, teachers, universities and facilitate life long education.

- Sustainable Energy Supply: The transition will be unavoidable, and there are already many useful things that will even give you a good return on investment: Energy saving cars, houses, house appliances, solar heating and power generation, wind power, water power, biofuels and energy saving in production, just to mention a few.

- Information Society Development: The future economy will be an economy based on efficient information processing. This does not only include technology, it is about new businesses, services, administration and new ways of life. If we want to stay a first world country, we must not only make sure everyone has access to information technology and can master it, but also make sure political and economic decisions are driven by it. This can be mitigated by free and open access to as much information and tools as possible, on all levels of government, educational institutions and businesses. Wikipedia is a primary example, but there should be also practically free access to digital libraries containing all books of the world, all TV programming, all teaching material of schools and universities, and all research results paid for with public money, and all kinds of work of art. To make that possible, in some cases new remuneration schemes for those producing and making this works accessible should be subsidized.

- Housing: Yes, even after the housing bubble, there is always need for new houses, especially in the U.S., where many houses are not very durable so every year over a million houses must be replaced; think about making them longer lasting and more energy efficient, and put some policies on urban development in place so people can live closer to their workplace, shops, schools and other places they need to go to.

- Water Supply: No water, no life.

- Transportation Infrastructure: A good transportation infrastructure pays for itself, and people also understand that it is a good thing because they benefit directly.

- Recycling - Instead of creating landfill, most of the raw materials from properly designed products can be reused, helping to preserve limited natural resources

And finally some stuff the government should not subsidize or where it should reduce spending:

- Military: I am a proponent of having adequate military forces, I believe that every country should be able to defend itself. However, the U.S. military spending accounts for 50% of the worlds military spending; this would make only sense if the U.S. would be planning against an invasion from outer space, or for a military conquest of the whole world. Some military is needed, but the current status is ridiculous. If you drop U.S. military spending to 40% of the current budget, the U.S. will still be spending more than the European Union. And if everyone drops military spending to a necessary minimum, we all profit. Arms control works.

- Intelligence: All the fifteen intelligence services were not able to prevent 9/11, and they also did not prevent a criminal like George W. Bush to cause much more political, financial and geo-strategic damage to the United States than any foreign service or conspiracy could have ever achieved. All this money and brainpower could have been put to much better uses. Secret Services are mostly useless and harmful. If China, Russia, Israel or Pakistan would chose to nuke New York, the services would not be able to prevent it; right now the only thing they are capable of doing is to give some groups a reason to nuke U.S. cities.

- Nuclear Power: It might be tempting to solve our energy problems using nuclear power, but we will run out of Uranium in 70 years without breeder reactors, and breeders are expensive and dangerous. Nuclear power is useful in the outer solar system where there is insufficient radiation energy from the sun, be we don't need it on earth, except for submarines and aircraft carriers. The main reason why countries like nuclear power is to be able to build "the Bomb" in case they need it. Germany and Japan for instance could have a bomb production factory up and running within 30 days if they would choose to do so.

- Incompetitive established Industries: Especially those industries where excessive world wide over-capacities exist like in car manufacturing should either survive on their own or vanish from the market. However, tariffs should be introduced for all imported products that are not produced under sufficient social and ecological standards.

Radical Alternative Economic Systems

There are a number of economist who are proposing all kind of alternatives to our current system. Many even respected economists argue against a central banking system and credit money, and propose a return to representative money backed by gold, possibly combined with free banking. This should avoid risky behavior of banks when they

can not turn to the government or central bank for a bailout, and also set a hard limit for the money supply because there is only a limited amount of gold available.

I can not see how this would spare us from any of these problems. Even under the current system, a bank can go bankrupt, but when this happens like in the case of Lehman Brothers, the result is very undesirable. The gold standard has been abandoned for good reasons: The amount of available gold is not related to economic growth, but money should be. Even worse, mining gold is not only expensive and a waste of resources, it also produces a lot of toxic waste and long term ecologic damages, and I would consider it as criminal stupidity to do that for the purpose of hoarding it in safes and bunkers to back currency.

Other proposals want to abolish fractional reserve banking for full reserve banking, where the whole money supply is created by a central authority, and every commercial bank can only loan out what it has in deposits. The main effect of this would be that bank credit would be even more difficult to get than in this current crisis, and people and businesses would make more use of private credit money like cheques and promissory notes. And all the money in fact still would be credit money, only that the government would be the sole creditor, with the banks as sole debtors. This would in fact either make it impossible for the government to make any loans, or the government would just loan from itself.

The latter would be not make any sense, and the former was the reason why in 1689 England, Scotland and Ireland happily submitted to being ruled by a Dutch King after they lost three wars in a row against the Netherlands.

The Netherlands had the most modern economic and financial system in the world, allowing the government to successfully borrow from the people and loan huge amounts in a short period issuing government bonds to finance infrastructure, arms and soldiers, while in Britain taxes had to be raised, and money could only be borrowed from a few wealthy individuals, and both was unpopular and difficult. As a consequence, England accepted Prince William III of Orange on the English throne as co-ruler with his wife Mary, and the dutch merchant elite took moved to London and took over and reformed the british economy. The rise of the British Empire was based on the modern financial system they received by being ruled by a Dutch.

Credit money is not a scheme of world domination seeking conspirators, it is something that developed naturally when the communication system, the capabilities for information processing and storage and the legal system in our first world societies became sophisticated enough to handle it. But credit money also became a necessity for an economic system that is so complex and powerful like the one we enjoy, and without it the industrial revolution may have never happened.

In the 20th century we could also observe that a central planning system is not only inferior to our distributed system, central planning is only possible in a society where a lot of freedom is forcibly taken away from the individual.

Other people see the evil in the time value of money and taking interest for loans, but I don't believe that returning to medieval economic practices would do any good to our economy. Our situation today is radically different from the situation 600 years ago, where most people never left the region they were born in, lived off food and goods from their close vicinity, and had an average life expectancy of about 25 years, which is worse than being born in the country with the lowest life expectancy in the world today, Swaziland, where about 40% of the pregnant women are HIV positive.

Other economists think that we need a total economic liberalization, the absolute rule of the market. They have not only been discredited by the recent events, there is enough scientific evidence to even know why a free market alone can not be the solution. In my mind, the largest fallacy those free market fanatics make is to believe that people always do what is in their best interest. This is definitely not true. People are often motivated by self interest, but a human is also an emphatic social being, capable of compassion and sacrifice, placing the welfare and survival of the group over his own well-being. A system based on a political economy focussing on egoism is as bound to fail as a system like communism that focusses on the opposite.

However, what we urgently need is an advancement of our mainstream economics that considers the consequences and implications of the credit theory of money and the fact that individual economic behavior today mainly consists of a few and rare important decisions that have long term effects on the persons money flow, and the different role and perception of money in times when not only rarely a physical token is given away, but the received "Goods" in many instances are also abstract and intangible.

Money also is increasingly perceived just as "hygiene factor"; a lot of people are not much motivated by more money, but they are frustrated when they feel that they get not enough. The latter feeling is also not based on absolute amounts, but a question of comparison with others and distributive justice. There is no problem with people getting rich who do or create something that improves the life of many people. It just sucks to see people pocket many millions only for being in the right place at the right time. And I would also question whether it is healthy thing when a single person owns billions of dollars. It simply feels wrong when at the same time a lot of people live in misery. It is also a disrespect of natural law and inevitably results in disaster.

Doing Some Justice

There is no way this crisis can be made to go away immediately, even by a benevolent world dictator with absolute power.

To solve the current crisis, trust needs to be rebuild by doing some justice, otherwise history will repeat itself and the next crisis will come soon. It should not be that those who screwed others are allowed to keep their booties, and those who did some earnest mistakes should also pay for it, but get the chance to make good and rehabilitate themselves.

The current crisis will keep lawyers busy for decades anyway. Now what could justice look like?

- The **rating agencies** are at the top of the list of culprits. They had the same role like stress analysts and structural designers in civil engineering. The banks were the architects. When a building collapses because stress analysts signed off flawed plans, they are rightly in trouble. The rating agencies turned out obscene profits in the order of 30% per year. They should not be allowed to keep even a penny they received for this work, and they should pay damages to those people who lost money because they trusted in their ratings.

- Most **banks** also were not victims, but mainly perpetrators. They designed the products, and they were aware of the problems but sold toxic waste anyway to unsuspecting investors, pocketing high fees for bad advice to their customers. They should be forced to take back the defective products they sold, including the fees, less the payouts the customers may have received.

- The **agencies** that were handing out "Ninja" loans (No income, no job, No assets), and real estate companies that collaborated with them, should be forced to pay their share, seizing every part of the profit they made above a decent margin of lets say 5%.

- The **managers** who pocketed high bonuses should also have their assets seized, and should be allowed to keep only what they would have earned ten years ago, before the craze started.

- The **greedy investors** also should not get away unscathed, but at the moment, they bear the majority of the losses. They should get a fair share of their invested capital back, but also have to pay back any interest or payouts they received on their investments for the last decade.

- The **consumers** who overspent money to live a decent life also should not have an easy way out. They should be forced to pay back all the money they loaned, but not bear all the fees and excessive interest rates that were added to their debt. The government should hand out cheap loans to these people, repay the principal plus a basic interest rate to the private creditors. The debtors should be barred from receiving any new credit until they have repaid the government loan.

I am not confident that many of the measures I proposed will actually be carried out.

The reason is partly the lack of political power and will to carry it out, and partly that the issues are so complicated that most politicians are overburdened with this matter.

And many of the culprits are simply too rich and too powerful, so taking away booty from so many rich and powerful people who regard it as fair remuneration will provoke heavy resistance that can hardly be overcome without a political revolution.

But those in power should be aware that this crisis is not just a financial one, it is a crisis that has the potential to discredit democracy and capitalism as a model for the world. If it gets really bad and lasts long, it might even cause large parts of the world population to turn to fundamental religious, fascist or communist ideals for governing their society. This would be the worst outcome of this crisis, so radical measures like described above would be justified in order to make the world a better place for everyone, except those who became obscenely rich by screwing others.

Towards a World Government?

I think that the current crisis will bring the world a step closer to a future world government, albeit a very small step. The idea of a world government is centuries old and had its golden age in the 1950s as a reaction to the horrors of the second world war. Since then it has come out of fashion and was mainly a topic for conspiracy theorists and american militias fearing the invasion of U.N. Black Helicopters.

The current financial crisis is a global one, and many other problems like global warming and other ecological problems are of global scope, too. And the world economy is more integrated than it ever was. However, “there is today no functioning global international military, executive, legislature, judiciary or constitution with jurisdiction over the entire planet”, but there currently is a global governance system consisting of many organizations and bodies like the UN, WHO, ITU, IMF and WTO, and with the ICC and ICJ there are even international courts, but there is no world constitution and no government that can draw it’s legitimation from the people of the whole world. And there are the G8, a forum of 7 western countries and Russia, and the G20, a forum of finance ministers and central bank governors of the world’s 19 largest national economies plus the European Union.

I am also quite hesitant to embrace the idea of a world government because my experience with government officials is that the larger the territory they govern is, the more inhumane the executive branch of this government becomes. While you can have a good chat with a city official, it gets more difficult on the state level, and federal officials are either surrounded by arrogance or claim to be powerless in dealing with your problem.

And the more people a politician represents, the more remote, inaccessible and shielded from the “ordinary” people he or she becomes. I don’t know if this is an inevitable problem with the centralization of political power, or a problem that our political system brings people into power positions who lack the moral fiber to properly deal with their role. It is said that power corrupts, but I believe that power mainly corrupts the morally weak.

Whenever there is a summit of multinational leaders like the G8 Summit which resembles world governing activity, the region where it takes place becomes an impenetrable high security zone with many civil rights suspended for the people living there, like in a war zone or disaster area. It is a symptom of an increasing lack of trust between governments and the people. When the government mistrusts the people, it becomes cruel. When people lose trust in their government, they will also lose trust in their money, and

the economy will go down the drain. And a world government would have a hard time gaining the trust of the people of the world. Although the European Union must be seen as a great success, the people in the european nations do not seem to be very eager to give more power to the EU, which can be seen in the negative referendums regarding the treaty of Lisbon. And when even people in the EU, who have so much in common, have so many reservations against a supranational government it seems to be unthinkable that the people of the world would opt to voluntarily transfer power to a world government.

But it seems also inevitable that in the long run there will be a world government, but I have little hope that this will happen due to a democratic process.

Since WWII, and even more since the demise of the Eastern Bloc the United States of America act as a self-proclaimed governor the world, but without really being up to the task and with deriving their authority from military and economic power, with 95% of the people in the world having no say in it. This is not how things are going to work.

It is sad that it has required such an epic failure of the U.S. economic policy to make new success on important international treaties possible. And while the Obama administration seems to be much more sane than the last one, I have much doubt that radical changes in U.S. policy can be expected, even when there should be a switch to New-Keynesian demand side policy, where still is unclear what that will mean in practice. To justify radical changes in the american society, the situation is not yet bad enough.

The majority of people in the United States also stems from people who were unsatisfied with their life in their originating country and were bold or desperate enough to start a new life far away, leaving a lot behind. This means also that the people in the United States are descendants of trouble makers, political extremists, religious fundamentalists, underdogs, misfits, adventurers and bold can-do types. It is definitely not a representative selection of the people of the originating countries, with the exception of the black people that did not come voluntarily, and the indigenous people who lived there a long time before the country was taken from them.

This might also explain why the United States are the country with the largest percentage of people locked up in prisons in the world.

For now the world has to cope with the United States being the dominant economy on the planet, but for how long?

The World in 2050

The end of a bipolar world in the 1990s saw many parts of the world embracing a capitalistic economic system, among them Russia and China. Together with India and Brazil, the term BRIC was coined by economists from Goldman & Sachs, as an acronym for these very large, underdeveloped countries with a high growth potential.

The interesting thing however were these accompanying tables predicting the GDP for the 22 top countries in 2050, compared to the 2007 tables. It is clear that these numbers

are just wild guesses, and precise predictions 43 years into the future are practically impossible, but it is interesting to see what would happen when the extrapolation of 2007 growth expectations would become reality.

Gross Domestic Product [2007]

Rank	Country	GDP (millions of USD)
1	United States	13,807,550
2	Japan	4,381,576
3	Germany	3,320,913
4	**China**	3,280,224
5	United Kingdom	2,804,437
6	France	2,593,779
7	Italy	2,104,666
8	Spain	1,439,983
9	Canada	1,436,086
10	**Brazil**	1,313,590
11	**Russia**	1,289,535
12	**India**	1,100,695
13	Mexico	1,022,816
14	South Korea	969,871
15	Australia	908,990
16	Netherlands	777,241
17	Turkey	659,276
18	Sweden	454,839
19	Belgium	453,283
20	Indonesia	432,944
21	Switzerland	427,074
22	Poland	422,090

Gross Domestic Product [2050][12]

Rank	Country	GDP (millions of USD)
1	**China**	70,710,000
2	United States	38,514,000
3	**India**	37,668,000
4	**Brazil**	11,366,000
5	Mexico	9,340,000
6	**Russia**	8,580,000
7	Indonesia	7,010,000
8	Japan	6,677,000
9	United Kingdom	5,133,000
10	Germany	5,024,000
11	Nigeria	4,640,000
12	France	4,592,000
13	South Korea	4,083,000
14	Turkey	3,943,000
15	Vietnam	3,607,000
16	Canada	3,149,000
17	Philippines	3,010,000
18	Italy	2,950,000
19	Iran	2,663,000
20	Egypt	2,602,000
21	Pakistan	2,085,000
22	Bangladesh	1,466,000

When we take these numbers seriously, we should better start now to create a fair world order, otherwise our situation might become quite unpleasant when all those countries like China and India start to treat the current first world countries like we treated them. Especially China for large parts of their history was not treated well, and they may get the idea to pay back.

The other interesting table is the expected GDP per capita, and here the numbers do not look that bad. However, the longer I look at these tables, the more they just seem to reflect some wishful thinking of some people at Goldman & Sachs. But these tables resemble what probably in 2007 many decision makers allocating capital around the world were using.

Gross Domestic Product per capita [2007][13]

Rank	Country	GDP per capita (in USD)
1	United Kingdom	46,099
2	United States	45,725
3	Canada	43,674
4	France	42,034
5	Germany	40,400
6	Italy	35,745
7	Japan	34,296
8	South Korea	20,015
9	Mexico	9,717
10	Turkey	9,569
11	**Russia**	9,075
12	**Brazil**	6,938
13	Iran	3,981
14	**China**	2,483
15	Indonesia	1,925
16	Egypt	1,739
17	Philippines	1,626
18	Nigeria	1,161
19	**India**	942
20	Pakistan	909
21	Vietnam	829
22	Bangladesh	463

Gross Domestic Product per capita [2050][12]

Rank	Country	GDP per capita (in USD)
1	United States	91,683
2	South Korea	90,294
3	United Kingdom	80,234
4	**Russia**	78,576
5	Canada	76,002
6	France	75,253
7	Germany	68,253
8	Japan	66,846
9	Mexico	63,149
10	Italy	58,545
11	**Brazil**	49,759
12	**China**	49,650
13	Turkey	45,595
14	Vietnam	33,472
15	Iran	32,676
16	Indonesia	22,395
17	**India**	20,836
18	Egypt	20,500
19	Philippines	20,388
20	Nigeria	13,014
21	Pakistan	7,066
22	Bangladesh	5,235

What can also be seen is that these people do not seem to believe that any shortages of energy or ecological problems will stand in the way of growth. They believe that the GDP will easily at least quadruple, and five billion people will enjoy the same standard of living like today in the first world countries. I just can't believe this is going to happen.

But there may be some truth in these numbers; some of these BRIC economies may be in a similar state like Germany after the war; freed from many shackles that were impeding economic development, the people in these countries now try very hard to improve their situation, and the potential for growth is immense. In my mind however there is a good probability that the initial growth will be even faster than anticipated, but that it will also level out sooner than anticipated, like it happened in Germany and especially Japan. Growth in these countries fell below the world average after they caught up with other industrialized countries within less than two decades.

Final Remarks

The journey through the economy turned out to be much longer than anticipated, and while I found many answers and interesting insights, a lot of new questions have surfaced. For example, what new rules do we need in an economy almost purely based on credit money? What are “best practices” to manage my personal finances? How about a service for personal cashflow management, with fast dynamic contract switching for insurances, communication services and other money flows, always switching to the cheapest provider? And now, knowing all this stuff about money and the economy, what will be the best personal strategy to deal with the crisis?

Answers to these questions will have to wait for another paper, because this one has already become a small book, and I think it is time now to just publish it.