A Modest Proposal for
Reforming the Undergraduate Macroeconomics Curriculum: The Case for a Thorough Treatment of Accounting Relationships

Johannes Schmidt[*]

Abstract

This paper makes the case for a more detailed and rigorous treatment of so-called 'balance mechanics' and accounting relationships in undergraduate macroeconomics classes. It is argued that these relationships are an important basis for evaluating different economic models and for avoiding mistakes that are continuously made in public debates but can also be detected in standard macroeconomic models:

The paper gives an overview of the important macroeconomic accounting relationships that should be systematically treated in an undergraduate course. It is argued that a mastery of these relationships is in itself a good basis for understanding economic events and debates and disburdens the economic discourse from unnecessary quarrels as there can be no doubt about purely logical relations. This is shown by looking closer at three examples: first, the problem of coordination between saving and investment can be made much clearer when balance mechanics and accounting relationships are taken into account; second, it is shown how balance mechanics can be used as a consistency check for economic models; and third, a problem of economic policy – the case for (or against) a funded pension system – is evaluated.

JEL: A22, E01, E12, E13, E21, E22, E42, E43

[*] Karlsruhe University of Applied Sciences
     Faculty of Management Science and Engineering
     Moltkestrasse 30
     D-76133 Karlsruhe
     phone: +49 (0)721 / 925-1981
     fax: +49 (0)721 / 925-1947
     e-mail: johannes.schmidt@hs-karlsruhe.de

1

1.   Introduction

In the undergraduate macroeconomics curriculum national income accounting does not take up a prominent place; normally it is regarded as a special subject that is briefly covered but without major relevance for economics. Therefore, most students do not get a firm grasp of the logical accounting relationships that are always valid in an economy whatever the plans and actions carried out by the economic subjects. The most important point here is that a relation that is valid for a single subject or a group of subjects may not be valid for the whole economy (One prominent example of such a relationship is: while the net financial wealth of each person might be positive or negative, it must necessarily be zero in a closed economy or in the world.) But although this fallacy of composition is often mentioned, it is not treated systematically.

This paper makes the case for a detailed and systematic treatment of the so-called 'balance mechanics' and the accounting relationships that form the basis for a better understanding of national income accounting but can also fruitfully be used for evaluating economic models and economic policy proposals. Furthermore, as these relationships are of a purely logical nature they are not connected to a specific macroeconomic 'school' be it neoclassical, Keynesian or whatever.

The paper is organized as follows: in section 2 the central accounting relationships and the principles of balance mechanics are introduced. In section 3 the usefulness of using these relationships is shown by looking at three different examples: Section 3.1 takes a closer look at the relation between saving and investment; the coordination of these variables is one of the age-old problems of macroeconomics, and many macroeconomic controversies have their root in different perspectives concerning this coordination problem. But using balance mechanics one can show that many of these controversies are based on misunderstanding of the concepts of 'saving', 'investment' and 'finance'. It is shown how the treatment of basic accounting relationships leads to a clearer understanding of these concepts. Section 3.2 shows how balance mechanics can be used for a consistency check of macroeconomic models and uses the model presented by ROBERT BARRO in is textbook (BARRO 2008); it can be shown that major results of this model depend crucially on assumptions that are either dubious or simply fallacious if balance mechanics are taken into account. Section 3.3 evaluates the proposal for a move to a (partial or fully) funded pension system; again, it will be seen that central arguments supporting such a move lose much of their strength if balance mechanics are properly introduced. Section 4 gives some concluding remarks.

2.   Accounting relationships and their importance

Accounting relationships and their usefulness for (macro-)economic theory have been analysed in depth by the German economist WOLFGANG STÜTZEL (STÜTZEL 1978, 1979) who called this method of analysis 'balance mechanics' ('Saldenmechanik'). There are certain similarities to the stock-flow consistent modelling of Post Keynesian theory (e.g. GODLEY/LAVOIE 2007). Its importance for macroeconomic theory and policy has been ana-

lysed by SCHMIDT (2011, 2012); LINDNER (2012, 2015) has developed a more formal presentation which is relied upon to a large degree in this section. The balance mechanics approach has two elements: several accounting relationships and the (logical) relations between groups an aggregate economy can be divided into. These two elements are introduced in the following two sub-sections.

2.1 The accounting relationships

Economic units use two accounting frameworks for recording their transactions with the rest of the world: a balance sheet and an income statement.

The balance sheet shows the stock of assets and liabilities of an economic unit and their balance – the unit's net worth. The income statement shows the difference between a unit's yield and its cost (in case of a firm) or between its income and consumption (in case of a household). The difference between yield and cost or between income and consumption shows the positive or negative outcome of a period, that is profit or loss which in turn increases or diminishes the unit's net worth.

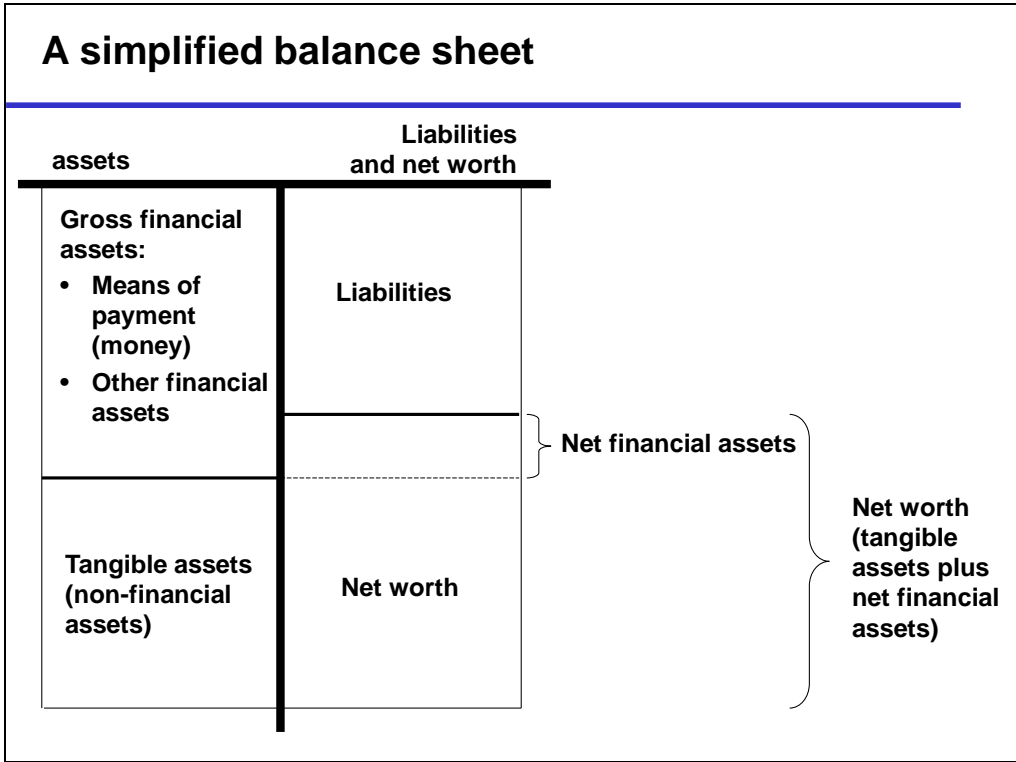A (simplified) balance sheet of an economic unit looks like this:

Figure 1: A simplified balance sheet
Source: author's presentation

The first part of gross financial assets are means of payment, usually called "money"; under normal circumstances, money consists of curreny and checkable accounts, but what exactly constitutes a means of payment depends on the circumstances of time and space (Stützel 1978, p. 65 f.). The second part consists of financial claims on other economic units (open bills resulting from sales of goods, bonds entitling the owner to interest payments, creditors'

claims on their debtors due to loans handed out etc.) which are called "other financial assets". As money also constitutes a financial claim (against the central bank in the case of currency[1] and against a commercial bank in the case of checkable deposits) each means of payment is a financial asset but not the other way round.

Liabilities, on the other hand, encompass every obligation to pay: liabilities due to the purchase of goods, due to loans taken out, due to issued bonds etc. It is important to see the strict symmetry of financial assets and liabilities: each financial assets corresponds to a liability of equal size: a person possessing a bond with a face value of EUR 10,000 due on December 31st, 2015, possesses the claim for receiving EUR 10,000 from the emitting firm on December 31st, 2015. The firm has a liability of equal size.

Gross financial assets minus liabilities give a person's net financial assets.

Tangible assets or non-financial assets are goods of any kind that are used over a longer period: properties, houses, machines, but also the stock of finished or half-finished products. Immaterial assets like patents or the so-called 'goodwill' of a firm shall also fall into that category although they are not tangible in a literal sense. The purchase or the production of such a tangible asset is called (net) investment. In macroeconomics, only the formation of tangible assets counts as net investment, in contrast to the acquisition of financial assets which is sometimes called financial investment.
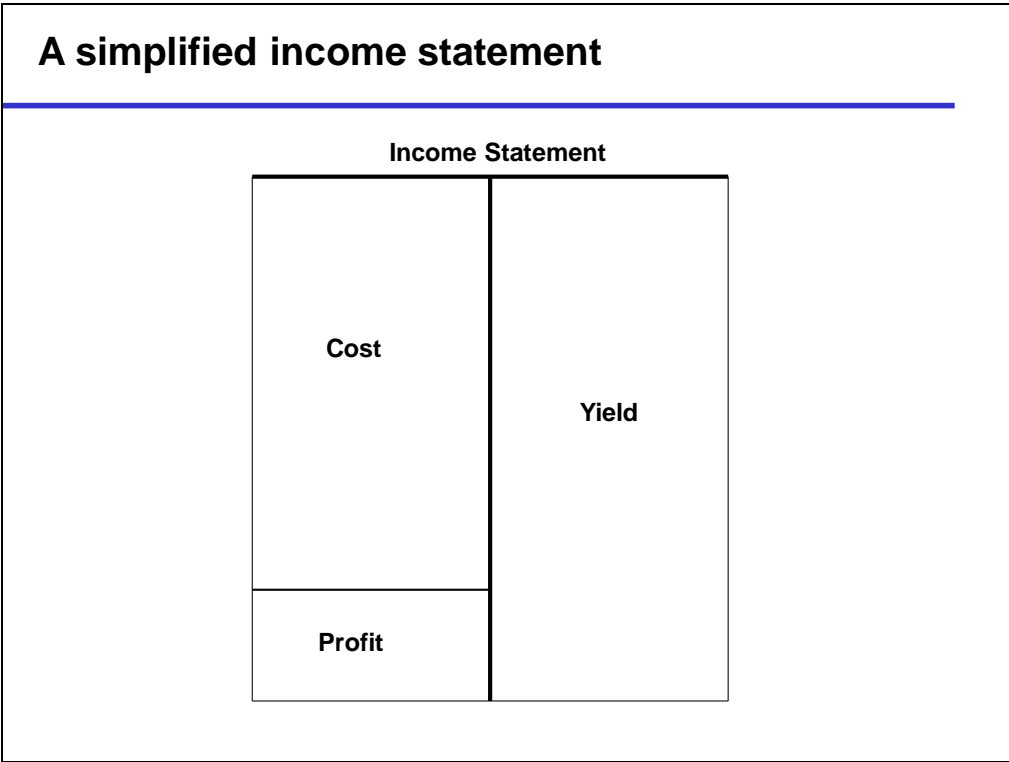

Figure 2: A Simplified Income Statement
Source: author's presentation

---

[1] Today, this „claim" has only historical significance, as there is no longer any right to exchange currency for a certain amount of gold (via an exchange for dollars), as it was the case until the collapse of Bretton Woods; but nevertheless, the currency issued by a central bank still appears as liability in its balance sheet.

On the right-hand side of an income statement, all yields are registered: these are the revenues due to the sale of goods and services as well as other yields resulting from, e.g. a higher market valuation of assets. The left-hand side records all costs resulting from the production of goods and services (wages, purchases of material, depreciation etc.). Profit is the difference between the two; the unappropriated part of it[2] increases the net worth of the firm (or decreases it in case of a loss).

For our purposes, it is necessary to differentiate strictly between change in net worth (profit or loss), change in net financial assets, and change in the stock of means of payment. To do this, one has to differentiate between payments, expenditures and cost or between receipts, revenues and yields, respectively. Via the income statement, the difference between yields and costs is calculated; but this is not necessarily equivalent to the difference between revenues and expenditures, and not equivalent to the difference between receipts and payments either.

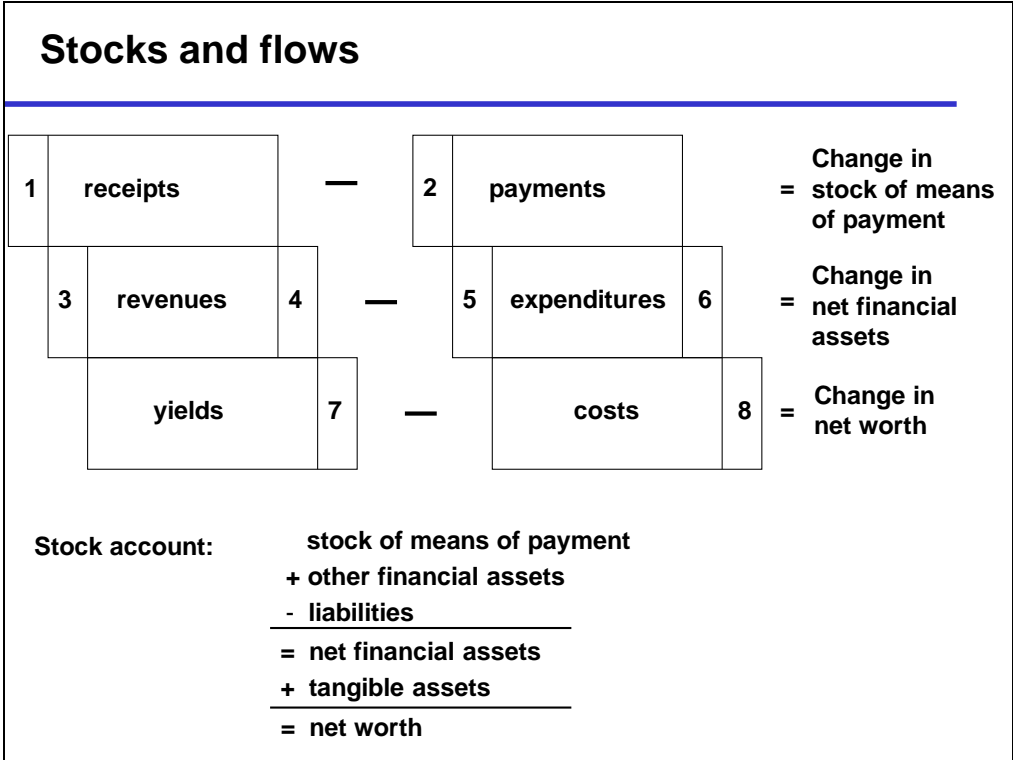The following scheme is helpful for a proper understanding:

Figure 3: Stocks and flows
Source: in dependence on BOFINGER (2015),

The three terms can coincide with one another but that is by no means necessary. If a firm sells a product on cash terms, this sale is at the same time a yield, a revenue and a receipt for the firm. If a firm purchases inputs and pays cash or debits a checkable account immediately, this is at the same time a cost, an expenditure and a payment. But this is not a necessary connection as the following examples show (seen always from the perspective of a firm; the numbers refer to the numbers in figure 3).[3]

---

[2] In the following, appropration of profits will be disregarded.
[3] The following examples are taken from GRASS/STÜTZEL (1988), p. 59 ff., although slightly adapted

(1) *Receipt, but no revenue*: This transaction increases the stock of money, but the stock of net financial assets stays the same. Either other financial assets decrease by the same amount as the stock of money increases (accounting exchange on the asset side) or the liabilities increase by the same amount (balance sheet extension). An exchange on the asset side takes place if a firm's customer pays a bill due by bank transfer; this increases the firm's stock of money but the claim against the customer ceases to exist, so net financial assets do not increase. A balance sheet extension takes place if the firm takes out a loan: its stock of money increases as the firm's bank account gets credited with the amount of the loan but at the same time the liabilities of the firm increase by the same amount.

(2) *Payment, but no expenditure*: This transaction decreases the stock of money, but net financial assets stay the same. That is the opposite of the first transaction: with the decrease of the stock of money other financial assets must increase (accounting exchange on the asset side) or liabilities must decrease by the same amount (balance sheet contraction). An exchange on the asset side takes place if the firm hands out a loan to an employee: the stock of money of the firm decreases but other financial assets of the firm increase by the same amount (against the employee for repayment of the loan); a balance sheet contraction takes place, if the firm repays a loan due.

(3) *Revenue, but no yield*: This transaction increases net financial assets, but net worth stays the same. This is possible only by decreasing tangible assets by the same amount. An example would be the sale of a machine at the price it is assessed in the balance sheet (an accounting exchange on the asset side again).

(4) *Revenue, but no receipt*: This transaction increases net financial assets, but the stock of money stays the same. The sale of a good on account is the classic example: the claims of the firm against the customer increase, but as he has not paid yet, the stock of money stays the same.

(5) *Expenditure, but no cost*: Net financial assets decrease, but net worth stays the same. This is only possible if tangible assets increase by the same amount as net financial assets decrease, e. g. by purchasing a machine which shows up in the balance sheet at the purchasing price.

(6) *Expenditure, but no payment*: Net financial assets decrease but the stock of money stays the same. An example is the purchase of inputs on account: the firm's liabilities increase but as there is no immediate payment, the stock of money stays the same.

(7) *Yield, but no revenue*: Net financial assets stay the same, but net worth increases. This can take place only by an increase in (the value of) tangible assets. It can be the result of a bequest the firm receives or of an increase in the market value of a tangible asset the firm already possesses, e. g. an increase in the value of property after a change in building laws.

(8) *Cost, but no expenditure*: This transaction also leaves net financial assets unchanged, but net worth decreases. Therefore, this decrease must result from a decrease of tangible assets. The most important example is depreciation of existing equipment and machinery.

2.2 Partial, relational, and global statements

The second important building block of balance mechanics is the division of an aggregate economy (a closed economy or the world as a whole) into a group and a complementary group. A group can be a single economic unit, a sector of the economy or any other relevant subset, depending on the problem at hand. The central message of balance mechanics is the fact that many economic statements are only true for single economic units or a group of economic units but not for the aggregate economy. An – at first sight – trivial example is the difference between revenues and expenditures (in the above mentioned sense): the revenues of an economic unit (or a group of units) can differ from its expenditures; for example, a private household can have revenues to the amount of EUR 5,000 and expenditures to the amount of EUR 4,000. But as the revenues of one person are the expenditures of another person, a single person or a group can only then succeed in achieving a financial surplus if the complementary group is willing to accept (or is trying to achieve) a commensurate financial deficit. For the aggregate economy revenues and expenditures are necessarily identical. For every economic unit (that is: for every single economic unit) revenues and expenditures can differ, for all economic units (that is: for all economic units together or for the aggregate economy as a whole) revenues and expenditures are necessarily the same. The statement which is valid only for a single economic unit or a group is called *partial statement*; the statement which is valid only for the aggregate economy is called *global statement*; and the *relational statement* makes clear how the apparently paradoxical relation between the other two statements can be resolved.[4]

Concerning the relation between revenues and expenditure one can formulate the following

Partial statement: For each economic unit and each group of economic units an increase in expenditures means a decrease of net financial assets, an increase in revenues means in increase of net financial assets. (STÜTZEL 1978, p. 72)

For a (group of) single economic unit(s) it is perfectly possible to decrease its net financial assets, be it by increasing its expenditures with unchanged revenues or by decreasing its revenues with unchanged expenditures. But then you can formulate the following

Relational statement: An economic unit or a group of economic units can achieve a decrease of its net financial assets by increasing its expenditures only if the complementary group achieves (or accepts) an increase of its net financial assets. (STÜTZEL 1978, p. 73)

One has to take into account that one person's expenditures are necessarily another person's revenues; analogously, the one person's financial deficit is another person's (or several other persons') financial surplus. The increase of one person's net financial assets is therefore necessarily the decrease of another person's net financial assets. Therefore we have the following

---

[4]   The terms are LINDNER's, introduced in LINDNER (2012), p. 5, to translate STÜTZEL's *Partialsatz*, *Globalsatz* und *Satz zur Größenmechanik*.

Global statement: The aggregate economy (the collectivity of all economic units) can never change its net financial assets by an increase or decrease of revenues or expenditures. (STÜTZEL 1978, p. 73)

In the aggregate economy, net financial assets can never be increased, but only shifted between economic units. Furthermore: As net financial assets are defined as gross financial assets minus liabilities and as one person's financial asset is another person's financial liability, an adding-up of all net financial assets of all economic units must necessarily lead to the result that net financial assets of the economy are zero in the aggregate.

One important qualification is the idea of "behavior in lockstep" (STÜTZEL 1978, p. 29 and 50): that leads to the peculiar result that the global statement applies also to each single economic unit. Referring to revenues and expenditures that means that every economic unit has exactly the same amount of revenues as of expenditures, so that there are no balances (or already existing balances stay the same). If all economic units increase their expenditures in lockstep the initial amount of each person's net financial assets is no brake for increasing expenditures as it does not change. Therefore the value of net financial assets does not limit expenditures as such but only the possibility of deviating from lockstep behavior. As a further consequence, there is no simple correlation between the amount of flow variables (e.g. expenditures) and the changes of stock variables (e.g. net financial assets) but only a correlation between deviations from lockstep and changes of stock variables.

3.   The Value of teaching balance mechanics at the beginning of the macroeconomics class

A firm grasp of balance mechanics leads to a clearer understanding of the logical relationships within a macroeconomy. Furthermore, as these relationships are valid always and do not depend on certain behavioral assumptions one gains a firm ground macroeconomic models can be built upon. In the following, it shall be demonstrated how the mastery of these relationships helps in getting a better understanding of macroeconomics: mastering the accounting relationships leads to a better understanding of the relation between saving and investment (section 3.1), it is a consistency check when evaluating macroeconomic models (section 3.2), and one can evaluate macroeconomic policy proposals, e.g. the case for a funded pension system (section 3.3).

3.1   Example 1: The coordination of saving and investment

The relation between 'saving' and 'investment' is one of the age-old problems of macroeconomic theorizing. A firm grasp of balance mechanics and the accounting relationships helps to get a better understanding of this relation and to avoid common misunderstandings.

3.1.1   The different meanings of 'saving'

'Saving' is a term that is used for quite different issues; many macroeconomic controversies arise because the different meanings of 'saving' are equated with one another, although they

describe quite different processes. Therefore it is important to clear which meanings the term 'saving' can have in a macroeconomic context. There are four of them:[5]

- 1st meaning: *increase of net worth*
  If 'saving' is meant to denominate the increase of net worth, it is – for the private household and the state – the difference between (net) income in a period and consumption in the same period. For a firm, it denominates the firm's retained earnings, that is the difference between yields and cost in the same period not distributed to the owners of the firm. Dissaving would mean that the amount a household spends for consumption is larger than his/her income, so his net worth decreases. For a firm, it is equivalent with a loss (disregarding personal drawings by the firm's owners).

- 2nd meaning: *increase of net financial assets*
  If 'saving' is meant to denominate the increase of net financial assets, it is the difference between revenues and expenditures of the same period. If an economic unit has spent less than it has earned his/her stock of net financial assets has increased – but not necessarily his/her net worth, as the increase of net financial assets can be the result of selling a tangible asset.

- 3rd meaning: *decrease of consumption*
  'Saving' within the meaning of decrease of consumption means that an economic unit decreases his/her consumption expenditures compared to the consumption expenditures of the last period. This meaning is only applicable to private households and the state as firms do not consume by definition.[6]

- 4th meaning: *shift to long-term assets*
  'Saving' is often meant to denominate not an *increase* of wealth but a *regrouping* of wealth, especially within the group of financial assets. 'Saving' in this sense means that already existing financial assets – e.g. means of payment or the deposits on savings accounts – are used to buy longer-term (financial) assets – long-term bonds, shares or tangible assets. The *stock* of wealth does not increase, only the *composition* of wealth – in the direction of less liquid assets with a higher expected return.

These different meanings of the term 'saving' must not be equated, even if they can coincide of course: if a household wants to have a larger increase of net worth out of his given income he has to decrease his/her consumption compared to an earlier period; and as households normally increase their net worth by increasing their stock of net financial assets the first three meanings of 'saving' coincide in this case. But if the household's income increases between the first and the second period, he/she can realize a larger increase of net worth and of net financial assets (meaning 1 and 2) without decreasing his/her consumption expenditures (meaning 3). He/she can save (= increase his/her net worth) without saving (= decrease his/her consumption expenditure).

In national income accounting 'saving' always means increase in net worth. Taking this into account it is quite simple to understand the famous equality of I and S, of investment and sav-

---

[5] This systematic differentiation between the meanings of ‚saving' is taken from GRASS/STÜTZEL (1988), p. 365.
[6] In spite of its common use, the term ‚public consumption' is also misleading as it denominates the governmental services provided to a state's citizens; these are normally supplied free of charge and are financed by taxes.

ing. I and S are always the same in a closed economy (or in the world). That is simply because each economic unit can increase his/her net worth by increasing the stock of net financial assets or by increasing the stock of tangible assets (= investment). But as, on an aggregate level, the stock of net financial assets is always equal to zero, the global increase in net worth, S, can only consist in an increase of tangible assets, I.

But in textbooks very often this identity is used to show that an increase of 'saving' in the sense of a decrease of consumption or an increase of financial assets of a sector leads to higher investment or that an increase in the public deficit – often called 'public dissaving' – would decrease national saving and lead to lower investment. One telling example is the discussion of the loanable funds theory by MANKIW in his textbook (1998). To take out just one example MANKIW states (p. 278 f.):

> "When the government runs a budget deficit, public saving is negative, and this reduces national saving. In other words, when the government borrows to finance its budget deficit, it reduces the supply of loanable funds available to finance investment by households and firms. […] *When the government reduces national saving by running a budget deficit, the interest rate rises, and investment falls*. Because investment is important for long-run economic growth, government budget deficits reduce the economy's growth rate." (italics in the original)

Even without going into the details of loanable funds theory[7] a knowledge of the accounting relationships and the different meanings of 'saving' makes clear at once that already the last part of the first sentence is false. Running a budget deficit means a decrease of net financial assets of the government but that is necessarily equal to an increase of the financial assets of another sector. So it is wrong to state unconditionally that national saving decreases. Furthermore the chain of events concerning interest rates and investment described by Mankiw is by no means clear or self-evident as will be shown below.

3.2.2 The connection between 'saving' and investment

In many textbooks and also in a lot of public debates it is argued that saving is a precondition for investment, e.g. by saying that, to enable (additional) investment, a household has to refrain from consuming part of his/her income and transfer this money to the corporate sector, either directly (by purchasing corporate bonds) or indirectly (via the banking system). But the balance mechanics allow to look at the propostions more closely, to detect the logical fallacies, and to get a better understanding about the relation between 'saving' and investment in the macroeconomy.

a)   'Saving' as a financial precondition for investment?

The most common form of the logical fallacy concerning saving and investment starts by assuming that carrying out an investment project requires financial means. These financial means are taken either directly from households buying corporate bonds or from the banks where households have deposited their financial surpluses. As with a given income the only

---

[7]   An in-depth and effective critique of the loanable funds theory based on accounting relationships is given by LINDNER (2015).

possibility for a household to achieve a financial surplus (or to increase it) is to decrease consumption, this decrease of consumption is a precondition for realizing a financial surplus which in turn serves to finance investment. Therefore, 'saving' becomes a precondition for investment.

But this is a false idea about macroeconomic processes. And the root of this false idea is an overhasty transfer of a relation valid for a single economic unit to the global economy. The balance mechanics have already shown that net financial assets in the economy cannot be increased but only shifted around. Therefore we have the following set of partial, relational, and global statements (Stützel 1978, p. 73 f.)

Partial statements: 'Investment' in the sense of an increase in investment expenditures and 'investment' in the sense of having a financial deficit are positively correlated. The demand for credit to have a constant liquidity (that is, a constant stock of means of payment) is the greater the greater are the investment expenditures.

The lower the expenditures, the higher the financial surplus. 'Saving' (decrease of consumption) in the sense of reducing expenditures and 'saving' (decrease of consumption) in the sense of realizing a financial surplus are positively correlated.

Taken together, these two statements make up the just-mentioned idea of financing investment via saving: if firms want to carry out an investment they have an additional demand for means of payment which is provided by the saving households.

Relational statements: There is no correlation between the amount or the increase of investment expenditures of a (group of) economic unit(s) and its demand for credit to ensure a constant liquidity. This demand for credit depends only on the amount by which the complementary group wants to increase its net financial assets regardless by how much investment expenditures increase.

There is no correlation between 'saving' in the sense of a decrease of expenditures and 'saving' in the sense of realizing a financial surplus. By decreasing its expenditures a group realizes a financial surplus only if the complementary group strives for (or accepts) a financial deficit. But even without decreasing expenditures a group always realizes a financial surplus if the complementary group conducts a financial deficit.

Global statements: Demand for credit to ensure a constant liquidity is always zero, regardless whether expenditures increase or decrease.

A decrease of expenditures always leads to a decrease of revenues, never to a financial surplus.

Let's look more closely what happens if households decrease their consumption expenditures and therefore 'save' in this sense. For a start, the decrease of consumption expenditures – compared to an earlier period – leads to a decrease of the revenues of firms, and therefore

their financial means do not increase but decrease. Of course one can imagine that the households lend these financial means to the firms, but that does not finance an investment; with the lending, the firms' liquidity status is the same as before the 'saving' decision of the households. This decision did not provide financial means to the firms, it withdrew them.

Secondly, to what degree do firms need additional means to finance investment? The demand for credit does not derive from the level of investment expenditures as such but by how much the investing firm deviate from lockstep behavior.

It is correct – in the sense of a partial statement – that there is a positive correlation between an increase of investment expenditures and the creation of a financial deficit. The higher are the investment expenditures, the higher is the demand for credit to preserve a constant liquidity status. But concerning the relations between groups of economic units there is no correlation between a group's investment expenditures and the demand for credit to keep liquidity constant. The demand for credit rather depends on the amount by how much the net financial assets of the complementary group increase. If the complementary group does not increase its net financial assets – that is if it spends immediately the revenues it got due to the expenditures of the investing group – the investing group directly receives revenues by the same amount, independently from the amount of the investment expenditures. As a consequence the global statement applies: for the aggregate economy the demand for credit to preserve a constant liquidity status is zero regardless how investment expenditures develop.

If the economic units do not plan a (noteworthy) increase of financial assets, but use additional revenues for further expenditures, there is no noteworthy demand for credit. Even if the single firm assumes that it has to make extensive use of credit lines the effective need of credit may be much lower: By carrying out the first investment a firm increases the revenues of a second firm and therefore this firm's possibilities for self-financing; if the second firm invests these earnings, the possibilities for self-financing of a third firm are increased; higher expenditures going to households and the state increase their expenditures and therefore the revenues of other firms; in the end, the earnings of the first firm increase more than expected so that in the aggregate the need for using credit lines is much smaller than hypothesized by looking at the investment plans.

But if there is a certain demand for credit – as the investments plans will not be carried out in perfect lockstep – how is it satisfied if not by 'saving' (= decrease of consumption) on the part of households? The loans given to firms do not stem from financial surpluses realized by households in the current period (these would only cause an additional need for finance on the part of the firms) but either from the *stock* of households' financial assets or from the creation of loans – that is: money creation – by the commercial banks.

If the households give loans to firms (e.g. by purchasing a corporate bond) the portfolio of households is regrouped and the balance sheet of the firm is extended. In the household's portfolio there is an asset swap: the stock of currency or checkable deposits decreases, the stock of corporate bonds increases. On the part of the firm there is a balance sheet extension: the stock of currency or checkable deposits increases and so does the stock of liabilities due to the emitted bond. For the household as well as for the firm, the amount of net financial assets

has stayed the same but their structure has changed. If the firm gets a loan from a commercial bank, the balance sheets of both the firm and the bank are extended.
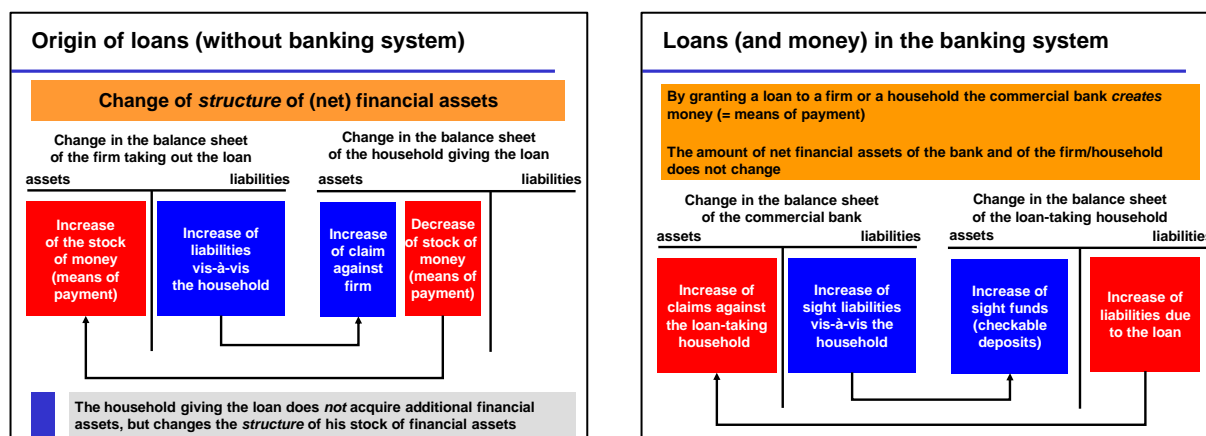

Origin of loans (without banking system)	**Loans (and money) in the banking system**
Change of *structure* of (net) financial assets	By granting a loan to a firm or a household the commercial bank *creates* money (= means of payment)
	The amount of net financial assets of the bank and of the firm/household does not change
Change in the balance sheet of the firm taking out the loan	Change in the balance sheet of the household giving the loan	Change in the balance sheet of the commercial bank	Change in the balance sheet of the loan-taking household
assets · liabilities	assets · liabilities	assets · liabilities	assets · liabilities
Increase of the stock of money (means of payment) · Increase of liabilities vis-à-vis the household	Increase of claim against firm · Decrease of stock of money (means of payment)	Increase of claims against the loan-taking household · Increase of sight liabilities vis-à-vis the household	Increase of sight funds (checkable deposits) · Increase of liabilities due to the loan
The household giving the loan does *not* acquire additional financial assets, but changes the *structure* of his stock of financial assets	

Figure 4: The origin of loans
Source: author's presentation

As soon as the firms spend the acquired means of payment for an investment good, 'saving' (in the sense of increase of net worth) comes into existence: at first instance as profit in the corporate sector as the purchase of the investment good is an expenditure, but not a cost for the purchasing firm; and for the producer of the investment good the sale is at the same time revenues and yield. Therefore the investment expenditure means a profit for the corporate sector as a whole and therefore – as the retained earnings are the increase of net worth of the corporate sector – corporate 'saving'. This increase in net worth will not get lost when the producer of the investment good spends the revenues again, e.g. for wage payments.[8] At the moment of the wage payment the firm's net worth decreases (wage payment is a cost for the firm) whereas the household's net worth increases. If the household buys consumption goods with his/her income, his/her net worth will decrease while the net worth of the firm the consumption good is purchased from increases etc. All told, it is not 'saving' (decrease of consumption) that induces investment, but by carrying out an investment, 'saving' (increase of net worth) comes into existence at the same time.

b)   Does 'saving' decrease the interest rate and (therefore) induce investment?

Another argument for 'saving' leading to investment is to say – as MANKIW does in his textbook (p. 274 ff.) – that in increase in 'saving' leads to a decrease of interest giving an incentive for investment. The idea is illustrated by a diagram showing 'saving' that depends positively on interest and is the supply of loanable funds whereas investment depends negatively on interest rates and is the demand for loanable funds.[9]

---

8   To be sure, in the course of time depreciation will reduce the value of the tangible asset.
9   The following paragraphs give only a brief sketch of the argument against the loanable funds theory. In-depth critiques have been given by BIBOW (2001) and LINDNER (2015).
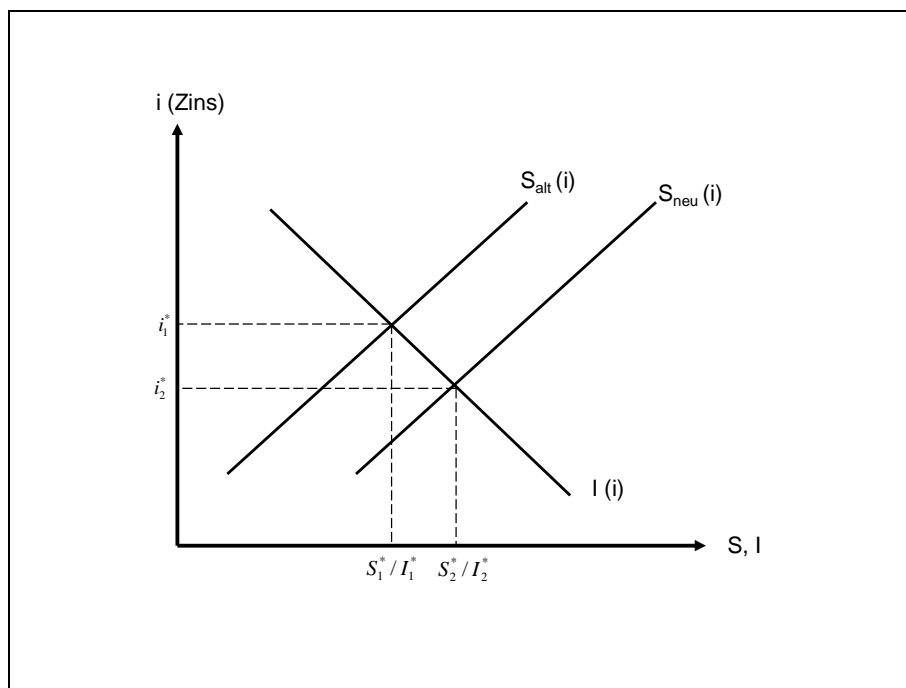
Figure 5: The loanable funds theory
Source: in dependence of MANKIW (1998), p. 275

If there is an increase in the propensity to 'save' (due to a lower time preference of house-holds or to a change in tax policy – MANKIW's example) the saving curve – the supply of loanable funds – shifts to the right. At the old interest rate, the supply of loanable funds is higher than the demand; this excess supply leads to a decrease of the price, that is: the interest rate. The decrease of interest leads, in turn, to an increase of the amount of loanable funds demanded and therefore to an increase of investment expenditures; we have a new equilibrium with lower interest and higher 'saving'/investment.

But on closer inspection, this presentation is anything but clear. Even if one accepts that 'saving' is the same as a financial surplus searching for profitable assets and investment is the same as a financial deficit (as was shown in the last section, this is a complete arbitrary assumption, when taking balance mechanics seriously) the mechanism cannot work the way presented. For if households actually realize a financial surplus by decreasing consumption and want to use this surplus for buying interest-bearing assets, that does not lead to a reduction of interest. Realizing the financial surplus on the part of the households constitutes a financial deficit on the part of firms. Given their payment obligations and their liquidity preference firms have to bridge this deficit by taking out additional loans. Therefore it is not the case that households increase 'at first' their financial surpluses (and with them the supply of loanable funds) and 'then' the decrease of interest lets investment (and with it the demand for loanable funds) increase. Rather the households' financial surplus is necessarily equivalent with firms' financial deficit.

The diagram suggests a mistaken analogy to supply and demand on the goods market. On the goods market the supply can increase (due to new technologies or other cost-saving innovations) shifting the supply curve to the right. At the old equilibrium price there is excess supply; some producers do not find customers any more. Competition leads to a decrease of the

14

price so that the quantity demanded increases and the market arrives at a new equilibrium with a larger quantity and a lower price. But supply and demand for a single good are independent from one another; it is readily imaginable that producers increase their production but are not able to sell this additional production at the old price as there are not enough buyers so that equilibrium is only restored at a lower price. But this deliberation is wrong when applied to financial surpluses and deficits as a financial surplus at one unit cannot exist without a financial deficit at another unit.[10]

Only another meaning of 'saving' – the fourth one mentioned in section 3.1.1 – makes sense of the idea of 'saving' leading to a decrease of interest. A decrease of interest can result if we understand by 'saving' the *regrouping of existing wealth towards long-term assets* – instead of the formation of new wealth. If the households plan to regroup their wealth by purchasing long-term assets – e.g. ten-year corporate bonds – the prices of these bonds will rise and their current yield fall without causing financial deficits on the part of firms. As aggregate demand stays the same the lower interest could indeed give firms an incentive to carry out additional investment projects. Only in this sense it is correct to say that 'saving' can (lower interest and therefore) induce investment. But: it is not decrease of consumption that induces investment, but a decrease of liquidity preference decreases the interest rate und may give an incentive to additional investment.

3.2   Example 2: ROBERT BARRO's macroeconomic model

Although balance mechanics are not a full-blown economic model as they are only concerned with purely logical relationships, the approach is a useful tool for checking the internal consistency of economic model. This will be shown by looking at the macroeconomic model used by ROBERT BARRO in his textbook (BARRO 2008). In the first sub-section, the central propositions of the model are presented; the second sub-section shows the problems if one takes balance mechanics seriously.

3.2.1   A brief sketch of the model

In his textbook *Macroeconomics: A Modern Approach* (2008) ROBERT BARRO is quite consequent: he first develops a macroeconomic equilibrium model with rapid market-clearing and introduces only at a later stage (in chapters 15 and 16) things like misperceptions and sticky prices. Due to the clarity of his presentation the essential assumptions and parts of the model become clear.[11]

In his model, BARRO does not distinguish between households and firms. All economic transactions are carried out by households; the households run a family business demanding labor

---

[10]   This conclusion does not change if you take the banking system into account. People not understanding how money is created think that an increase of 'saving' by households leads to an increase of money brought to banks (savings accounts). To 'get rid of that money' banks have to lend it out; and to do so they have to decrease their interest so that more economic units take out loans. But the first step of the argument is already mistaken: If households 'save' banks do not receive additional amounts of money they must lend out again. If households had not 'saved' they would have bought consumption goods; therefore the money would have been transferred to the accounts of the firms but it would not have left the banking system. Therefore, a decision to 'save' on the part of households does not lead to an inflow of money to the banking system that did not exist before.

[11]   The following is a abbreviated version of BARRO (2008), pp. 122-168.

and capital for the production of goods, are suppliers of labor for other family businesses and own all (real) capital which is rented to other firms to carry out production.

The households act on four macroeconomic markets: the goods market, the labor market, the rental market and the bond market. Households earn and use their income on these markets.

On the goods markets, the households as producers of goods act in perfect competition. Their revenue results from the number of produced goods (Y) that are sold at price P. The costs of production are, on the one hand, the wage bill, calculated by the product of the nominal wage rate w and the amount of labor demanded L^d; on the other hand there are the rental payments for the use of capital goods, calculated by the product of the nominal rental price R and the number of rented capital units K^d. Barro assumes that the households/family businesses rent all capital necessary for production and do not use the capital goods they own; these are also offered for rent to other households/family businesses. Therefore the profit (Π) of a family business is:

$$\Pi = PY - (wL^d + RK^d) \qquad (1)$$

On the labor market, households receive labor income, calculated as the product of the wage rate w and the labor supplied L^s. For a start, it is assumed that households offer all their labor, that is $L^s = L$, so that

$$wage\ income = wL$$

On the rental market, households receive an income calculated by the product of the nominal rental price R and the amount of capital supplied, i.e. rented out, by the households; again, it is assumed that households supply all of the capital they own, so that $K^s = K$, therefore:

$$gross\ rental\ income = RK$$

Capital is assumed to depreciate with the yearly rate δ. To calculate the (nominal) value of depreciation, the quantity of capital K is valued with the price P; the product is multiplied with the rate of depreciation δ. This gives the

$$net\ nominal\ rental\ income = RK - \delta PK$$
$$= \left(\frac{R}{P}\right)PK - \delta PK$$
$$= \left(\frac{R}{P} - \delta\right)PK$$

Therefore, we have the

$$rate\ of\ return\ on\ owning\ capital = \left(\frac{R}{P} - \delta\right)$$

On the bond market, households receive an interest income, due to the amount of held bonds, B. Barro assumes only one kind of bond with a very short maturity and disregards different risk profiles of the issuers (who are also households). Therefore, each bond carries the same interest rate, i. This gives the

$$interest\ income = iB$$

The interest income can be positive or negative, depending on the household being a net creditor or a net debtor.

Therefore, a household's total income is

$$household\ nominal\ income = \Pi + wL + \left(\frac{R}{P} - \delta\right)PK + iB \qquad (2)$$

A household can use his income to buy consumption goods or to increase his net wealth, i.e. to 'save'. For a consumption good, you have to pay the price P, so that

$$household\ nominal\ consumption = PC$$

To increase net wealth, there are three possibilities: buying bonds (B) – financial assets –, buying capital (K) – tangible assets – or increasing the amount of money (M) – means of payment – which exists only in the form of currency in this model. Money is needed for buying goods, but Barro assumes that every household wants to hold a constant sum of money[12], so that

$$\Delta M = 0$$

Increases in net wealth take place only by acquiring bonds or capital goods. The expected rate of return determines which kind of asset is bought; if financial as well as tangible assets are to be held their rates of return have to be equal:

$$i = \frac{R}{P} - \delta \qquad (3)$$

As there are no other determinants of the nominal interest rate, the direction of causality runs from the rate of return on capital to the interest rate on bonds.

The increase in (nominal) net wealth – 'saving' – of a household is

$$nominal\ saving = \Delta M + \Delta B + P\Delta K \qquad but\ as\ \Delta M = 0$$

$$= \Delta B + P\Delta K$$

Inserting the condition of equal rates of return for bonds results in

$$household\ nominal\ income = \Pi + wL + i(B + PK)$$

Equating nominal income with the possible uses of income (consumption and saving [increase of net wealth]) gives the nominal budget constraint of a household:

$$PC + \Delta B + P\Delta K = \Pi + wL + i(B + PK) \qquad (4)$$

Assuming, firstly, profit maximization as behavioral motive of households, secondly, the usual neoclassical properties of the production function (decreasing returns to labor and capital, constant returns to scale) and, thirdly, flexible and therefore market-clearing prices one gets the familiar result that profits in equilibrium are zero, the real wage rate (w/P) is equal to the marginal product of labor (MPL), and the real return on capital is equal to the marginal product of capital (MPK). The national product Y is completely divided into labor income and

---

[12]   In an older version of his textbook (BARRO 1997) he gives the following reason for this assumption: "By making this assumption, we avoid a clutter of minor terms in the household's budget constraint over more than one period" (BARRO 1997, p. 99). It seems that it doesn't come to his mind that this assumption has far reaching consequences.

capital (rental) income; in the aggregate, there is no interest income, as each receiver of interest income (a creditor or bond holder) is accompanied by a payer of interest income (a debtor or bond issuer) so that the net value of bonds is zero in the aggregate. As the rates of return on the bond market must be equal to the returns on the rental market, we have

$$i = MPK - \delta$$

Going from the nominal budget constraint to the real budget constraint by dividing by P, we get:

$$C + \frac{1}{P}\Delta B + \Delta K = \frac{w}{P}L + i\left(\frac{B}{P} + K\right) \qquad (4a)$$

$$C + \frac{1}{P}\Delta B + \Delta K = \frac{w}{P}L + i\frac{B}{P} + iK$$

Substituting equation (3) for i in the last summand results in:

$$C + \frac{1}{P}\Delta B + \Delta K = \frac{w}{P}L + i\frac{B}{P} + \frac{R}{P}K - \delta K \qquad (4b)$$

Aggregating this budget constraint over all households the amount of bonds held sums up to zero as every creditor has to be accompanied by a debtor; therefore the aggregate budget constraint is

$$C + \Delta K = \frac{w}{P}L + \frac{R}{P}K - \delta K \qquad (5)$$

Due to the properties of the neoclassical production function the first two summands on the right-hand side of the equation must be equal to the national product Y. Therefore we arrive at:

$$C + \Delta K = Y - \delta K \qquad (5a)$$

So the consumption decisions of households seem to decide on the amount of net investment in the economy: decrease of consumption and the formation of net wealth accompanied by it induces equally high investment. BARRO (2008, p. 168) explicitly states: "Therefore, the left-hand side of the equation implies that the economy's net investment, ΔK, is determined by households' choices of consumption, C. Given the real net domestic product, one unit more of consumption, C, means one unit less of net investment, ΔK." Additionally, unemployment due to insufficient aggregate demand is ruled out, as each decrease of demand for consumption goods induces an appropriate increase of investment good production, so that full employment is retained and involuntary unemployment is unable to arise.

3.2.2 Critique of the model

Indeed all these results are up to one crucial assumption which is considered negligible by BARRO himself: the model assumes a lockstep of payments and receipts (on the other hand, a difference between expenditures and earnings is allowed, as the households are able to buy or issue bonds). This is due to the assumption that every household wants to hold a constant amount of money, $\Delta M = 0$. But this means nothing else than the household striving – and realising – to keep payments and receipts in (perfect) lockstep.

a)   Determination of interest

Assuming perfect lockstep of payments and receipts leads to a determination of the interest rate only by real (in contrast to monetary) factors. That can be seen clearly if it is assumed that a household wants to increase his/her net wealth and decreases consumption to reach that goal. In case his income does not change that leads to a financial surplus. In the first place, this surplus accrues in the form of money (means of payment); but as it is also assumed that the household wants to hold each increase in financial wealth in terms of bonds he demands bonds on the bond market. If the household has achieved a financial surplus, then necessarily at least one other household has a financial deficit. But as this household also does not want to decrease his/her money holdings, he/she will immediately emit a bond to cover his deficit, so that the increased demand for bonds is met by an increased supply of bonds. A decrease of the interest rate is unnecessary – and will not take place anyway – but this result is simply the consequence of the assumption regarding the constancy of money holdings.

In other words: If it is assumed from the beginning that financial surpluses are invested in bonds and that financial deficits are financed by the emission of bonds to keep money holdings constant, the 'supply' or 'demand' of bonds cannot influence or determine the interest rate – 'supply' and 'demand' are alwalys equal by assumption. Diverging liquidity preferences of households are precluded – and can no longer determine the interest rate. Therefore BARRO has to look for another interest-determining factor – and it is the amount of capital or its marginal product, respectively.

Only if households increase their net wealth by increasing their demand for tangible assets (capital) a decrease of the interest rate can take place. If some households decrease their consumption and demand tangible assets instead, the capital stock increases; but that leads to a decrease of the marginal product of capital and therefore – as the rates of return on tangible assets and financial assets have to be equal – the interest rate defined that way. But this is not a consequence of the decrease of consumption as such but of the assumption concerning the constancy of money holdings: if households wanted to hold their financial surplus for whatever reasons in another form than bonds, e.g. in the form of increased money holdings, liquidity considerations would come into play – and they would influence interest rates independently of real economic factors. But if such liquidity considerations are allowed in the model then it is no longer the case that an increase in 'saving' (that is, a realisation of financial surpluses) leads to a reduction of interest – even the opposite is possible: if all households with financial surpluses want to hold them in the form of money and if all households with financial deficits want to borrow money to keep their liquidity constant, that leads to an increase, not a decrease, of interest.[13]

b)   Unemployment due to Insufficient Aggregate Demand?

BARRO leaves open how a decrease of consumption (e.g. due to a decreased time preference) affects aggregate demand and production. He does not treat this problem but due to the fact that the model incorporates a bond market aggregate demand could be insufficient for full employment. Let's assume that all (or the overwhelming majority of) households decrease

---

[13]   See for example BIBOW (2001, S. 599)

their consumption (due to a decreased time preference) and want to invest the financial surpluses into bonds. It is not clear a priori how many additional bonds really come into existence, as one does not know how the amounts of consumption decreases differ between the households. If all households decreased their consumption in lockstep, that is by the same amount, incomes/revenues would also decrease by the same amount so that none of the households would actually realize a financial surplus that could be invested in bonds – and nobody would suffer from a financial deficit that would have to be consolidated by an emission of bonds, either. Aggregate expenditures and revenues would decrease but as the model still assumes that nobody wants to change his/her money holdings, even if the consumption decreases differ between households interest would not change – at least not necessarily decrease.

Full employment of resources could only be secured if either the reduced time preference of one household would be exactly compensated by a respectively increased time preference of another household, or if the households would strive for tangible assets from the very beginning. In the first case, the decrease of expenditures of one household would be made void by the increase of expenditues of another household; in the second case the structure of production changes: there will be a lower production of consumption goods and a higher production of capital goods.[14] By aggregating the budget constraints of households, which lets vanish the bond holding of households, the second case appears to be the most relevant. But to guarantee that, the bond market must be modelled differently: Bonds must not represent a claim on a certain amount of money but certify the right to goods.[15] In effect, that would mean borrowing and lending goods between households, so that full employment can be ensured.

Furthermore, as the households plan a strict equivalence between payments and receipts, money must necessarily be neutral. Money is just a unit of account and cannot influence real variables. But how then can money be integrated in the model?

c)   The Integration of Money via the Quantity Theory

As is well known, the price level is undetermined in a Walrasian equilibrium. To determine it, traditionally the quantity equation is used: a given money supply and an exogenously given (or instituionally founded) income velocity serve to fix the price level. Furthermore it is stated that the use of money is necessary to carry out transactions. Therefore, each household holds a certain amount of money, even if it does not bear any interest. BARRO justifies the households' money holdings by referring to the high transaction costs that would incur if one wanted to drive the amount of money held down to zero:

> "[I]t would be possible for the household to hold little or no money at every point in time. If each inflow of income were perfectly synchronized with an equal outflow of expenditure on goods or purchases or interest-bearing assets, each household's money balance could always be close to zero. However, this synchronization would require a great deal of effort and planning. We assume, as a general matter, that the household can reduce its average money balance by incurring more transaction costs. […] The general idea is that,

---

[14]   In BARRO's model the problem of restructuring production is bypassed by assuming only one good (corn) that can be either consumed (eaten) or invested (sown).
[15]   This way is chosen in the textbook by FELDERER/HOMBURG (1992).

by putting more effort into money management and, thereby, incurring more transaction costs, the household can reduce its average holding of money, M." (BARRO 2008, p. 237, italics are bold in the original)

So the amount of money balances is the result of an optimizing decision: Money demand is the higher

- the lower the interest rate, as the opportunity cost of holding money decrease;
- the higher the price level, as the household strives for a certain real money balance, so that there is a proportional relationship between the price level and nominal money demand;
- the higher the real income; but due to economies of scale in cash management the desired money balance rises to a lesser degree than income.[16]

This leads to the money demand based on the quantity theory and to the neutrality of money – but this neutrality is simply due to the strict equivalent of payments and receipts. Barro sticks to his assumption concerning money balances: they stay constant as long as the mentionded factors do not change, or they change due to a change of one or more of the factors *in a predictable manner*.

But taking into account balance mechanics such a justification for money demand is simply inconsistent. As long as the stock of money households wish to hold stays constant, it cannot be justified why people hold money in the first place. BARRO says that to keep monetary balances to zero a great synchronization effort would be necessary; but he overlooks the fact that this would be the case for each money stock that is to be kept constant. The difficulty of synchronization does *not depend on whether the desired amount of money holdings is positive or zero but whether it is constant or not*. In the end, there is no reason for holding money as long as it is assumed that people strive for a perfect synchronization of payments and receipts – but this kind of lockstep is necessary to derive the neutrality of money.

The problem of this combination of "payments in lockstep" and demand for money justified by the quantity theory becomes apparent by looking at the quantity equation $MV = PY$. If you take the idea of payments in lockstep seriously, that means that the need for using means of payment M diminishes the more you converge to lockstep, and the velocity V becomes higher. In the end, if perfect and universal lockstep is reached, the need for means of payment is zero, the velocity is infinite (see STÜTZEL 1979, p. 179). But it is simply contradictory to abstract from all deviations from perfect synchronization (by assuming $\Delta M = 0$) on the one hand, and to introduce such deviations via the velocity (and its assumed constancy) on the other hand.

This is a case of confusing a partial statement with a general statement: The quantity theory states that there is a clear connection between the increase of money/means of payment and the increase of exchanges or sales, that is it postulates a connection between a stock variable (money/means of payment) and a flow variable (sales or exchanges per period). But this connection is not valid for the whole economy. If you take into account the balance mechanics,

---

[16] According to BARRO (2008, p. 241) – who refers to empirical results – this is valid for the demand for checking accounts only; concerning the demand for currency, there is an almost proportional relation to real income.

there is no reason why – on a macroeconomic level – there should be a stable relation between these variables and therefore why there should be a constant velocity.

The intensive search for reasons why money demand has become unstable during the second half of the 20th century[17] shows that its stability was seen as the normal case. But taking into account the accounting relationships and balance mechanics the perspective is quite different: As there is no correlation between a stock variable and a flow variable an unstable velocity is the normal case, and the burden of proof lies on the person claiming it to be stable or constant (see also STÜTZEL 1979, p. 250 f.)

3.3   Example 3: The Case for or Against a Funded Pension System

The third example is taken from economic policy and is concerned with the reform of pension systems. The pay-as-you-go pension system which makes up the core of most pension systems in the world is said to be in danger due to lower birth rates, which makes it more difficult to ensure that in later decades the pensions can be paid by the then smaller generation in working age.

To fix – or at least to attenuate – this problem a (at least partial) move to a funded pension system is proposed. Such a system, the argument goes, leads to an increase in 'saving' in the sense of an increased formation of net wealth. One example is CHARLES BLANKART who makes the case for a funded system in his textbook on public-sector economics (BLANKART 2003, p. 399): A funded system substitutes the investment in human capital with an investment in tangible assets. By liquidating them the pensioners are able to finance their twilight years. This investment does not – according to BLANKART – take place in a pay-as-you-go system: If there is not a sufficient number of children, pensions cannot be paid. He uses the following thought experiment to illustrate his point: the population of an isolated island feeds exclusively upon corn that is both a consumption good and an investment good. One day the population decides to do completely without offspring. The last survivors becoming pensioners will starve to death if they have not saved enough corn. According to BLANKART, the thought experiment shows that there is no alternative to saving if there is not sufficient offspring.

But that proposal and the thought experiment show clearly that the different meanings of 'saving' are equated – or rather confused. It is correct and incontrovertible that higher 'savings' in the sense of a higher macroeconomic net worth can attenuate the problem of an ageing society. On a macroeconomic or aggregate level, net worth consists only of tangible assets (machines and equipment) increasing productivity and production and therefore also the income of a now smaller working population. But it is wrong to conclude from that fact, that an increased 'saving' of households leads to an aggregate increase in tangible assets. If you subsidize households' 'saving' by an appropriate tax policy[18], it leads to an increase of households' stock of net financial assets (if the policy is successful and increases households' savings). This increase of net financial assets in the household sector necessarily corresponds to a decrease of net financial assets in another sector: e.g. the profits of the corporate sector decrease,

---

[17]   Cf. LAIDLER (1993) for a review of this research.
[18]   This policy is also advocated by MANKIW (1998, p. 274 ff.)

as the yields/revenues flowing from the household sector have diminished. It is by no means apparent how this fall of yields/revenues should lead to an increase in corporate investment. In section 3.1.1.b it was shown that there is no reason to expect a fall in interest rates. At best, the central bank could trigger such a process; but it could do that without letting households dwindle down corporate earnings.

Therefore it is simply a false conclusion that is drawn: Starting with the correct insight that an increase of aggregate net worth – that is: an increase in society's tangible assets – attenuates the mastering of higher social spending, proponents of funded systems draw the wrong conclusion that a decrease of consumption on the part of households and an increase of households' stock of net financial assets leads to such an increase in aggregate net worth or is even identical to it.

Some authors (e.g. BREYER/BUCHHOLZ [2008], p. 136) concede that an increase in an individual's net worth could consist in holding additional government bonds – that is, the individual's saving is simply matched by an increase of government debt without increasing the stock of tangible assets. But the authors counter that by stating, that the argument of the advantageous effects of an increase in 'saving' is made under the *ceteris paribus* assumption, that is, among other things, the government deficit has to stay the same. The reason is that by linking an increase in government deficits with the cutback of the pay-as-you-go system, this system would be introduced again by the backdoor.

But this is a fallacious argument: If households' net financial assets increase, it is logically impossible that other sectors' financial assets – be it the government or the corporate sector – stay the same.

Another result is possible only if households and indeed each economic unit strive only for tangible assets from the outset and do not plan any changes in their net financial assets. This is the 'lockstep case' again and it would indeed circumvent the problem: households would demand (newly produced) tangible assets instead of consumption goods, and the firms would just have to restructure their production; that might take some time but does not pose fundamental problems. To put it bluntly: if households 'save' by building/demanding real estate used by themselves and build up stocks of canned food for the retirement period, then there is neither a problem of insufficient demand nor a problem of coordinating 'saving' and investment (because they are identical). But surely this process does not match the reality of households' saving.

The argument, that a pay-as-you-go pension system leads to a reduction of households' 'savings' and therefore to a reduction of (real) capital accumulation, goes back to a paper by MARTIN FELDSTEIN (1974) – and it is in this paper where the origin of the mistake can be found. If one takes a closer look at this paper, it can be seen that the different meanings of 'saving' are not distinguished clearly or that FELDSTEIN implicitly assumes 'lockstep behavior', respectively. The topic of the paper is the problem whether the existence of a pay-as-you-go pension system reduces private households' saving (and whether it influences the date of retirement). The result of Feldstein's research is indeed, that households' 'saving' (and due to the data he uses, that must denote the increase of households' stock of net financial assets) are reduced by 30-50%. But he concludes from this fact: "The evidence that the social security

program approximately halves the personal savings rate *implies* that it substantially reduces the stock of capital and the level of national income." (FELDSTEIN 1974, p. 922, emphasis added). He concludes from the fact, that the yearly increases of households' net financial assets have greatly diminished after the introduction of pay-as-you-go systems, the increases of tangible assets (real capital) have also diminished without actually checking the development of real capital formation. And this conclusion is adopted by many authors in the aftermath.

4. Concluding remarks

The paper has, by using three different examples, shown the value of making students acquainted with balance mechanics and the elementary accounting relationships it implies. A great advantage of this instrument of analysis is its independence from behavioral assumptions (as it is about purely logical relations) and also from a single macroeconomic 'school'.[19]

Of course, balance mechanics is not a full-blown theory but it is an important tool that can ensure the logical consistency of models. The next step will be to connect these logical relations with behavioral assumptions and to make clear where the pure logic ends and where the model (in a strict sense) begins. But as balance mechanics make clear the relation between statements that are valid for an individual actor and statements that are valid for the economy as a whole they could provide a step towards the development of meaningful microfoundations for macroeconomic theory[20] that go beyond the notorious 'representative agent' – which very often is just a synonym for committing a fallacy of composition.

---

[19] In this paper, BARRO's neoclassical model was examined. But balance mechanics is not, by itself, 'Keynesian' and can also be used to critically evaluate (Post) Keynesian models which sometimes also suffer from misunderstandings of these relations. REISSL's critique (REISSL 2015) of a paper by KEEN (2014) is a recent example.

[20] KING (2012) strongly and persuasively attacks the idea of microfoundations that is normally advocated in economics – but this is not what is meant here.

References

BARRO, R. J. (1997): *Macroeconomics* (5th ed.). Cambridge: MIT Press.

BARRO, R. J. (2008): *Macroeconomics: A Modern Approach*. Mason: Thomson South-Western.

BIBOW, J. (2001): "The loanable funds fallacy: exercises in the analysis of disequilibrium". *Cambridge Journal of Economics*, vol. 25, p. 591-616.

BLANKART, C. B. (2003): *Öffentliche Finanzen in der Demokratie* (5th ed.). Munich: Vahlen.

BOFINGER, P. (2015): *Grundzüge der Volkswirtschaftslehre: eine Einführung in die Wissenchaft von Märkten*. München: Pearson.

BREYER, F., BUCHHOLZ, W. (2008): *Ökonomie des Sozialstaats* (2nd ed.). Berlin etc.: Springer.

FELDERER, B., HOMBURG, S. (1992): *Macroeconomics and New Macroeconomics* (2nd ed.). Berlin: Springer.

FELDSTEIN, M. (1974): "Social Security, Induced Retirement, and Aggregate Capital Accumulation". *Journal of Political Economy*, vol. 82, no. 5, p. 905-926.

GODLEY, W., LAVOIE, M. (2007): *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production, and Wealth*. New York: Palgrave Macmillan.

GRASS, R.-D., STÜTZEL, W. (1988): *Volkswirtschaftslehre: eine Einführung auch für Fachfremde*. Munich: Vahlen.

LAIDLER, D. E. W. (1993): *The Demand for Money: Theories, Evidence and Problems* (4th ed.). New York: HarperCollins.

KEEN, S. (2014): "Endogenous Money and Effective Demand". *Review of Keynesian Economics*, vol. 2, no. 3, p. 271-291.

KING, J. E. (2012): *The Microfoundations Delusion: Methaphor and Dogma in the History of Macroeconomics*. Aldershot: Edward Elgar.

LINDNER, F. (2012): "Saving does not finance Investment: Accounting as an indispensable guide to economic theory". *IMK working paper*, no. 100. Düsseldorf: Macroeconomic Policy Institute.

LINDNER, F. (2015): "Does Saving Increase the Supply of Credit? A Critique of Loanable Fund Theory". *World Economic Review*, vol. 4, p. 1-26.

MANKIW, N. G. (1998): *Principles of Macroeconomics*. Fort Worth: Dryden.

REISSL, S. (2015): "A Critique of Keen on effective demand and changes in debt". *Real-World Economics Review*, no. 72, p. 96-117.

SCHMIDT, J. (2011): „Die Bedeutung der Saldenmechanik für die makroökonomische Theoriebildung". In: H. HAGEMANN, H. KRÄMER (ed.): *Keynes 2.0 – Perspektiven einer modernen keynesianischen Wirtschaftstheorie und Wirtschaftspolitik* (Jahrbuch Ökonomie und Gesellschaft, vol. 23). Marburg: Metropolis, p. 111-147.

SCHMIDT, J. (2012): „Sparen – Fluch oder Segen? Anmerkungen zu einem alten Problem aus Sicht der Saldenmechanik". In: M. HELD, G. KUBON-GILKE, R. STURN (ed.): *Lehren aus der Krise für die Makroökonomik* (Jahrbuch Normative und institutionelle Grundfragen der Ökonomik, vol. 11). Marburg: Metropolis, p. 61-85.

STÜTZEL, W. (1978): *Volkswirtschaftliche Saldenmechanik: ein Beitrag zur Geldtheorie* (2. Aufl.). Tübingen: Mohr.

STÜTZEL, W. (1979): *Paradoxa der Geld- und Konkurrenzwirtschaft*. Aalen: Scientia.