

Working Paper

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Did Scarce Global Savings Finance the US Real Estate Bubble? The “Global Saving Glut” thesis from a Stock Flow Consistent Perspective

July 27, 2015

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There is a consensus among the majority of economists that the credit supply is limited by current household saving. If governments or foreigners ran deficits, they would absorb this limited saving so that firms could not borrow any longer and had to reduce their investment. This is the “Loanable Funds” theory. Ben Bernanke’s “Global Saving Glut” thesis is based on this view. According to Bernanke, the US depended on South East Asian and commodity exporting countries’ scarce saving to finance the US real estate boom. Using simple accounting rules, the article shows however that credit is never limited by current saving. Often, the exact opposite is true: people can only save after others have taken on credit and paid incomes. This is also the case with the US and its trade partners and creditors: since non-Americans accept the US-Dollar as a means of payment – which only the US can produce – Americans give credit to themselves to finance their current account deficits. Each Dollar that non-Americans invest in the US has either been earned or borrowed in the US before. By their deficits, the US does not absorb scarce saving but allows other countries to increase their income and saving.

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Keywords: Investment, Finance, Saving, Current Account Imbalances, Credit Supply, Global Saving Glut, Loanable Funds Theory, Financial Crisis

JEL-Classification: B2, B4, E2, E5, F3

*This is a revised version of an article originally published in German (Lindner, 2014). I thank Michael Watt for the translation and Ben Schumann for helpful comments. Contact address: fabian-lindner@boeckler.de

Introduction

Among the majority of economists there is a consensus that the credit supply is limited by households' current saving. If the government or foreign countries would absorb this limited saving, companies would be unable to attain loans and would have to reduce their investment. The consensus sees the supply of loans as being limited by a "pot" which is filled by household saving and emptied by government deficits, foreigner's deficits and/or corporate investment. Thus, there is a competition among potential borrowers for households' saving. If the credit "pot" would be depleted, borrowers would have to wait for further household saving to fill it again.

This is known as the Loanable Funds theory (LFT) which was first devised explicitly by Dennis Robertson (1934) and up until now forms the foundations of mainstream economic analysis of national and international economic policy. According to this theory, lower household consumption expenditures, government expenditures and / or foreign expenditures (relative to their respective revenues) would be necessary to increase the pot's size.

This is the theoretical underpinning that gives way to demands for more capital funding of pensions (Börsch-Supan and Gasche, 2010) and government austerity measures (Cochrane, 2009; Fama, 2009). With more capital funding due to higher household saving, companies could invest more; and with lower government expenditures and deficits more loans would be available to companies for investment.

Furthermore, the Loanable Funds theory is the basis for the Global Saving Glut theory devised by the former head of the Federal Reserve, Ben Bernanke (2005). Bernanke states that the United States rely, due to their low saving rate, on saving from Asian and commodity exporting countries in order to finance investment in the domestic housing sector. Therefore the Global Saving Glut is partially responsible for the subprime mortgage crisis in the US. In the following, the paper will critically examine this theory of the Global Saving Glut as an application of the LFT.

The paper is structured as follows. Firstly, it will be shown more explicitly that a majority of contemporary economists advocate the LFT and thus the "saving pot" theory of credit. Secondly, using simple and trivial accounting rules, it will be shown that there is no basis for the LFT. The credit supply is never limited by household saving and there is no competition for such saving. Saving and the credit supply are two quite different economic phenomena that have to be clearly distinguished. It will be shown that in reality things are often the exact opposite of what LFT is advocating (Lindner, 2015).

This follows from the fact that the LFT mixes up concepts which are different from one another, i.e. saving which is a change in agents' net worth in the form of either the acquisition of tangible assets (investment) or increases in net financial assets (financial

saving) and the granting of credit (a pure financial transaction that leaves net worth unchanged). The economist Wolfgang Stützel (1978; 1979) described this mixing of different variables as “problem entanglement”. Stützel developed a framework based on simple accounting concepts in order to test pompous statements of theoretical macroeconomics for their validity using mostly trivial accounting measures.

In the third part, the paper examines and criticizes the Global Saving Glut as an application of the LFT. It will be shown that this theory does not hold empirically. More specifically, it will be shown that the US, as the issuer of the global reserve currency, does not rely on foreign savings or credit in order to finance either its current account deficit or its domestic investment. Further, the largest foreign creditors of the US were not countries with large current account surpluses such as China or other South East Asian countries, as Bernanke claims, but European banks both from countries with deficits and with surpluses. But those banks were only able to provide credit to the US after borrowing US dollars themselves. Since American individuals require dollars in order to build or buy a house, they are not interested in euro or yuan. It is peculiar that Ben Bernanke as the head of the same central bank which is the monopoly issuer of US dollars assumes that the US relies on credit from abroad, given that only the US banking system is able to produce those dollars.

1 Loanable Funds, the Competition for Scarce Global Saving and the Global Saving Glut

In the following section, it will be shown in more detail how many influential economists believe in the “saving pot theory of credit” according to which credit is a) limited by household saving, can b) be increased by lower consumption and c) for which potential borrowers have to compete. Gregory Mankiw for example explicitly writes in his influential introductory macroeconomics textbook:

“Saving is the supply of loans [emphasis added] - individuals lend their saving to investors, or they deposit their saving in a bank that makes the loan for them. Investment is the demand for loanable funds - investors borrow from the public directly by selling bonds or indirectly by borrowing from banks. [...] At the equilibrium interest rate, saving equals investment, and the supply of loans equals the demand.” (1997, p. 63)

The thesis that saving equals the credit supply is also the foundation of Bernanke’s (2005) international Saving Glut theory:

“All investment in new capital goods must be financed in some manner. In a closed economy without trade or international capital flows, *the funding for investment* [emphasis added] would be provided entirely by the country’s national saving. By definition, national saving is the sum of saving done by households [...] and saving done by businesses (in the form of retained earnings) less any budget deficit run by the government (which is a use rather than a source of saving).”

By setting saving equal to the credit supply it follows that bank lending is limited by savings. If for example the state would take out a loan whose overall supply is limited by household savings, companies would have to limit the amount of credit they demand. Mankiw states in a related article with co-author Laurence Ball (1995, p. 96-98)

“Budget deficits [...] reduce national saving. [...] A decline in national saving reduces the supply of loans available to private borrowers, which pushes up the interest rate (the price of a loan).”

Not only government deficits but also foreign deficits, which correspond to domestic current account surpluses, would lead to an “export of saving” which in turn would lead to a lack of financing possibilities and thus investment for “saving exporters”. How damaging this is from the viewpoint of Loanable Funds theorists is described by Hans Werner Sinn using the German current account surplus (own translation):

“Germany exported its savings *instead of providing credit to the domestic economy* [own emphasis added]. In 2008 alone Germany exported 60 % of its current savings and merely invested 40 % domestically. In the same year the overall savings of the economy were 277 billion Euros, of which 111 billion were domestic net investments and 166 billion were capital exports. By definition this was also the surplus of the German current account.” (Sinn, 2010)

This point is also made by Ronald McKinnon (2001, p. 227) when he writes:

“For more than twenty years the world’s richest, most mature industrial economy has drawn heavily on the *world’s limited pool of saving* [emphasis added] to support high consumption in the 1980s by the federal government, and in the 1990s by households.”

Conversely a country which does not save enough and cannot provide enough credit can import foreign saving via current account deficits. Bernanke (2005) writes:

“[...] well-developed international capital markets *allow savers to lend* [emphasis added] to those who wish to make capital investments in any country, not just their own. Because *saving can cross international borders* [emphasis added], a country’s domestic investment in new capital and its domestic saving need not be equal in each period. If a country’s saving exceeds its investment during a particular year, the difference represents *excess saving that can be lent on international capital markets* [emphasis added]. By the same token, if a country’s saving is less than the amount required to finance domestic investment, the country can close the gap by borrowing from abroad.”

These citations should serve as adequate proof that leading mainstream economists agree on the fact that saving equals the supply of credit and consequently that higher saving leads to an increase in the credit supply and therefore investment. The German economist Wilhelm Lautenbach already wrote in 1936 (own translation):

“How does the credit mechanism work, if the state finances large expenditures through credit? Where does the credit come from? Most who ask this question, not only non-economists, have a general understanding that there is somehow a scarce supply of credit. Following from this understanding there is normally the fearful question, whether the state expenditures limit the credit supply for the private sector.” (1952, p. 95)

Similarly Otto Donner writes (own translation):

“Many are under the impression the the credit supply comes out of a pot with limited content. If the state were to expand its credit demands, this supply would eventually be depleted completely. [...] This thought process led to the French general staff in 1914 believing that the First World War could only last a few months due to the fact that financing a modern war would not be possible over longer periods of time.” (1942, p. 185)

The following sections show that this view of a limited saving pot is simply nonsense. The theory to be proven has already been formulated by Hans Gestrich in 1944 (own translation):

“The credit supply in no way depends on the amount of saving. It depends more on the ability and willingness of banks to provide credit which in turn has to be matched by the willingness to take on debt.” (1947, p. 26)

To show this, one only needs some simple accounting relationships. These will be illustrated in the following section.

2 How the Balance of Payments, Saving and Financing are connected

To understand the difference between saving and credit more precisely one needs only some simple accounting concepts as they are taught in every introductory business text book (for instance Kaiser 2008). Every economic agent such as companies, households, banks or whole countries has a balance sheet in which the amount of its assets and liabilities are recorded. Economic agent's gross assets are comprised of tangible assets, ta (such as machines, houses and so forth) and gross financial assets, gfa :

$$(1) \quad \text{gross assets} = ta + gfa$$

An agent's financial assets consist of its financial claims on other agents. Gross *financial* assets can be further divided into means of payment, m , and all other financial assets, ofa :

$$(2) \quad gfa = m + ofa$$

Means of payment are a claim since they constitute either the claim vis-à-vis a commercial or vis-à-vis a central bank. A payment is defined as the settling of a debt (Kaiser, 2008, p. 25). Thus, means of payment are means to settle debts. This is what makes means of payment - money - so special. *Other financial assets* are thus exactly the financial claims that cannot be used to settle debts. They give the holders the right to receive means of payment. These other financial assets include bonds, loans, derivatives or insurance policies.

What financial asset does however constitute a means of payment is context-specific. For example, non-banks normally accept deposits at commercial banks as means of payment; however commercial banks among themselves accept only central bank money to settle their respective debts. In the US, one would hardly accept Euros as means of payment, however many countries in the world do accept payment in the form of US dollars. This will be further elaborated during the discussion of the US' international credit.

The differentiation between means of payments and other financial assets is crucial to understanding financial crises. A financial crisis occurs when a considerable amount of economic agents are unable to service their debts due to the fact that they are running out of means of payment. This means they are in danger of becoming insolvent.

In order to determine an agent's net worth, nw , (for companies: equity) one has to subtract its liabilities, l , from its assets:

$$(3) \quad nw = ta + gfa - l$$

Finally it will be useful to define the difference between gross financial assets and liabilities separately as net financial assets, nfa :

$$(4) \quad \begin{aligned} gfa - l &= \\ m + ofa - l &= \\ nfa & \end{aligned}$$

Table 1 gives an overview of the balance sheet of an economic agent. Depending on the agent there are different types of assets and liabilities in its balance sheet. Companies, for example, hold more tangible assets and a relatively small amount of financial assets. They on average hold relatively large amounts of equity. Private households hold tangible as well as financial assets, whereby the tangible assets are mostly comprised of real estate. Bank assets are mostly made up of loans and other financial assets, whereas their liabilities are mostly comprised of short term debt such as deposits. They often have much lower equity levels relative to other economic agents.

Table 1: Balance sheet

Assets	Liabilities and Net Worth
Gross financial assets, gfa	Liabilities, l
Money, m	Debts
Other financial assets, ofa	Stocks
Loans	
Bonds	
Stocks, etc.	
Tangible assets, ta	
Machines	Net worth, nw
Houses, etc.	

To understand which and how items on the balance sheet change, three types of flows have to be distinguished (Kaiser, 2008):

- Income, y , and consumption, c , that change agents' net worth;
- Revenues, r , and expenditures, e , that change agents' net financial assets, and
- Receipts and payments which change agents' stock of means of payment

Income, y , and consumption, c , change the net worth of an economic agent:

$$(5) \quad y - c = \Delta nw$$

Changes in net worth are exactly “saving” as treated in economic theory. Since net worth is comprised of tangible assets and net financial assets, “saving” can be divided into two concepts which have to be strictly kept apart. One is the change in tangible assets, or investment, i , (i.e.: $\Delta ta \equiv i$), and the other the change in net financial assets:

$$(6) \quad s = y - c = i + \Delta nfa$$

We will also call changes in net financial assets “financial saving”.

Not distinguishing between these two concepts of “saving” leads to much confusion. The discussion among neo-classical and Keynesian economists on whether higher saving is a requirement for higher investment or if rather the opposite is the case is - looking at it from a purely accounting perspective - not particularly productive. Investment is by definition saving because it increases tangible assets and thus total gross assets (for more detail on this point, see Lindner (2015)).

All transactions that change an agent’s net financial assets are called revenues, r , and expenditures, e :

$$(7) \quad \begin{aligned} r - e &= \Delta nfa = \\ &\Delta m + \Delta ofa - \Delta l \end{aligned}$$

Revenues and expenditures contain the purchase and selling of goods and services (exports and imports on country level), wages, capital income (interest, dividends and so on) or transfers (taxes, subsidies). Financial saving occurs when an agent earns more than she spends, whereas if she spends more than she earns she is financially dis-saving.

The fact that an agent saves financially by realizing a revenue surplus and dis-saves via an expenditure surplus does however *not* say in which form she saves: she can increase her means of payment, her other financial assets and / or decrease here liabilities.

The third type of flows are receipts and payments. They change an agent’s level of means of payment.

$$(8) \quad receipts - payments = \Delta m$$

Table 2 shows the different flows that change balance sheet items, as depicted in table 1:

- Under the header “production” (lines 1 to 3) all production of the different agents and sectors is incorporated. Production is also part of income because it can be invested or consumed. Note that depreciation has been deducted here, so that net value added and net income is recorded in the table.
- The current account (lines 4 to 7) includes the revenues and expenditures of economic agents
- The financial account (lines 8 to 10) incorporates all financial transactions, so all changes in the means of payment, other claims and liabilities are entered here.
- Under Income (lines 11 to 14) all income and consumption terms are entered.

Table 2: Production and transactions matrix

		<i>Household</i>	<i>Company</i>	<i>Bank</i>	<i>Total Economy</i>
Production	1) Consumption goods				
	2) Investment goods				
	3) Sum of production= 1) + 2)				
Current account	4) Trade in goods and services				
	5) Wages				
	6) Interest and dividends				
	7) Taxes and transfers				
Financial account	8) Means of payment		+ Δm		+ Δm
	9) Other financial assets			+ Δofa	+ Δofa
	10) Liabilities		+ Δl	+ Δl	+ $2 \times \Delta l$
Income	11) $\Delta nfa = 4) + 5) + 6) + 7) = 8) + 9) - 10)$				
	12) Consumption				
	13) Investment (tangible assets + inventories) = 2)+1)-12				
	14) Sum of income= 11) + 12) + 13)				
Savings	15) = 14) - 12) = 11) + 13)				

The table is comparable to Godley and Lavoie’s (2012, p. 39) “Transactions Flow Matrix”, however it is more precise in distinguishing between expenditure/income and production. The columns incorporate different economic sectors (companies, households and banks as well as the total economy). However one could include any other economic units or sectors.

With the clear distinction of the three flows the analytic foundation is set to critically examine LFT. This can be done using a simple example with three economic agents, a bank, a household and a company. The economy is closed and there is no government. We first analyze purely domestic interactions in order to clearly distinguish the economic processes in a more familiar setting to then extend the analysis to the international level.

2.1 Lending in reality

Let’s assume that the company would like to build a machine with which to produce consumption goods. To build this machine the company requires workers. Furthermore we

assume that the company has not got the necessary money to pay the workers. Therefore the company has to take up a loan at the bank.

If the bank deems the company to be credit worthy, it simply opens an account in the name of the company with the appropriate sum. Since the granting of the loan is a financial transaction it is entered into the financial account (table 2, lines 8 to 10). Since the principle of double-entry accounting requires every economic agent to put down two entries, such a transaction results in four book entries:

- The bank's loan to the company is registered as an increase in other financial assets ($+\Delta ofa$)
- The company increases its stock of means of payment ($+\Delta m$) which is credited to its bank account
- The company increases its liabilities vis-à-vis the bank ($+\Delta l$), which is the sum of money owed to the bank
- The company's new deposit is a higher liability of the bank ($+\Delta l$)

Looking at the accounting process it becomes apparent that the process of granting a loan does not produce any income or decreases the amount of consumption of any agent in the economy. Thus there is no change in net worth. Furthermore there has not been a change in revenues or expenditures of any of the parties involved, which means that net financial assets of all economic units remain unchanged. The company has merely received a receipt with no corresponding payment, which increases its means of payment. Given that the means of payment is newly created through the provision of credit, the bank has not decreased its own means of payment, thus has not made a payment. The transaction has only lengthened the balance sheets of both the bank and the company by increasing both financial assets and liabilities by the same amount.¹

In short, the bank creates credit and money out of nothing (Stobbe, 1994; McLeay et al., 2014, p.179-199). This can be continued as long as non-financial institutions accept bank deposits (the bank's liabilities) as means of payment, which is the normal case for developed economies. Hyman Minsky 2008, p. 255 remarks pointedly:

“[...] everyone can create money; the problem is to get it accepted.”

A characteristic of modern economies is exactly that bank deposits are accepted as means of payment.

¹Absolute net worth has not changed for both agents so that no saving of either agent has taken place. However, the ratio of net worth to liabilities has decreased for both agents, meaning that they both now have a higher leverage ratio.

Naturally the bank is limited by the fact that it has to pay out central bank money (cash as well as reserves held with the central bank) eventually if someone wishes to receive cash as payment. The bank would then have to take out a loan at the central bank. This would lead to the same transactions as shown in table 2, but not between a bank and a company, but between a commercial bank and a central bank. This would again only lead to changes in receipts and payments but not to changes in income and consumption or revenues and expenditures of any economic agent. This will be addressed in depth for the case of the US and its foreign creditors.

In the jargon of accountancy, the granting of credit is a *pure financial transaction* (Stobbe, 1994, p.100ff). A pure financial transaction does not, by definition, change any agent's net worth, thus it does not require saving by anybody.

The category of pure financial transactions also contains the purchase and sale of shares, bonds and so on: for instance, with the purchase of a bond the buyer decreases her means of payment and increases her stock of other financial assets, whereas the seller decreases her stock of bonds and increases her means of payment. If this happens across national borders one speaks of international financial transactions.

2.2 What happens when saving takes place?

Now we'll go a step further. The company has received the means of payment and can thus hire workers in order to construct the machine. We further assume that the company produces consumption goods, c^p , which are purchased by the workers (the superscript p stands for production, thus for produced goods which are listed in lines 1 and 2 of table 2).

The company (*comp*) has to pay for workers' (*hh*) wages (wage, w , times labour, emp : $w \times emp$)², who produce both investment and consumption goods. It has to pay interest to the bank (*b*) (interest rate, int , times outstanding debt l_{-1} : $int \times l_{-1}$ and receives payments from the workers for the consumption goods it sells, c^e . Note that c^e are workers' *expenditures* on consumption goods and c^p are the *produced* consumption goods. They are not identical when consumers buy consumption goods that are not produced in the relevant period and which companies have on stock. In this case, companies would reduce their stock of goods by the amount $c^e - c^p$. Wages, interest payments, the purchase and selling of goods and services are entered as revenues and expenditures in the current account of both companies and households:

²We assume for simplicity that households only receive wages. This could mean that a part of the wages also includes ownership compensation. However, that ownership compensation - live for instance dividends - is not explicitly included does not change anything in the argument but would only lead to more terms in the above expression.

Table 3: Trade, Production, Consumption and Saving

	Household	Company	Bank	Total Economy
Production				
1) Consumption goods		c^p		C^p
2) Investment goods		i^p		I^p
3) Sum of production = 1) + 2)		y^p		Y^p
Current account				
4) Trade in goods and services	$-c^e$	$+c^e$		0
5) Wages	$+w \times emp$	$-w \times emp$		0
6) Interest and dividends		$-int \times l_{-1}$	$+int \times l_{-1}$	0
7) Taxes and transfers				
Financial account				
8) Means of payment	$+\Delta m$	$-\Delta m$	$+\Delta m$	0
9) Other financial assets				
10) Liabilities				
Income				
11) $\Delta nfa = 4) + 5) + 6) + 7) = 8) + 9) - 10)$	$w \times emp - c^e$	$c^e - w \times emp - int \times l_{-1}$	$+int \times l_{-1}$	0
12) Consumption		$i^p + c^p - c^e = I^p + I^{Inv}$		c^e
13) Investment (tangible assets + inventories)		$y_{comp} = i^p + c^p - w \times emp - int \times l_{-1}$		$I^p + I^{Inv}$
14) Sum of income = 11) + 12) + 13)	$y_{hh} = w \times emp$	$s_{comp} = i^p + c^p - w \times emp - int \times l_{-1}$	$y_b = int \times l_{-1}$	$Y = Y^p = C^p + I^p$
Saving				
15) $= 14) - 12) = 11) + 13)$	$s_{hh} = w \times emp - c^e$		$s_b = int \times l_{-1}$	$S = I^p + I^{Inv}$

$$(9) \quad \begin{aligned} r_{comp} - e_{comp} = \\ e_{hh} - r_{hh} + e_b = \\ c^e - w \times emp - int \times l_{-1} \end{aligned}$$

All the relationships are shown in table 3. Companies produce a certain amount of consumption and investment goods (lines 1 to 3), generate revenues and make expenditures according to formula (9) (lines 4 to 7 in table 3). The company's income y_{corp} is its profit. Since companies, by definition, do not consume, their income and thus their profits are equal to their saving (line 14 = 15). Their company's investment (increase in tangible goods i^p , plus changes in inventory i^{inv}) is part of its profits due to the fact that the production of tangible goods constitutes income, which is entered as a positive profit in the profit and loss account. Changes in inventories take place when the production of consumption goods differs from the sale of those goods:

$$(10) \quad i^{inv} = c^p - c^e$$

Households receive wages and purchase consumption goods (lines 4 to 7). Their income is equal to their wage. Due to the fact that in this example households do not increase their tangible assets (for instance houses), their saving is equal to their wages minus their consumption expenditures.

Now, how high is the saving of households, the banks, the companies and the entire economy? This is shown in line 15) in table 3: Household saving corresponds to wages minus consumption expenditures; company saving is its increase in tangible assets plus the difference between its revenues and expenditures on wages and the interest service. The banks' saving is equivalent to their interest income (they do not, in this example, pay interest on deposits. Otherwise, their saving (and profit) would be equal to the difference of credit and deposit interest rate). If the saving of all sectors is added, one receives aggregate saving, S (aggregate variables are written in capital letters):

$$(11) \quad \begin{aligned} S = s_{hh} + s_{comp} + s_b = \\ w \times emp - c^e + \\ i^p + c^p - w \times emp - int \times l_{-1} + \\ int \times l_{-1} = \\ I^p + C^p - C^e = \\ I^p + I^{inv} \end{aligned}$$

Thus, the aggregate economy's saving is equal to the newly produced tangible assets I^P and inventories I^{Inv} . That total saving is equal to just the increase in tangible assets results from the fact that revenues and expenditures and therefore all changes in net financial assets in the economy add up to zero. To every expenditure corresponds a revenue. This can be easily seen in the current account. Thus for every economic agent increasing her net financial assets there is a corresponding decrease in net financial assets of all other economic agents in the economy.

To put it in more general terms: An economic agent can only save financially if other agents dis-save financially by the same amount. This is true for every real-world economy, no matter what constellation of revenues and expenditures we assume or which sectors of economic entities we observe. That is why in the entire economy (that is the world economy or a closed economy) only the increase in tangible assets, thus investment, is saving. Thus saving and investment are equivalent in the aggregate. This holds irrespective of how high the savings of individuals or groups of economic agents are.

The equivalence of investment and saving however does not mean - as claimed by LFT - that household saving (or the sum of household and government saving) is equal to total saving and thus to investment. No matter how high one group's financial saving is, the financial dis-saving of the rest of the economy has to be just as high. The only thing remaining is the creation of tangible assets. However there is no reason to believe *ex ante* that the increase in tangible assets would be equal to household saving.

This can be easily shown by looking at three possibilities of household saving: a) what happens if households spend what they earn (do not save financially); b) when they spend more than they earn (dis-save financially) or c) spend less than they earn (save financially).

(a) **Households do not save financially:** they spend as much on consumption goods as they receive in wages. This means that companies generate as much revenue as they spend on wages. The good thing for companies is: due to the fact that workers spend their wages entirely on consumption goods, companies can repay the loan that they had taken out beforehand. In more general terms: The *less* households save, the *more* liquidity is available to companies and thus the *fewer* credits they have to take out! This is the exact opposite of what is being claimed by the Loanable Funds Theorists. How high is aggregate saving? Aggregate saving is equal to company's investment although households do not save.

(b) **Households dis-save financially:** They thus spend more than they earn. Then, firms receive *more* means of payment than they have spent on wages. If they wanted to hire more labour in the next period in order to produce further machines, they

would need no further credit at all! Obviously households had to reduce their gross financial assets or increase their debt when they dis-save. In this scenario higher financial stability of the business sector would be achieved at the expense of the financial health of households - as will be shown in the next part, this was exactly what US households did before the Great Depression. Again, aggregate investment - although households' financial saving was negative - is equal to total investment by companies.

- (c) **Households save financially:** When households spend less than they earn, companies receive *less* money than in the case in which households had not saved. In the first instance an increase in household saving does therefore *not* lead to more credit available for companies, but to the fact that there is less money flowing back to companies than they had spent on wages. If companies wanted to keep their expenditures constant, they would *have to* take out more loans. This however would lead to the reduction of their solvency. They would have to accept higher interest payments and thus higher costs in the future. This in turn would increase the risk of becoming insolvent and decrease their creditworthiness. Potential creditors - households or banks - would be more reluctant to lend money to companies. They would be more inclined to demand a higher compensation, thus higher interest rates. Again, aggregate saving is equal to the company's investment.

As is clear from those simple example, the real world is in stark contrast to the implications of LFT. The theory assumes that an increase in saving leads to an increase of money in financial markets and therefore a reduction of interest rates which would encourage companies to take on debt and increase investment. But household financial saving does not change the amount of money in financial markets or banks at all. The amount households save means less revenue for the companies. In all cases - whatever household saving was - aggregate investment was equal to the economy's increase in tangible assets so that there is no necessary relation between household saving on the one hand and the company's investment and aggregate saving on the other.

All the results derived in this example hold if we include the government and foreign countries. If the government reduced its expenditures in order to increase its financial saving (reduce its deficit) it necessarily decreases the revenues of the remaining economy, in this case the private sector. If the government reduced public contracts and subsidies, the companies would have less revenues and money. If the government reduced social transfers and public services, households would have lower revenues and money. If foreign countries purchased less domestic goods, exporters would have less revenues etc.

To conclude: this example shows that saving often is the *result* of the granting of credit and not vice versa. If the company would not have received the loan, it would not

have been able to finance its expenditures and households would not have any income, and thus no possibility for saving. Furthermore, without the loan the company would not have been able to build the machine, and total saving, irrespective of household saving, would have been zero.

2.3 Financial Saving in the US prior and after the Crisis

The developments in the US prior to and after the recession of 2008 / 2009 constitute an ideal experiment to illustrate the implications of a change in household and government financial saving for companies. From the previous discussions and table 3 we know that the income of companies is equal to their retained earnings, i.e. their saving (since companies do not consume) and that this saving is composed of additional tangible and net financial assets, which in turn is equal to profits:

$$(12) \quad y_{comp} = i_{comp} + \Delta nfa_{comp}$$

Furthermore we know that changes in net financial assets of all sectors (companies, *comp*, households, *hh*, the government, *gov*, and foreign countries, *foreign*) add up to zero, due to the fact that every expenditure, *e*, of an economic agent is the revenue, *r*, of another economic agent:

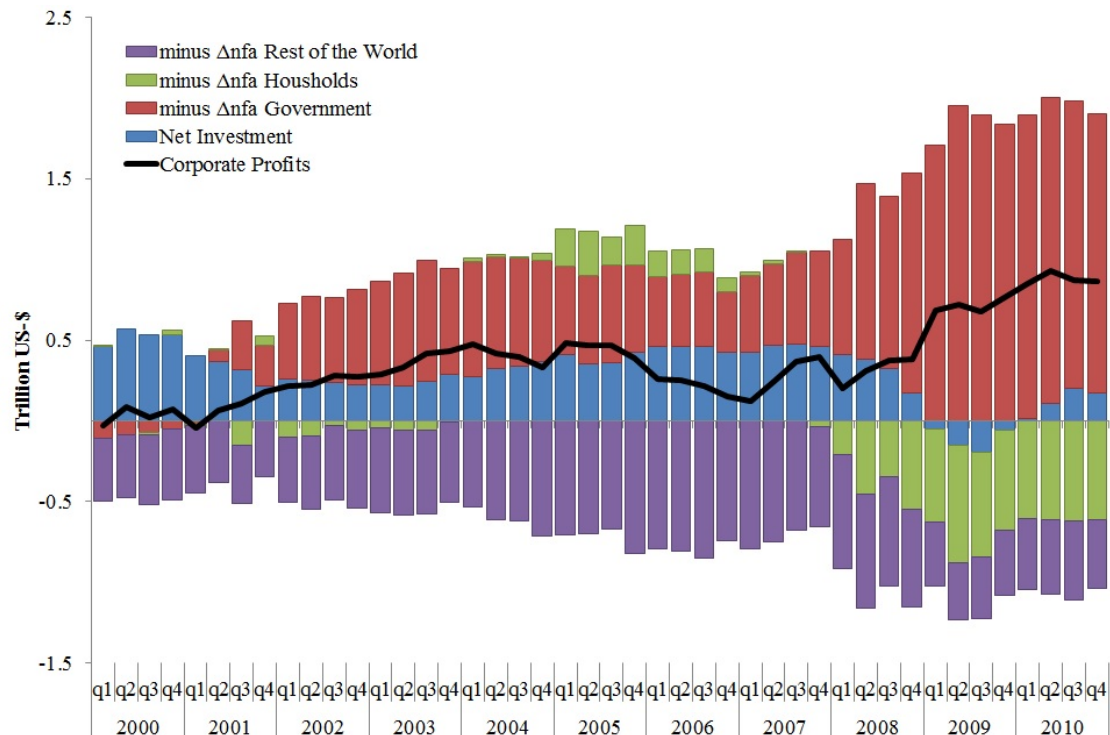
$$(13) \quad 0 = (r_{comp} - e_{comp}) + (r_{hh} - e_{hh}) + (r_{gov} - e_{gov}) + (r_{foreign} - e_{foreign}) = \\ \Delta nfa_{comp} + \Delta nfa_{hh} + \Delta nfa_{gov} + \Delta nfa_{foreign}$$

If one solves (13) for the change of companies' net financial assets and plugs it into the definition of company profits - (12) - we see that company profits are equal to the accumulation of tangible assets by the companies (its investments) minus the financial saving of all other economic sectors.

$$(14) \quad y_{corp} = i_{comp} - \Delta nfa_{hh} - \Delta nfa_{gov} - \Delta nfa_{foreign}$$

Because the accumulation of net financial assets corresponds exactly to the revenue-expenditure balance, formula (14) states that positive (negative) financial saving of other sectors always has a negative (positive) impact on companies' financial saving. If the other sectors save by spending less than they earned, companies dis-save accordingly and spend more than they earn.

Figure 1: U.S. Corporate Profits in trillion US-Dollars



Source: Federal Reserve Flow of Funds, Authors' calculations

An increase in financial saving decreases (given constant investment) the profits of companies, financial dis-saving increases them.³These statements are not due to behavioural assumptions but are identities that *always* hold.

On the basis of US flow of funds, figure 1 shows the composition of profits of the US corporate sector. Every bar adds up exactly to the profits of the companies which are shown as a black line. One can see clearly that the government's deficits and the surpluses of foreign nations (which correspond to the deficits of the US) have had the exact opposite effect than stated by the LFT: If the government runs a deficit, thus spending more than it earns, it increases one by one corporate profits and therefore grants them the possibility to finance investment themselves rather than taking on more debt.

Conversely, the government surplus during the late 1990ies and in 2000 have reduced company profits by the same amount. Profits were even slightly negative in the first quarter of 2000. Since no one in the economy dis-saved (the balance sheets of households and the state were in balance) it came as no surprise that the companies had little cash reserves to spend on dividends. This led to the burst of the assets price bubble in March 2000. Only after the public deficits increased under George W. Bush did company profits recover.

³this is also the basis for Kalecki's (1942) profit equation, which was also formulated by Lautenbach (1952).

Furthermore, one can see that household financial saving reduced company profits between 2001 and 2003. Conversely, households' financial dis-saving between 2004 and 2007 did the opposite. This increase in household deficits was financed through an increase in debt. Thus the higher financial stability of companies was secured to the detriment of the financial stability of households. Once households did not get the credit needed they suddenly had to decrease their expenditures - i.e. save - and the consequent decrease in demand for consumption goods and property was the trigger of the Great Recession.

That the government accepted running a deficit (by not reducing expenditures by the same degree as the loss in tax revenues) led to a subsequent increase in company profits. Especially after 2008 one can observe that government deficits did not decrease company liquidity - as claimed by adherents of LFT - but *increased* it considerably. Government deficits have helped create record profits for US companies while companies reduced their investment considerably.

Furthermore in figure 1 one does not see any positive correlation between household financial saving and company investment as believed by LFT adherents. Quite the contrary is the case: As household saving increased between 2001 and 2003 (and after 2008), companies invested less. This makes eminent sense since one would not expect companies to increase their production capacity if their sales decrease.

Overall one can summarise that nothing is quite as the LFT adherents believe:

- Saving is not needed to grant credit
- It is rather the opposite: in order to save, loans have to be granted
- One group's higher financial saving leads to the rest of the economy having - in the first instance - *fewer* financial means, not more
- There is no necessary correlation between household financial saving or any other group's and overall formation of tangible assets.

All these findings hold not only for economic agents within an economy but also across borders. How exactly the deficits of different economic agents in the US (of the economy as a whole and of private households) were financed is assessed in the next part. It will be shown that neither households nor the economy as a whole was substantially dependent on credits from abroad, although the US increased its net liabilities against foreign countries considerably.

3 Bernanke's Saving Glut and the Financing of the USA

3.1 The US does not rely on credit from abroad

According to the Savings Glut theory, which assumes an identity between saving and the granting of credit, the US depends on loans from abroad when it realizes current account deficits. In reality however this is not the case since the majority of the world accepts US-dollars as means of payment. US-dollars can only be produced by the Federal Reserve, not by any other central bank. Why then should the US as a whole be dependent on money which they can produce for free and without restrictions?

The US dollar is accepted as a means of payment even by non-Americans because it is the worldwide reserve currency. The majority of international transactions is denominated in US-dollars, even when there is no American party present in the transaction. For example 80 % of all export/import invoices between South East Asian countries are denominated in US-dollars, so are almost 30 % of all European exports and imports (Goldberg and Tille, 2006). Furthermore crucial commodities such as crude oil or wheat are traded in US-dollars. The majority, over 50 % in 2012, of all bonds are traded in dollars (ECB, 2013) and 90 % of all currency transaction include the US-dollar (ECB, 2013).

That means that even if no American is involved in a transaction, non-Americans need US-dollars to settle payments with other non-Americans. This leads to demand for US-dollars and the acceptance of dollars as means of payment in transactions with non-Americans. However, non-Americans only receive US-dollars if they earn them through current account surpluses vis-à-vis the US or borrow them from the US.

If for example an American imports goods from China or South East Asia, he does not have to take up a loan in China or South East Asia but with his local commercial bank. Following the same principle as in table 2, the bank opens an account in the name of the economic agent, from which the agent transfers the payable amount to the exporter abroad. The foreign exporters either accept the US deposit as means of payment or they demand payment in cash, thus central bank money. The US bank then has to either decrease its reserves of central bank money or borrow money from the Fed in order to pay the exporter abroad.

Since the Chinese exporter accepts US-dollars as means of payment, he increases his net financial assets through a current account surplus; the American importer reduces his by running a deficit. Since the transaction was performed across borders, the US as a whole increases its liabilities: if paid in cash, the dollars are a liability of the central bank which is now held by foreigners; if it is a bank transfer, the liability is a claim by the foreign exporter against a US commercial bank. But in whatever way the payment is made, the US liability is a claim of the Chinese exporter vis-à-vis the US. Even if the

liabilities against foreign countries increase, the increase in imports was not *financed* by the foreign trading partner but by a domestic bank. This can be done so long as foreigners accept US-dollars as means of payment.

Furthermore, the exporter did not “export” his saving but the transaction *allowed* him to save. If the American bank had not granted credit to the American importer (a pure financial transaction), the importer would not have been able to buy goods abroad and the exporter would not have had any revenues and could thus not save. It is of course possible that foreigners who run current account surpluses vis-à-vis the US or borrowed US-dollars through credit creation in the USA subsequently lend those dollars to Americans. Furthermore it cannot be ruled out that foreigners finance transactions made by Americans. This is indeed very often the case and will be illustrated in greater detail later.

But that does not mean that the US as a whole relies on the granting of credit from abroad. For instance, if China would no longer want to hold its currency reserves in the form of American government bonds and therefore stopped investing its surpluses in the US, the Fed could easily purchase said bonds and thus ensure the financing of the state. This is exactly what the Fed does under the Quantitative Easing scheme.

This means that, overall, the US does not rely on foreign credit. Again, this is the exact opposite of what is proclaimed by the LFT advocates: non-Americans depend on the dollar, because it is scarce to them, for the US as a whole (although not for individual Americans), the dollar is not scarce! The US can increase their liabilities against foreign countries as long as foreign countries accept US-dollars as means of payment. The US is effectively granting themselves credit, even if the newly created money flows abroad and foreigners formally become creditors of the US. McKinnon (2001, p.232) writes quite rightly (and in contrast to a sentence which could be read a few pages prior, which stated that the US is dependent on scarce international saving):

“The closest analogy to the United States’ position is that of a central bank that issues fiat money within its own national monetary domain. Although banknotes and coins may formally be liabilities of the central bank, in practice they never have to be redeemed, because the private sector’s demand for domestic money is ongoing. Analogously, on an international scale, the collectivity that is the United States can issue to the rest of the world liquid claims on itself that never” have to be redeemed.”

If the US saves more (reduces imports relative to exports) it is apparent that other countries have to reduce their saving by the same amount due to the fact that they export less to the US. This was exactly the case from the financial crisis 2008 onwards (see figure 1). Equivalent to that, non-Americans earn fewer dollars. Furthermore, if their financial

obligations are denominated in dollars they would depend on borrowing dollars in the US. This however increases the vulnerability of a sudden drying-up of dollar denominated credit. This is the central reason why the world and Europe in particular were so deeply affected by the financial crisis. This will be illustrated further in the next section.

3.2 Why European Banks are the Biggest Gross Creditors of the United States

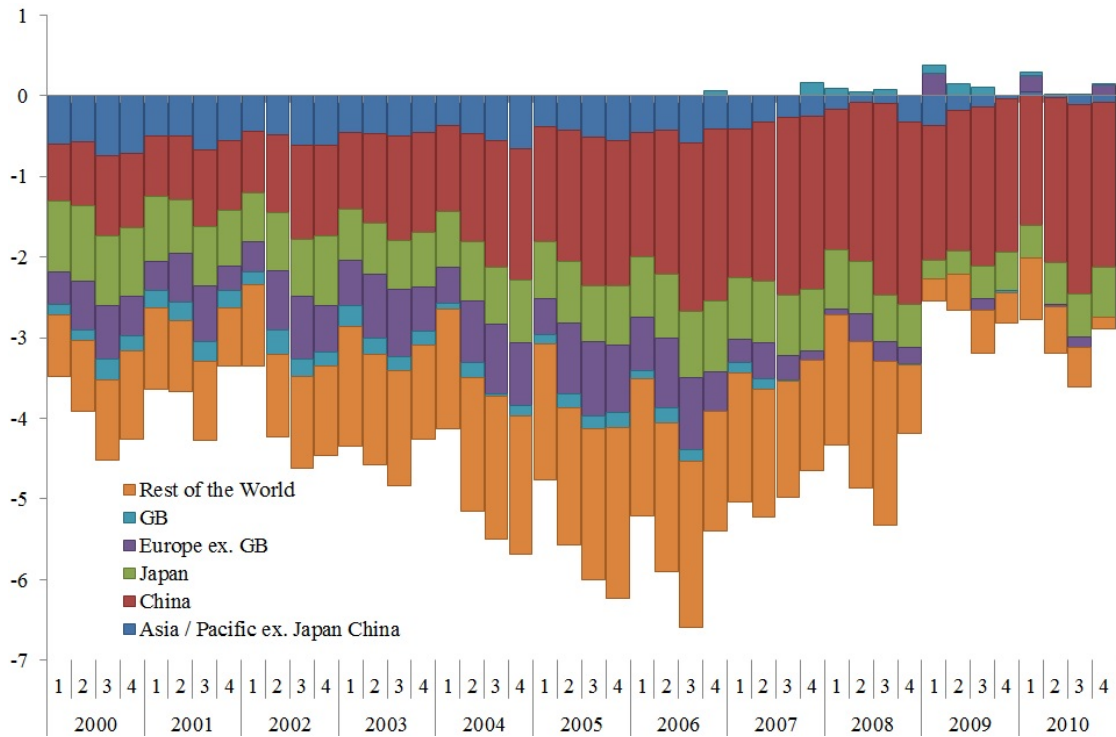
The largest foreign creditors of the US are not countries with current account surpluses vis-à-vis the US, such as China or Japan (as stated by Ben Bernanke in his Savings Glut thesis) but European countries that have balanced current accounts or sometimes even deficits against the US. This was the basis of much criticism of Bernanke's Saving Glut thesis (Archaya and Schnabl, 2010; Borio and Disyatat, 2011; Shin, 2012).

Figure 2 shows the current account balance of the United States divided by regions, figure 3 the structure of US borrowing (*gross* claims the rest of the world acquires vis-à-vis the US), again divided by regions. One can observe great differences between the regional distribution of current account balances on the one hand and the distribution of gross financial claims on the other. The US runs high deficits against China and Japan, however they are much lower vis-à-vis Great Britain and the other European countries. The structure of changes in financial claims against the US is exactly the opposite: Great Britain and the rest of Europe have increased their claims against the US the most, whereas China, Japan and the rest of the Asian Pacific region increased their holdings only by a small fraction compared to their current account positions.

To a considerable extent the increase in gross claims have nothing to do with current account balances but reflect purely financial transactions. This is already evident in the different amounts of transactions: The current account deficit (figure 2) as a whole has not surpassed seven % between 2000 and 2010. The increase in US gross liabilities (claims by foreigners on US residents) (figure 3) is a multiple of this sum. This already indicates that most of the financial transactions between the US and the rest of the world do not simply finance current account transactions but are purely financial transactions.

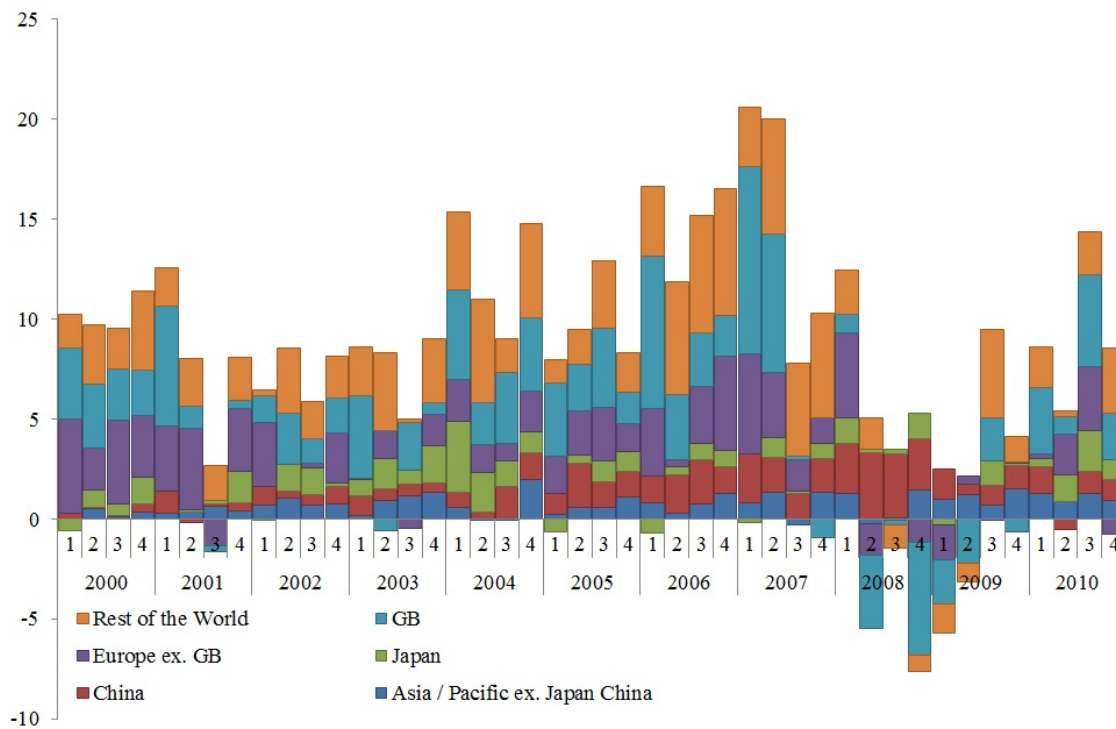
An important example for these purely financial transactions is the behaviour of European banks that borrowed dollars from US money market mutual funds by selling asset backed commercial papers (ABCP) to those funds. With the obtained dollars European banks purchased structured American mortgages from US investment banks. European banks therefore became intermediaries between Americans - i.e. between the mutual funds and the investment banks (Archaya and Schnabl, 2010; Shin, 2012).

Figure 2: Regional Current Account Balance in % of US GDP



Source: Bureau of Economic Analysis (Macrobond)

Figure 3: Increase in U.S. Liabilities broken down into creditor regions in % of US GDP



Source: Bureau of Economic Analysis (Macrobond)

Table 4 shows the financial accounts of the economic agents involved. In order to understand what happens, we have to distinguish between the accounts for the individual economic agents involved and the accounts of the national economies within which the agents act. In a first step, a US money market mutual fund buys an ABCP from a European bank. The mutual fund receives the ABCP - a financial assets: $+\Delta of a_{ABCP}$ - and reduces its dollar holdings: $-\Delta m_{\$}$. This is an exchange of assets which leaves the fund's balance sheet length as well as its net worth unaltered. The European bank receives US dollars, $+\Delta m_{\$}$ and increases its liabilities, i.e. the ABCP it had issued, $+\Delta l_{ABCP}$. The European bank lengthens its balance sheet.

What happens to the financial accounts of the US and Europe within which the fund and the bank act? If the two agents would only make their transactions within a country, the respective country's external gross assets and gross liabilities would not be affected. Here however they are. Since the money - a liability of the US central bank - is handed over to a European, the US increases its gross liabilities vis-à-vis Europeans. Since an American economic agent receives a financial claim against Europeans, he also increases his gross financial assets by the same sum. The US *net* financial asset position has not changed - i.e. no current account balance has occurred - but *gross* financial assets and liabilities have increased. Vice versa for the European country within which the bank - a European economic agent - has increased its gross claims vis-à-vis the US and also its liabilities. By transferring assets and liabilities across country borders, the balance sheets of national economies have lengthened.

Now, in the second step, the European bank purchases a structured mortgage bond (a collateralised debt obligation, CDO) in the US, thereby increasing its stock of other financial assets ($+\Delta of a_{CDO}$) and decreasing its dollar holdings ($-\Delta m_{\$}$). This is again an asset exchange. It is also an asset exchange for the European bank which exchanges its claim against the Federal reserve against a claim against a US investment bank. By selling it, the investment bank receives the money and increases its own liabilities.

In the balance sheet of the whole US, there was just an exchange of liabilities. Since the dollars have gone back to the US, Europeans do not hold this particular claim against a US economic agent anymore. The European bank - as well as Europe in its entirety - exchanges one claim against another claim (money against a CDO) which leaves its balance sheet length unaffected. The US investment bank now uses the money to purchase mortgages from mortgage banks (not shown in the table). This is a transaction which does not affect the balance of payments of the entire US since it is a transaction that only affects US residents. The mortgage banks lend the money to Americans purchasing houses and so forth.

All those transactions and processes only take place in the financial accounts of the parties concerned. They have nothing to do with current account transactions. Only if some US agent buys goods and services abroad - as exemplified above with the China-US example - is the current account affected. But that European banks have now become creditors and debtors to US residents has nothing to do with the commercial transactions between the US and China and other exporters.

Through these steps European banks have become creditors of Americans. However the US-dollars that reach the Americans receiving a mortgage have only been redirected over Europe and originate originally in the United States which, according to LFT, should not have had enough “saving” to be able to provide so much credit to European banks in the first place (see figure 1).

Table 4: Financial account transactions between Europe and the United States

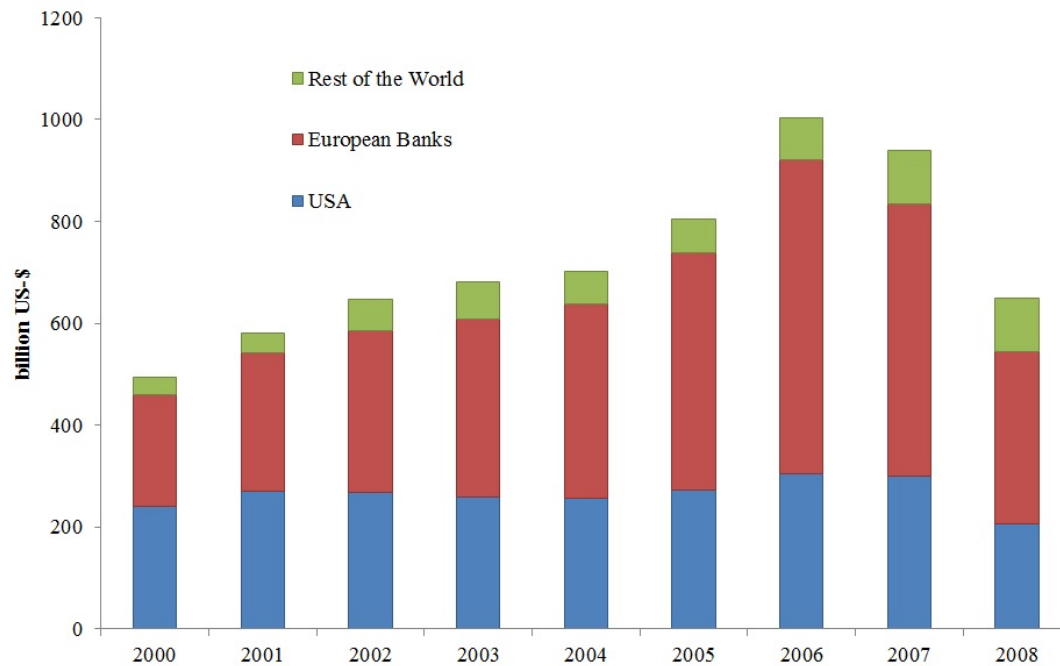
<i>1. Money market mutual fund (MMMF) buys an ABCP from a European bank</i>					
	US			Europe	
	MMMF	investment bank	aggregate economy	bank	aggregate economy
Means of payment	$-\Delta m_{\$}$			$+\Delta m_{\$}$	$+\Delta m_{\$}$
Other financial assets	$+\Delta ofa_{ABCP}$		$+\Delta ofa_{ABCP}$		
liabilities			$+\Delta l_{\$}$	$+\Delta l_{ABCP}$	$+\Delta l_{ABCP}$
<i>2. European bank buys a CDO from a US investment bank</i>					
	MMMF	investment bank	aggregate economy	bank	aggregate economy
Means of payment		$+\Delta m_{\$}$		$-\Delta m_{\$}$	$-\Delta m_{\$}$
Other financial assets				$+\Delta ofa_{CDO}$	$+\Delta ofa_{CDO}$
liabilities		$+\Delta l_{CDO}$	$+\Delta l_{CDO} - \Delta m_{\$}$		

Again it becomes apparent: In order to undertake all these purely financial transactions in which the American money market fund has lent dollars to European banks who, in turn, lent them to US investment banks, no saving by anybody was necessary. However, through these transactions the European banks have become the largest foreign creditors to the US and vice versa.

These purely financial transactions have increased the risks of European banks greatly. The ABCPs with which they indebted themselves against the money market funds in particular, were, with an average maturity of 90 days (Brunnermeier, 2009), very short term financial instruments. The special purpose vehicles of European banks that used these instruments (indirectly through structured mortgages) to finance mortgages of sometimes 30 year maturity periods had to refinance themselves constantly through the dollar money market and the reissuing of ABCPs. Thus they depended on borrowing dollars in short succession. Data on the ABCP financing divided into regions by Acharya and Schnabl 2010 show that European banks in particular were indebted in ABCPs, even more so than American banks (figure 4). Among the European banks it was mainly the British and German banks that did so.

After house prices started to decrease in the United States and an increasing number of mortgage holders became insolvent, the American money market funds lost confidence

Figure 4: Outstanding ABCPs by region



Source: (Archaya and Schnabl, 2010)

that the ABCPs, which depended on the interest revenues generated by mortgages, were still riskless, and were not willing to prolong expiring ABCPs. This led to the German IKB running into difficulties when their special purpose vehicle did not find any means of refinancing its maturing ABCPs and only government intervention prevented it from becoming insolvent. Shortly after the French bank BNP Paribas also had difficulties refinancing.

That means that it was not Chinese or other banks from countries with current account surpluses, or indeed American banks, which were first affected by the crisis in the United States, but European banks. Countries with high current account surpluses against the US - like China or Japan - were hardly involved in the market of structured mortgages. The fact that European banks were indebted in dollars and that their claims lost value in the course of the housing market crisis meant that they needed more dollars to service their liabilities against their American creditors (money market funds).

After private American creditors were reluctant to roll over European banks' short term liabilities, the American Federal Reserve replaced the financing. Through the so called "Term Auction Facility" (TAF) the Fed provided, from end of 2007 onwards, short term credit which was mainly used by American branches of European banks. British banks (for example Barclays, RBS, Bank of Scotland) and German banks (including many "Landesbanken") took advantage of most of the credit supplied (Shin, 2012). Af-

ter the insolvency of Lehman Brothers in 2008, European banks received further dollar-denominated credit through their national central banks that those central banks in turn borrowed from the Federal Reserve. That means that even with only purely financial transactions occurring, the United States ultimately grants credit to itself.

At no point did a lack of saving limit the credit given to the US or European banks. The granting of credit from European banks depended on their risk assessment, regulation of the banking sector and the availability of US dollars. It is interesting to point out that the regulation of European banks was much more lax than that of American commercial banks (this was not true for American investment banks however). Particularly German and British banks were able to create special purpose vehicles with hardly any equity that issued short term ABCPs to finance structured mortgage credit (Archaya and Schnabl, 2010).

The more general lesson is that if one wants to explain the supply of credit one does not have to focus on saving but on regulation. The saving or more accurately, the dis-saving of US households was the result of abundant credit. Without credit households would not have been able to finance their expenditure surplus, and thus dis-save.

4 Conclusion

Important and influential advocates of mainstream economics still believe that saving somehow limit credit. This view is neither logical nor is it empirically founded. This view is rather a product of overlooking the issues. Credit generation is a purely financial transaction which needs no preceding increase in saving. Furthermore an increase in financial saving of one group of economic agents always decreases financial saving of all other economic agents. If households or the government increased their net financial assets through decreasing spending it will lead to a decrease of liquidity in the company sector, without a single loan being granted.

The fact that the overall saving in the economy is equal to the formation of tangible assets has nothing to do with households providing their saving to companies through the banking system. It is rather due to the fact that overall net financial savings always equals zero, no matter how much certain economic agents accumulate in saving.

The case of Ben Bernanke's Saving Glut theory makes this particularly apparent: the United States did not have to rely on "scarce international saving" from the rest of the world to finance investment in real estate. Ultimately houses were always financed by credit from the US, even if European banks acted as intermediaries due to the lax banking regulations in Europe. Even to realise their import surpluses, the US is not reliant on foreign credit, and not at all on saving, from abroad. The US themselves produce the

reserve currency which is scarce to every foreigner. So it comes as no surprise that the Fed had to act as lender of last resort to European banks.

If one rightly criticizes the excessive granting of credit prior to the crisis, one should not look at the amount of financial saving of households or the government as a possible cause. The excess of expenditures (dis-saving) of US households, but also of European economies such as Spain, Ireland or Greece was the result of excessive and cheap credit, not its cause (Lindner, 2012). Thus the regulation of banks and financial markets should have a more central role in political and economic debate.

How dangerous this “saving pot theory” of credit is, becomes apparent in the current European crisis. The austerity policy imposed by the Troika paired with household decrease in expenditures to pay off their mortgages has led to a deep recession which undermines the attempt to further European integration. Nowadays, it should be evident that the counter-productive attempt to reduce deficits by the government did not open up new credit to companies, but conversely reduced liquidity and forced companies into insolvency.

Europe has forgotten the lessons from the Great Depression of the 1930ies. Even back then the need for governments to save during a crisis was legitimized by the “saving pot theory” (Klausinger, 2001), as illustrated by the citations of Wilhelm Lautenbach and Hans Gestrinch in the introduction. Both have lived through and studied how this doctrine worsened the crisis up to 1932 and subsequently helped the Nazis seize power.

The tragic aspect of the Great Depression was that not only orthodox economists, but also influential social democrats such as the former finance minister and Marxist Rudolf Hilferding argued against Keynesian spending programs (Garvey, 1975). These programs were developed and their implementation demanded in 1931 by Lautenbach and Wilhelm Röpke who was one of the founders of Ordoliberalism, in the Brauns commission as well as by the German trade union movement, in particular by Wladimir Woytinsky.

The sole party however which openly demanded higher spending to boost employment was the NSDAP. What the democratic parties overlooked was implemented by Hitler and his economics minister Hjalmar Schacht. He fell back on parts on the initial ideas of Lautenbach and Woytinsky and was able to strengthen the Nazi dictatorship through ensuring quick success in increasing employment. Even abroad one spoke of the “German economic miracle” until the late 1930s (Bucerius, 03.04.1947). Joan Robinson thus wrote:

“I do not regard the Keynesian revolution as a great intellectual triumph. On the contrary, it was a tragedy because it came so late. Hitler had already found how to cure unemployment before Keynes had finished explaining why it occurred.”(Robinson, 1972)

The mixing up of saving and credit is therefore not a venal sin.

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ISSN: 1861-2199

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