The Power of Money – How Integrating Real Sector Accounts with Financial Accounts Can Improve the Understanding of the Swedish Business Cycle

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Abstract

This paper presents an approach to understanding business cycle dynamics by integrating real sector and financial accounts through the concept of financial savings. Starting from the expenditure side GDP identity, a financial savings identity is derived stating that the sum of financial savings among the business sector, households, the public sector and the foreign sector is equal to zero. This identity is then filled with sector information from the real and financial accounts, using the fact that financial savings is equal whether calculated from the real or financial side of the economy. After dividing the Swedish business cycle into positive and negative phases and looking at the dynamic financial savings pattern in both phases, the conclusion is drawn that non-financial corporations drive business cycles via shifts in expectations of future investments. In positive business cycle phases, non-financial corporations expand investments more than income showing up as a decrease in financial savings (the opposite holds true in negative phases). For this to be made possible funding is needed providing center stage to the balance sheet. It is found that short-term and long-term loans are the most important funding source for Swedish non-financial corporations. It is concluded that money, derived to have a direct link to financial savings, is endogenous thus serving the funding needs of non-financial corporations. Funding hinges on the will of non-financial corporations to shift their spending expectations relative to income. Given such expectations, a lender has the choice to approve or reject funding requests. If the request is approved money plays the role of enabling spending expectations to be realized. If it is rejected then expectations will not be realized. The former means that nominal growth comes about, the latter means no nominal growth. It is within this context the power of money in business cycle terms needs to be understood.

Introduction

It is common in describing and analyzing business cycles to focus on GDP and its supply and expenditure components. It is less common to use GDP from the income side. The aim of this paper is to analyze business cycles by combining the expenditure and income side. In specific, the difference

between sector income and sector expenditure defined as sector financial savings is used dynamically in the analysis. A key advantage with using financial savings is that it is identical whether calculated from the real or the financial side of the economy, thus providing a natural link between the two sides. The paper has an empirical emphasis as data from the real sector and financial accounts of Statistics Sweden are used to draw conclusions about the Swedish business cycle. It is however necessary to start with some theory in order to put the concept of sector financial savings into and understandable macro context clarifying and deriving its relationships with established business cycles variables such as GDP and money supply. The data used are in nominal prices.

Linking nominal GDP to real sector balances

Starting with GDP from the expenditure side:

$$GDP_t = C_t + I_t + G_t + (X_t - M_t) \quad (1)$$

On the right hand side the expenditure components show up. They are equal to GDP which represents total income.

We add the minus of taxes (T) to both sides

$$GDP_t - T_t = C_t + I_t + G_t - T_t + (X_t - M_t) \quad (2)$$

The left hand side in (2) denotes private disposable income. Next consumption (C) is subtracted from both sides.

$$GDP_t - T_t - C_t = I_t + G_t - T_t + (X_t - M_t) \quad (3)$$

The left hand side of (3) denotes private savings (S). Using this and subtracting investments (I) from both sides gives:

$$S_t - I_t = G_t - T_t + (X_t - M_t) \quad (4)$$

After moving the right hand side terms to the left hand side we get:

$$(S_t - I_t) + (T_t - G_t) + (M_t - X_t) = 0 \quad (5)$$

Equation (5) represents the relationship between sector balances.

(S –I) is equal to private savings minus private investments representing the private sector balance.

(T-G) is equal to taxes minus government expenditures representing the public sector balance.

(M-X) is equal to minus net exports representing the foreign sector balance[1].

The reason why net exports show up with a negative sign is that the foreign sector balance should be seen from the viewpoint of the outside world. Imports thus represent incomes from the viewpoint of foreigners whereas exports represent expenditures. One common feature of equation (5) is that all three balances have an income component (S, T and M) as a positive term and an expenditure component (I, G and X) as a negative term.

The production of real sector balances at Statistics Sweden is based on equation (5) though it is more comprehensive. In specific, the private sector contains various subsectors: non-financial corporations, financial corporations and households and non-profit organizations. To align the derivations with the practicalities of producing real sector accounts, it is necessary to elaborate on the (S – I) component.

$$S_t = GDP_t - T_t - C_t \qquad (3+4)$$

Using the equality of GDP – T with private disposable income it can be written:

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[1] To be fully correct, the foreign sector balance should also include primary and secondary incomes. Considering this, a correct derivation should start with GDP plus these income terms. We ignore this here though for the reason of expositional ease. GDP is a more established concept and easier to associate with than the correct term including income (GNDI). Moreover, adding income terms to expenditure components may be seen as confusing as a main point made in the paper is to analyze business cycles by considering the dual dynamics of income and expenditure components, with the two sides being clearly separated. In the empirical part, all foreign sector balances include primary and secondary incomes.

$$GDP_t - T_t = DI_t \text{ (priv)} \quad (2')$$

$$DI_t \text{ (priv)} - C_t - I_t = (S_t - I_t) \quad (6)$$

Private disposable income can be divided up between corporations (Π) and households including non-profit organizations (W) such that:

$$DI_t \text{ (priv)} = \Pi_t + W_t \quad (7)$$

Combining (6) and (7) gives:

$$(\Pi_t - I_t) + (W_t - C_t) = (S_t - I_t) \quad (8)$$

The first term on the left hand side in (8) denotes the balance of all corporations and the second term the balance of households including non-profit organizations (NPISH). We can now rewrite equation (5) as:

$$(\Pi_t - I_t) + (W_t - C_t) + (T_t - G_t) + (M_t - X_t) = 0 \quad (5')$$

Equation (5´) is aligned with the output of Swedish real sector balances except that corporations are divided into non-financial and financial and there exists a sector not specified. We choose the arbitrary period of 2004:Q3 to show the alignment.

Table 1. Real Sector Balances in Sweden in 2004:Q3 (MSEK)

Non-financial corporations	9 630
Financial corporations	17 339
General government	2 250
Households and NPISH	13 116
Not specified sector	3 861
Sum of Domestic Sectors	46 196
Rest of the World	-46 196
Sum of all Sectors	0

Source. Statistics Sweden / Real Sector Accounts

The relationship between nominal income and nominal expenditure

From equation 1 it follows that total income (AI) is equal to total expenditure (AE). This is an accounting identity that always (!) holds. Identities however do not answer the question of causality. Nor do they answer how nominal growth comes about (i.e., a change in AI=AE), an issue which will be dealt with in subsequent sections. In a market economy the buyer has the upper hand over the seller in that he has always the option to buy or not to buy. The seller can produce a product before it is bought or ordered and he can try to induce a potential buyer to buy the product by means of various selling techniques. Nonetheless, a market is made only when a potential buyer decides to buy a product. This makes the transaction two-sided. The feature of a two-sided transaction is what makes the accounting identity AI=AE hold in every period. The option of the buyer in a market economy to buy or not to buy a product is what makes the expenditure side drive the income side. Income serves as the budget constraint of expenditure.

The mutual dependency of income and expenditure is summarized in a theoretical model called *Circular flow of income.* Put simply, the model states that the expenditure of buyers (mainly households) becomes income for producing sellers (mainly firms). The sellers then spend their income on factors of production, such as paying the wage bill. The income of the factors of production is spent on goods, which induces further production. The cycle then continues in this way.

Linking financial savings to business cycles

How does growth come about? Looking at the first and most well-known of equations here presented (nr 1) it is tempting to answer: increase or decrease one or more of the expenditure components and aggregate income will increase/decrease by the identical amount. In fact, for a small, open economy as the Swedish with a big share of foreign trade, this answer may well suffice as exports play a big role especially around business cycle turning points. The mechanisms in place are usually that a global business cycle upturn leads to increased demand for Swedish products. Swedish exports increase. This increase of expenditures happens at the same time as incomes increase, usually an increase in business profits. In terms of

equation (5´) the sum of sector balances remain zero as the increase in X is equal to the increase in Π.

The above description of one feature of the business cycle may well suffice for an open economy. However, it would not for a closed economy. Moreover and fundamentally more disturbing, the increase in exports which is an increase in foreign imports says nothing about the funding of the increase in foreign demand.

We shall go through a number of examples of how nominal growth can come about as a result of changes in domestic sector balances. The export example above contains one important common feature for these examples: although the sector balance equation (5´) held as it summed to zero, two of the sector balances changed. Compared to the initial position, the rise in exports and coinciding rise in business profits shows up as follows:

(M-X) ↓ as X ↑ (9)

(Π – I) ↑as Π ↑ (10)

ΔX = Δ Π (11)

Growth in this example comes about when the dominating (foreign) buy side decides to buy a seller´s (domestic) product. The transaction is characterized by a decrease of the buying side´s sector balance (equation (9) and an equally big increase of the selling side´s sector balance (equation (10)). As transactions are two-sided, equation (11) sets out the growth equation in that the change in total expenditure (exports) equals the change in total income (business profits).

Before going through some domestic examples we define the real sector balances as financial savings. Simply put, a sector´s income minus expenditure is the sector´s financial savings. Though it may seem as mere semantics to use the term financial savings instead of balance, the utility may be seen clearer considering that financial savings can be calculated in two ways. Calculating real sector financial savings takes income minus expenditure; calculating financial savings from the financial accounts (balance sheets) takes the sum of transactions on the asset side minus the sum of transactions on the liability side.

Financial Savings from Real Sector Accounts = Income – Expenditure (12)

Financial Savings from Financial Accounts =

= Sum of asset transactions minus the sum of liability transactions (13)

(12) = (13)

One may think of a wage income ending up on a bank account as a way to explain why financial savings is identical regardless of whether it is calculated from the real or financial side. If the wage income is 100 crowns, then financial savings is 100 crowns if none of the income is spent. The income hits the bank account where it is booked as a transaction on the asset side in the form of deposits.

It can now be concluded that for growth to come about, financial savings of a buying unit must decrease as much as the financial savings of a selling unit increases. Focusing on the domestic sector has the advantage that the financial side can be connected to the growth transaction as we possess the balance sheet of the domestic sectors (unlike the foreign importing units). We start from a hypothesized position that all domestic sectors are in balance with income equal to expenditure. Financial savings of all domestic sectors is thus zero. This would represent the theoretical concept of equilibrium. Let us now get out of the equilibrium position by assuming that one sector, say households, increase expenditure more than income by buying a good produced and sold by a corporation. Replicating equations (9) and (10) it is seen that:

$(W\text{-}C) \downarrow \text{ as } C \uparrow$ (14)

$(\Pi - I) \uparrow \text{as } \Pi \uparrow$ (15)

$\Delta C = \Delta \Pi$ (16)

Real side growth transaction can now be connected to the financial side by looking at how the changes in financial savings can come about seen from the balance sheet. Reverting to the 100 crown wage income example, the equilibrium position would mean that during every period the 100 crowns enter and leave the bank account as total income is spent. The only change to the balance sheet of this household would be the flow into and out of the bank account such that financial savings is zero every period. But for growth according to equations (14)-(16) to come about it is necessary that financial savings calculated from the balance sheet decrease. The household may well continue to use his 100 income crowns for spending as a start. However, the spending of the 101st crown and so forth requires funding other than income. This can following equation (13) happen by either drawing down on assets or increasing liabilities (or a combination of both).

It can also be assumed that the buying and the selling unit belong to the same sector, say non-financial corporations.

$(\Pi - I)_{(BUY)} \downarrow$ as $I \uparrow$ (17)

$(\Pi - I)_{(SELL)} \uparrow$as $\Pi \uparrow$ (18)

$\Delta I = \Delta \Pi$ (19)

$(\Pi - I)_{(BUY)} \downarrow + (\Pi - I)_{(SELL)} \uparrow = 0$ (20)

In this case, growth comes about for the same reasons as above. But financial savings for the sector does not change (equation (20)) as the decrease in the buying unit´s financial savings is offset by the increase in the selling unit´s financial savings. Connecting this real growth transaction to balance is trickier if the buying unit draws down assets to fund the increase in expenditure. The transfer of assets from the buying unit to the selling unit would be neutralized seen from the sector´s asset side, hence not visible in the financial accounts. However, if the buying unit increases liabilities, then the balance sheet of the sector would be boosted with the rise in assets pertaining to the selling unit (provided that it does not immediately pay down debt) and the rise in liabilities pertaining to the buying unit. In real life, the option of financing investment with debt is more common than asset drawdowns, the latter of which sometimes is associated with forced selling or problems with lenders. For the non-financial corporation sector as a whole, asset drawdowns would clearly not be conducive to animal spirits and a sustaining economic boom given their negative effects on market prices. Therefore it can be stated that rising liabilities on the part of buying units can serve as an approximative measure of the sector´s decrease in financial savings and vice versa.

In terms of business cycle causality, as the buyer has the upper hand over the seller, the purchase can be said to cause the sale. Or: the decrease in financial savings among the buying unit(s) can be said to cause the increase in financial savings among the selling unit(s). This can for the whole economy be written as:

$E_t(AE_{t+1}) > AE_t = AI_t = E_t(AI_{t+1})$ (21)

Equation (21) states that expectations in period t on the part of buying unit(s) with respect to total expenditure in period t+1 is greater than total expenditure which is equal to total income in period t. Note also that total income in period t is expected to be the same in period t+1, putting the finger on the accommodating and noncompulsory nature of income (in a market economy that is). For positive growth to come about (here (AE_{t+1} =

$AI_{t+1}) > (AE_t = AI_t)$) the expectations need to be realized (for negative growth, the same goes but with a less than sign). It goes beyond the scope of the paper to try to pin down the reasons for the expectations in equation (21). It may for instance be that a corporation for some reason has become more optimistic about future profits. Note that the expectations ought to be seen as an exogenous factor driving the business cycle. It is assumed that demand expectations are met by supply though it is left unanswered if demand leads supply or vice versa.

If the expectations in equation (21) are realized, it can be expressed:

$$AE_{t+1} > AE_t \quad I \quad \Delta FS_{BU,\, t+1} < 0 \tag{22}$$

where ΔFS_{BU} denotes the change in financial savings on the part of all buying units. Equation (22) means that total expenditure increases on the condition that financial savings on the part of all buying units decrease. As total expenditure is equal to total income equation (22) needs to be complemented with the corresponding income expression:

$$AI_{t+1} > AI_t \quad I \quad \Delta FS_{SU,\, t+1} > 0 \tag{23}$$

where ΔFS_{SU} denotes the change in financial savings on the part of all selling units. Equation (23) means that total income increases on the condition that financial savings on the part of all selling units increase.

Combining equations (22) and (23) we get:

$$(AE_{t+1} = AI_{t+1}) > (AE_t = AI_t) \quad I \quad \Delta FS_{BU,\, t+1} \downarrow + \Delta FS_{SU,\, t+1} \uparrow = 0 \tag{24}$$

which can be written as:

$$\Delta AE_{t+1} = \Delta AI_{t+1} = \Delta GDP_{t+1} > 0 \quad I \quad \Delta FS_{BU,\, t+1} \downarrow + \Delta FS_{SU,\, t+1} \uparrow = 0 \tag{25}$$

The conditional terms in equations (24) and (25) reflect a transfer of financial savings from the buying to the selling units. The extra money (in the sense of being on top of income) that the buying units manage to get hold of is transferred to the selling units. The transfer amount is positive here as growth is positive (the opposite would hold true if growth had been

assumed negative). The economic reference of this extra money or positive transfer amount should soon be obvious. First, let us define GDP growth as:

$$\Delta(MV)_{t+1} = \Delta GDP_{t+1} \quad (26)$$

Equation (26) is the known "Fisher equation" in growth terms equaling nominal GDP growth to the growth in money supply times its turnover rate. The left hand side of equation (26) reflects the funding of expenditures. Connecting equations (25) and (26) we get:

$$\Delta(MV)_{t+1} = -\Delta FS_{BU,\,t+1} = \Delta FS_{SU,\,t+1} \quad (27)$$

Equation (27) says that the change in money supply times its turnover rate is equal to the negative change in financial savings on the part of all buying units which is equal to the positive change in financial savings on the part of all selling units. Or simply put, Δ(MV) is the transfer amount from buying to selling units. If growth is negative, the buying units buy less showing up in increased financial savings. The buying units then transfer a negative amount to all selling units meaning that Δ(MV) is negative.

The link between the money supply, M, the turnover rate of money, V, and the change in financial savings can easiest be thought of as the money supply as the buying units´ liability side and the turnover rate as their deposits on the asset side. If a corporation for instance increases debt by taking up a new loan, this would show up as an increase in the money supply; if it activates idle deposits for a purchase, this would show up as a rise in the turnover rate of money as idle money comes into circulation. However, it is beyond the scope of the paper to elaborate more on this link; suffice it here to establish it.

Remember that the expectations of future expenditure were defined as exogenous. For the expectations to be realized, financing was needed showing up as a change in financial savings. Connecting this change to the change in money supply times its turnover rate leads up to the conclusion that money in this context is endogenous, or determined within the system, by the requirements of the real economy. The opposite case of exogenous money would for instance be a central bank injecting money into the system. A useful reference in understanding endogenous money may be the Austrian economist Joseph Schumpeter (1934) who wrote that:

"The entrepreneur with a good idea lacking money must either raise it or borrow it from a bank…when the bank advanced the entrepreneur a loan

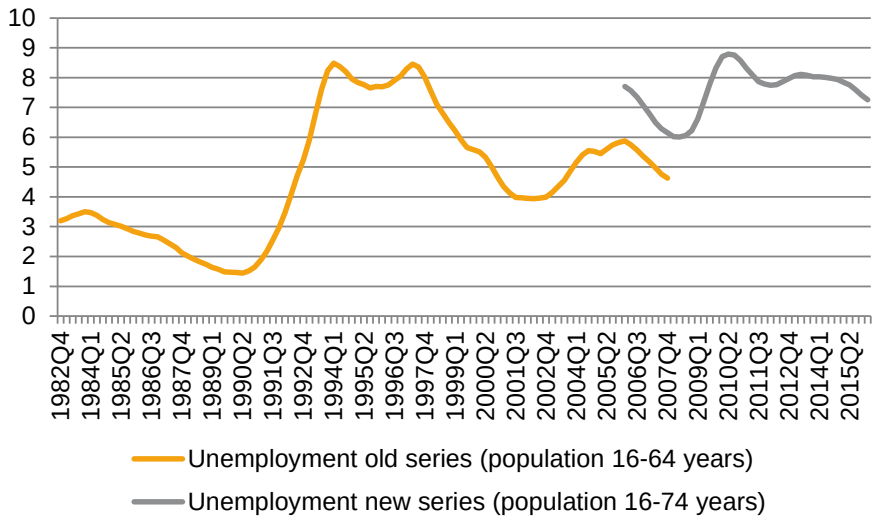
this was not the transfer of existing purchasing power but the creation of new purchasing power out of nothing…which is added to the existing circulation."

Defining Swedish business cycles phases

The aim of the paper is to analyze business cycles from sector balances. To do this it is necessary first to define business cycle phases. We use two methods to define them: the trend in the unemployment rate and tendency surveys of the Swedish economy. The two methods yield three different types of business cycles phases. Due to the subjective character of defining business cycle phases, it would be advisable to define more rather than one phase upon which to analyze and draw conclusions. Conclusions drawn should hold for all three phases, limiting the risk of "creating phases so as to fit pre-desired results". The three defined business cycle phases also have different duration and sector composition which may further contribute to limit the risk.

The unemployment trend is calculated as a four-quarter moving average (figure 1). Business cycles phases are defined as positive between peaks and troughs; negative between troughs and peaks. The phases are shown in table 2.

Figure 1. Swedish unemployment rate 1982-2016, percent



Source. Labour Force Survey, Statistics Sweden

Note. The unemployment series is a four-quarter moving average

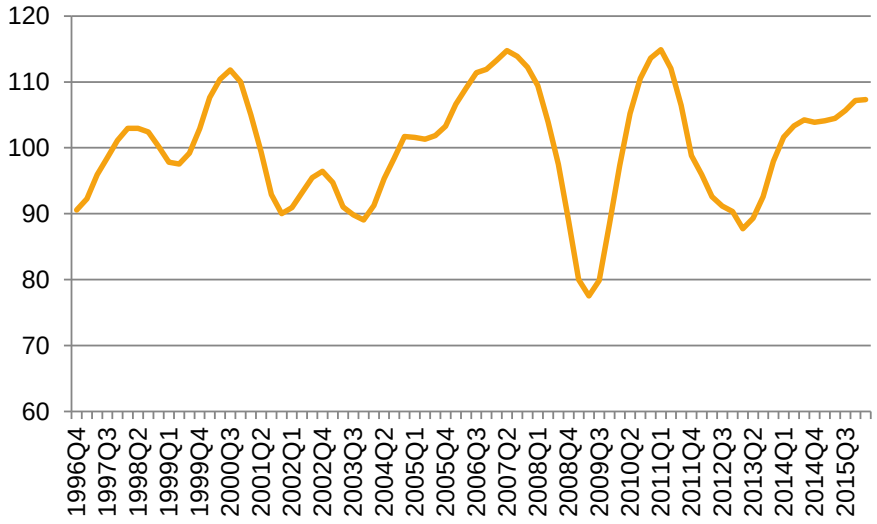
Table 2. Swedish business cycle phases defined from the trend in unemployment

Start	End	Business Cycle Phase
1983 Q4	1990 Q2	Positive
1990 Q2	1994 Q1	Negative
1997 Q2	2002 Q2	Positive
2002 Q2	2004 Q3	Negative
2004 Q3	2008 Q2	Positive
2008 Q2	2010 Q2	Negative
2010 Q2	2016 Q1 (last obs)	Positive

Source. Own definitions and arrangements

The other method draws from two tendency surveys made by the National Institute of Economic Research (NIER). The respondents answer questions about the present economic situation and expectations of the future in quality terms such as better, unchanged or worse. The surveys chosen are the total business sector and the manufacturing sector. The index 100 is the standardized mean of the series and is popularly considered the line between expansion and contraction. An index above 100 means a higher share of respondents having answered better than worse and vice versa. We define business cycle phases as being positive when the four-quarter moving average of the series index is above 100 and vice versa. The phases are shown in tables 3 (total business sector) and 4 (manufacturing sector).

Figure 2. Economic Tendency Indicator, total business sector



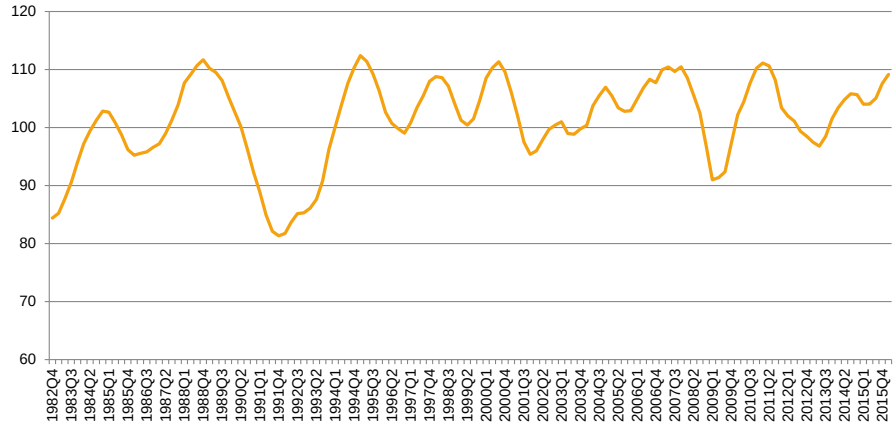
Source. National Institute of Economic Research (NIER)

Note. The index series is a four-quarter moving average

Table 3. Swedish business cycle phases defined from a business-wide confidence index

Start	End	Business Cycle Phase
1997 Q4	1999 Q1	Positive
1999 Q1	1999 Q4	Negative
1999 Q4	2001 Q2	Positive
2001 Q2	2004 Q4	Negative
2004 Q4	2008 Q3	Positive
2008 Q3	2010 Q2	Negative
2010 Q2	2011 Q4	Positive
2011 Q4	2014 Q1	Negative
2014 Q1	2016 Q1 (last obs)	Positive

Figure 3. Confidence Indicator Manufacturing



Source. National Institute of Economic Research (NIER)

Note. The index series is a four-quarter moving average

Table 4. Swedish business cycle phases defined from a manufacturing sector confidence index

Start	End	Business Cycle Phase
1984 Q3	1985 Q3	Positive
1985 Q3	1987 Q3	Negative
1987 Q3	1990 Q3	Positive
1990 Q3	1994 Q1	Negative
1994 Q1	1996 Q3	Positive
1996 Q3	1997 Q1	Negative
1997 Q1	2001 Q3	Positive
2001 Q3	2002 Q4	Negative
2002 Q4	2003 Q2	Positive
2003 Q2	2004 Q1	Negative
2004 Q1	2008 Q4	Positive
2008 Q4	2010 Q1	Negative
2010 Q1	2012 Q3	Positive
2012 Q3	2013 Q4	Negative
2013 Q4	2016 Q1 (last obs)	Positive

Source. Own definitions and arrangements

Analyzing financial savings and business cycles

As we now move on to the empirics of the paper it may be worthwhile keeping in mind that equation 5´ serves as the theoretical centerpiece of the empirical analysis. As theory often means simplification, equation 5´ may not necessarily contain all the detailed information in the real sector account database from which we draw the series used in the empirical analysis. By and large, each income/expenditure component in equation 5´ may be seen as the summed actual income/expenditure used to calculate financial savings. For instance, the income term W for households and non-profit organizations should not be interpreted as only wage but as total income of the sector of which wages are a significant part. The income term of corporations in equation 5´ does not include dividends which partly show up in the income term of households and non-profit organizations.

The purpose of the empirical analysis is to find out the sector(s) driving the business cycles and the sector(s) reacting to it. By a driving sector it is meant a sector which decreases its financial savings during a positive phase and vice versa. By a reacting sector we mean a sector which sees its financial savings increase during a positive phase vice versa. The claims

made in this paragraph hinge on the facts that business cycles as opposed to equilibrium presuppose a change in financial savings among one or more actors, that expenditure drives income via expectations and that total expenditure is always equal to total income.

We calculate the change in financial savings for the relevant sectors during all the defined business cycle phases. We use established National Account abbreviations of the sectors:

S11 = Non-financial corporations

S12 = Financial corporations

S13 = General government

S1415 = Households and Non-profit institutions servings households (NPISH)

S1N = Not specified sector

S2 = Rest of the World

Table 5. Change in financial savings in 6 sectors in business cycle phases defined from the unemployment trend (MSEK).

Start	End	S11	S12	S13	S1415	S1N	S2	Phase
1983 Q4	1990 Q2	-21 116	2 064	22 486	-8 752	367	4 952	Positive
1990 Q2	1994 Q1	40 360	-4 175	-54 893	22 931	-349	-3 874	Negative
1997 Q2	2002 Q2	-12 983	3 852	9 590	16 685	2 596	-19 740	Positive
2002 Q2	2004 Q3	17 125	6 230	-406	-10 851	-1 113	-10 986	Negative
2004 Q3	2008 Q2	-26 817	2 911	28 869	21 350	-1 324	-24 989	Positive
2008 Q2	2010 Q2	11 485	-12 744	-27 377	11 002	-155	17 789	Negative
2010 Q2	2016 Q1	-39 056	32	2 349	30 793	-335	6 216	Positive

Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The financial savings series from which the changes are calculated is a four-quarter moving average. All series are in nominal prices

Table 6. Change in financial savings in 6 sectors in business cycle phases defined from total business sector (MSEK).

Start	End	S11	S12	S13	S1415	S1N	S2	Phase
1997 Q4	1999 Q1	-3 563	-4 440	13 236	-2 364	811	-3 681	Positive
1999 Q1	1999 Q4	-1 691	-1 358	-1 034	95	131	3 857	Negative
1999 Q4	2001 Q2	-9 979	-5 151	11 909	11 215	820	-8 814	Positive
2001 Q2	2004 Q4	16 008	17 860	-13 978	-2 398	559	-18 052	Negative

2004 Q4	2008 Q3	-22 728	4 438	20 849	25 750	-2 124	-26 185	Positive
2008 Q3	2010 Q2	9 869	-12 177	-23 704	6 899	272	18 842	Negative
2010 Q2	2011 Q4	-9 328	1 719	-232	7 238	624	-20	Positive
2011 Q4	2014 Q1	-16 983	2 670	-12 502	19 793	-572	7 594	Negative
2014 Q1	2016 Q1	-12 745	-4 357	15 084	3 762	-387	-1 358	Positive

Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The financial savings series from which the changes are calculated is a four-quarter moving average. All series are in nominal prices

Table 7. Change in financial savings in 6 sectors in business cycle phases defined from the manufacturing sector (MSEK).

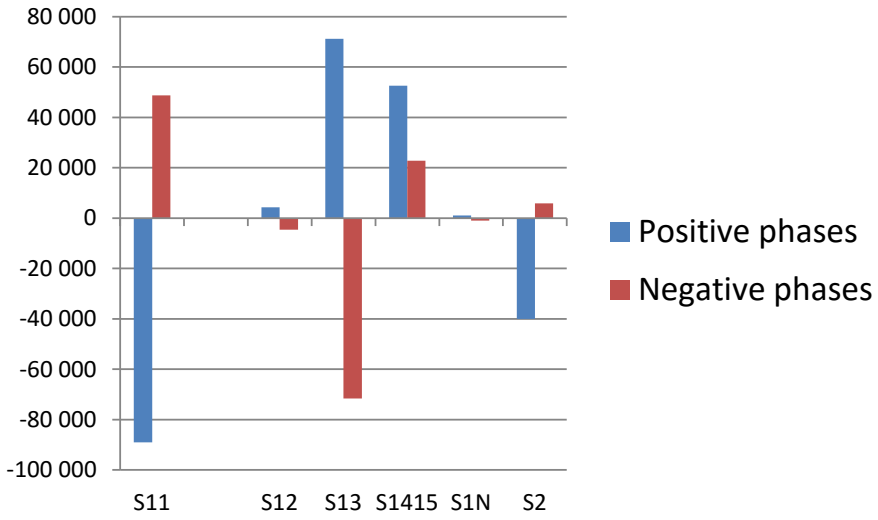
Start	**End**	**S11**	**S12**	**S13**	**S1415**	**S1N**	**S2**	**Phase**
1984 Q3	1985 Q3	-4 108	-352	-303	211	955	3 597	Positive
1985 Q3	1987 Q3	-4 906	-943	13 689	-3 930	-339	-3 572	Negative
1987 Q3	1990 Q3	-16 425	3 716	7 544	-4 848	601	9 412	Positive
1990 Q3	1994 Q1	42 921	-4 310	-55 763	23 735	-926	-5 656	Negative
1994 Q1	1996 Q3	-10 084	3 790	23 165	-1 609	327	-15 589	Positive
1996 Q3	1997 Q1	1 721	-2 513	5 175	-4 397	-384	397	Negative
1997 Q1	2001 Q3	-14 717	-4 643	27 047	6 123	2 278	-16 088	Positive
2001 Q3	2002 Q4	19 179	4 622	-23 348	3 299	-483	-3 270	Negative
2002 Q4	2003 Q2	-6 465	10 099	2 524	-2 211	-706	-3 240	Positive
2003 Q2	2004 Q1	8 317	2 144	842	-4 235	463	-7 529	Negative
2004 Q1	2008 Q4	-22 580	-1 042	22 618	28 675	-1 469	-26 204	Positive
2008 Q4	2010 Q1	10 504	-7 985	-19 675	1 147	373	15 635	Negative
2010 Q1	2012 Q3	-17 833	4 136	-7 878	21 806	67	-298	Positive
2012 Q3	2013 Q4	-7 770	-1 063	-1 875	5 052	-677	6 333	Negative
2013 Q4	2016 Q1	-16 709	-3 915	14 666	4 024	90	1 844	Positive

Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The financial savings series from which the changes are calculated is a four-quarter moving average. All series are in nominal prices

Figure 4 summarizes the results in tables 5-7 as it sums the changes in financial savings in each business cycle phase. The sums of the three methods are than calculated as an average. The average decrease in financial savings in non-financial corporations in positive phases is -89.000 MSEK. This is the average of -100.000 MSEK according to the method of the unemployment trend, -58.000 MSEK according to the method of the total business sector and -109.000 MSEK according to the method of the manufacturing sector.

Figure 4. Average summed changes in financial savings, MSEK

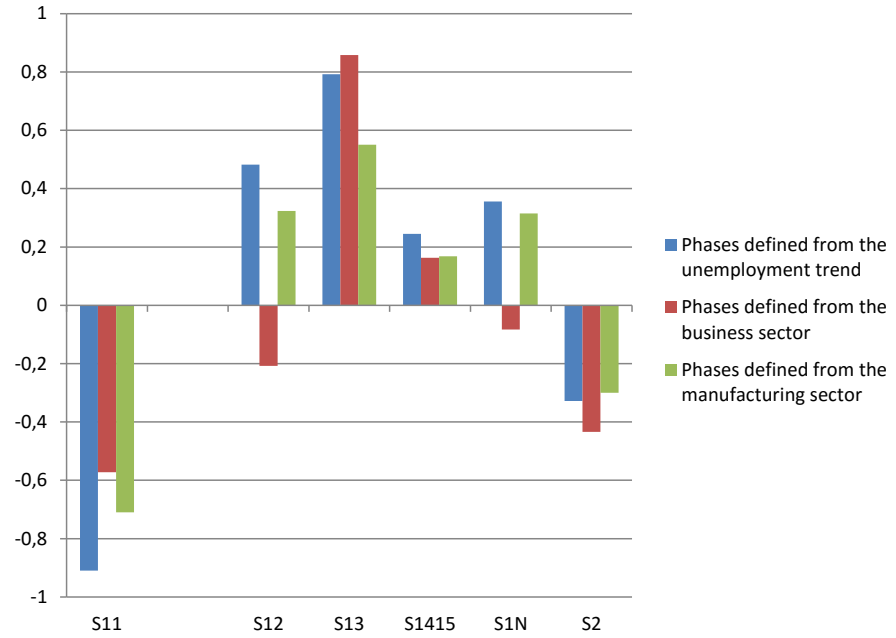


Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The financial savings series from which the changes are calculated is a four-quarter moving average. All series are in nominal prices

Another way to show the results in tables 5-7 highlighting rather than averaging out the three methods is to calculate correlations between each sector´s change in financial savings and the business cycle. To do this we attach the number 1 to positive phases and the number 0 to negative phases. The results are shown in figure 5. The biggest single correlation (-0.91) in absolute terms is for non-financial corporations when the method of the unemployment trend is used. This means that changes in financial savings are negatively correlated with the business cycle. To get a sense of how this relationship comes about more specifically we confine table 5 to this sector solely and add 1 to the positive phases and 0 to the negative phases. A closer look at table 5 confined reveals that the change in financial savings during all four positive phases is negative (a negative sign with a positive sign means negative correlation) and the change in financial savings during all three negative phases is positive (a positive sign with a negative sign means also negative correlation).

Figure 5. Correlations between changes in financial savings and the business cycle



Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The financial savings series from which the changes are calculated is a four-quarter moving average. All series are in nominal prices

Table 5 confined to non-financial corporations

Start	**End**	**S11**	**Phase**
1983 Q4	1990 Q2	-21 116	Positive = 1
1990 Q2	1994 Q1	40 360	Negative = 0
1997 Q2	2002 Q2	-12 983	Positive = 1
2002 Q2	2004 Q3	17 125	Negative = 0
2004 Q3	2008 Q2	-26 817	Positive = 1
2008 Q2	2010 Q2	11 485	Negative = 0
2010 Q2	2016 Q1	-39 056	Positive = 1

Interpreting the results

Combining the summarizing information in figures 4 and 5 is likely to provide a better picture of real world events than using the information in each figure separately. Looking at the summed changes in financial savings seen in figure 4, an advantage would be to separate sectors with big absolute changes from those with small absolute changes. However, the approach may lend too much weight to lengthy over short business cycle phases. The correlations shown in figure 5 treat all business cycle phases equally regardless of duration. An advantage using correlations is that comparisons within a sector are facilitated depending on which method is used to define a business cycle phase. On the other hand, small changes in financial savings as well as outliers may give rise to big correlations.

A general conclusion from figures 4 and 5 is that non-financial corporations drive business cycles and the general government reacts to it. As defined, the non-financial corporations are driving in the sense that they decrease financial savings in positive business cycle phases and increase them in negative phases. This conclusion is supported both in terms of average summed changes in financial savings and correlations with them and the business cycle. The general government is reacting in the sense that financial savings increase in positive business cycle phases and decrease in negative phases. Also here the conclusion is backed up both by the summed changes in financial savings as well as their correlation with the business cycle.

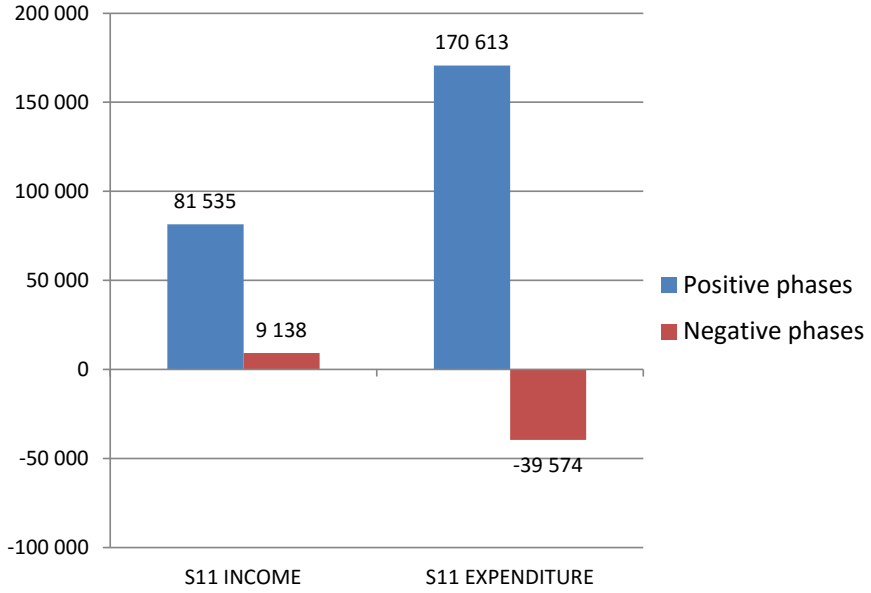
One may be tempted to label the foreign sector as a driving sector given its negative correlation with the business cycle and the negative summed change in financial savings during positive business cycle phases. A closer look in the database reveals that the pattern has mainly to do with primary incomes and not so much with net exports. This means that the foreign sector has less to say about business cycles defined from the GDP terminology. The impact of the foreign sector here is more on GNI relative to GDP.

The other sectors show relatively less of changes in financial savings and relationship with the business cycle. One can note that households and non-profit organization spend less than they earn in positive business cycle phases. The Swedish households´ savings ratio has increased significantly during the last 15 years.

Non-financial corporations driving the business cycle

We divide financial savings into its two components, income and expenditure. The aim is to find out how income and expenditure among non-financial corporations interact during business cycle phases. We know from the previous section that non-financial corporations drive business cycles by decreasing financial savings in positive phases and vice versa. In figure 6 the result is shown that non-financial corporations increase their expenditure by an average of 170.613 MSEK in positive business cycle phases. This compares with an average increase of income of 81.535 MSEK. In negative business cycle phases, income barely increases, 9.138 MSEK, whereas expenditure decreases by 39.574 MSEK. It is obvious that expenditure is more volatile than income. Expenditure drives income. Figure 7 shows that changes in expenditure among non-financial corporations are correlated stronger with the business cycle than changes in income. The expenditure side of non-financial corporations represents the dominance of the sector with respect to the business cycle.

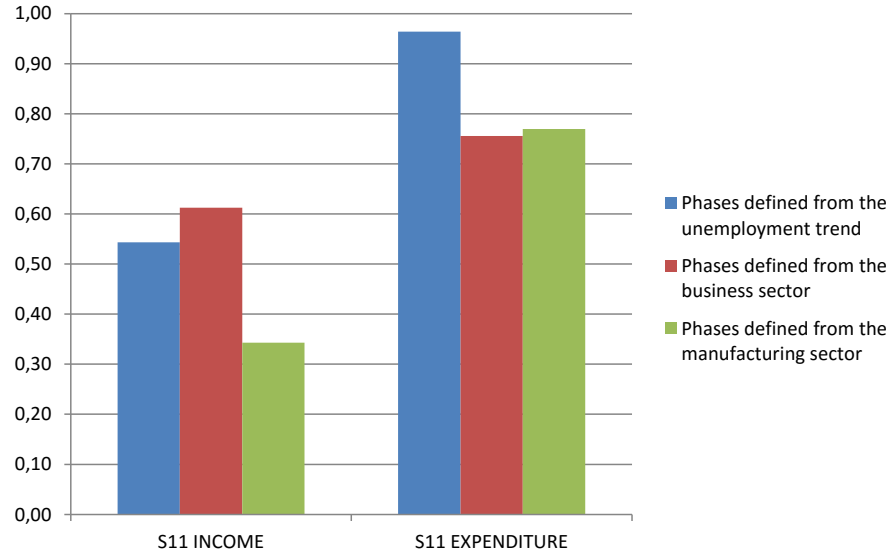
Figure 6. Average summed changes in income and expenditure for non-financial corporations (MSEK)



Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The income and expenditure series from which the changes are calculated are a four-quarter moving average. All series are in nominal prices

Figure 7. Correlations between changes in income and expenditure among non-financial corporations and the business cycle

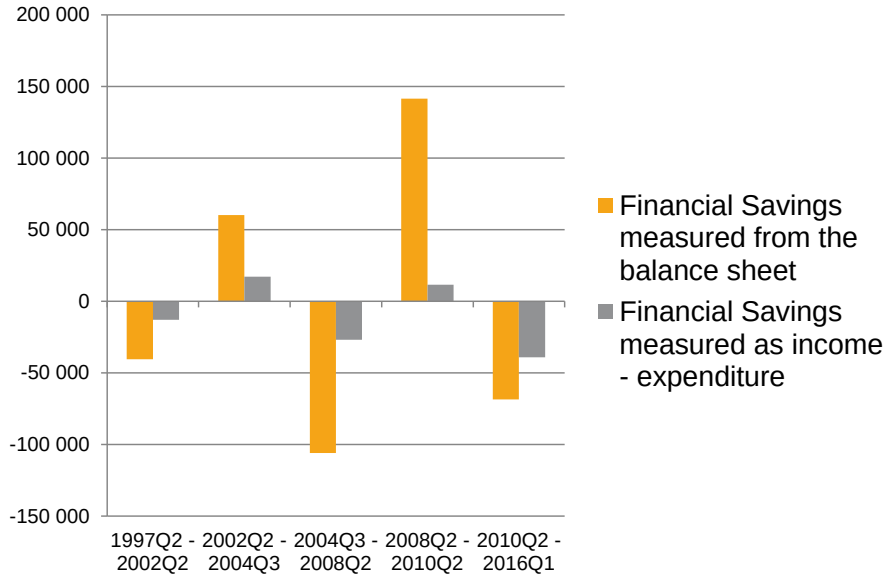


Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The income and expenditure series from which the changes are calculated are a four-quarter moving average. All series are in nominal prices

The role income plays in setting the budget constraint for expenditure may not be obvious given the difference between the two variables. The budget constraint clearly appears to be relaxed. However, the increase in income during positive business cycle phases serves as collateral for new debt-financed expenditure. This reasoning centers around the identity that financial savings is identical whether calculated from the real side of the economy (income minus expenditure) or from the balance sheet (sum of asset transactions minus sum of liability transactions). If a corporation earns 10 MSEK and wants to invest for 11 MSEK it will most likely borrow the additional 1 MSEK. Financial savings is -1 MSEK measured from the real side (10 MSEK of income minus 11 MSEK of expenditure) or from the balance sheet (no transactions on the asset side minus transactions of 1 MSEK on the liability side). Rising income facilitates and enables such debt transactions to be realized. One advantage with financial accounts is that it becomes possible to tell how the financing has come about (be it a drawdown of assets, market financing or a bank loan).The disadvantage is that discrepancies exist between financial savings measured from the real side and the balance sheets respectively. Figure 8 shows these (changes in) discrepancies in the five business cycle phases defined from the unemployment trend.

Figure 8. Change in financial savings non-financial corporations´ financial savings (MSEK)

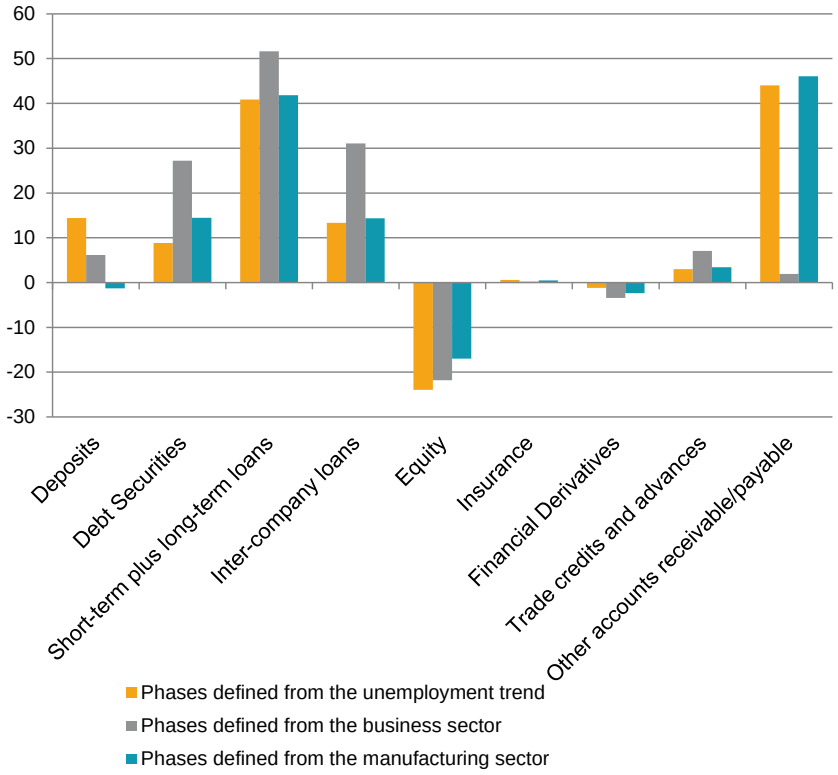


Source. Statistics Sweden / Real Sector, Financial Accounts and own calculations

Note. All series are in nominal prices and four-quarter moving average.

Given existing discrepancies, we address the link between the real and the financing side of non-financial corporations from three angles. The first as shown in figure 9 shows the contribution among the items in the financial accounts to the change in total financial savings. The sum of the contributions is 100. Looking at the yellow bars in figure 9 pertaining to phases defined from the unemployment trend, the contribution is about 40 percent for short-term plus long-term loans and other accounts receivable/payable respectively. This would on average mean that the yellow bars in figure 8 are made up by these two variables to about 80 percent.

Figure 9. Contributions from financial account items to the change in total financial savings among non-financial corporations measured from the financial accounts



Source. Statistics Sweden / Financial Accounts and own calculations

Note. All series are in nominal prices and four-quarter moving average.

The second addresses the quality of the data sources among the items in figure 9. The opinion among those having compiled the data is that deposits and short-term plus long-term loans score best in terms of source reliability whereas the item other accounts receivable/payable scores worst.

The third is a statistical regression analysis, the details of which are bundled off to an appendix for reasons of expositional ease and readability, which shows that short-term plus long-term loans is the only item in the financial accounts that can explain the expenditure growth among non-financial corporations in a statistically significant way.

Valuing these three angles jointly (transaction magnitude, quality of data source and quantitative explanatory power) the conclusion is obvious that

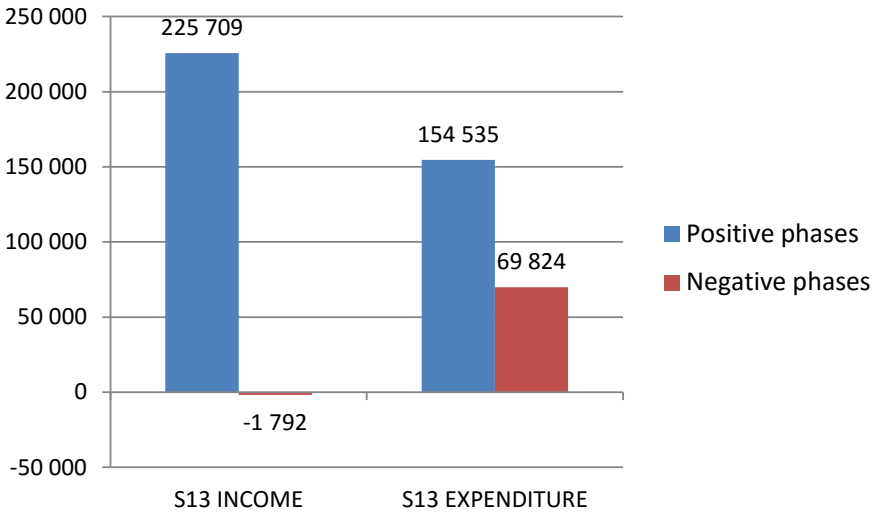
short-term plus long-term loans is the main financial savings item in terms of matching financial savings calculated from the real sector accounts as income minus expenditure.

General government reactive to the business cycle

Applying the same way of presenting income and expenditure dynamics of the general government as was made for non-financial corporations, the results look a lot like a mirror image of the results for non-financial corporations. In figure 10 it is shown that income increases by an average of 225.709 MSEK in positive business cycle phases. This compares with an average increase of expenditure of 154.535 MSEK. In negative business cycle phases, income decreases somewhat (-1.792 MSEK) whereas expenditures increase by 69.824 MSEK. It is obvious that income is more volatile than expenditure. Income is also more strongly correlated with the business cycle than expenditure (figure 11).

One major relationship from a business cycle perspective between the market economy and the general government is that changes in expenditure among non-financial corporations drive income part of which leaks out to the general government as taxes. This happens both directly and indirectly as the change in corporate income affects the change in wages of which a part leaks out to the general government. The income side of the general government represents the reactiveness of the sector to the business cycle.

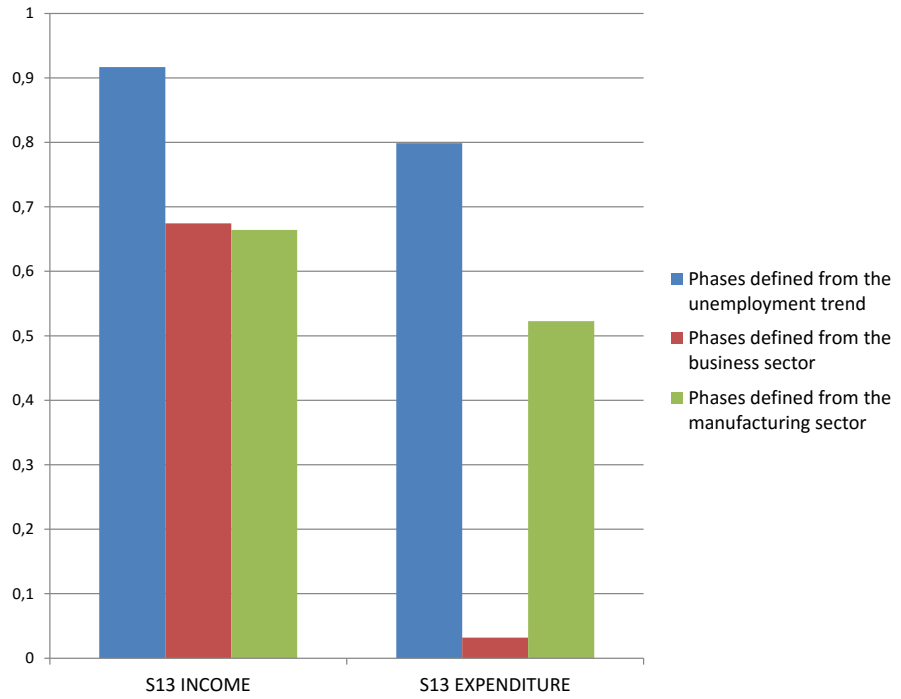
Figure 10. Average summed changes in income and expenditure for the general government (MSEK)



Source. Statistics Sweden / Real Sector Accounts and own calculations

Note. The income and expenditure series from which the changes are calculated are a four-quarter moving average. All series are in nominal prices

Figure 11. Correlations between changes in income and expenditure of the general government and the business cycle



Source. Statistics Sweden / Real Sector Accounts and own calculations

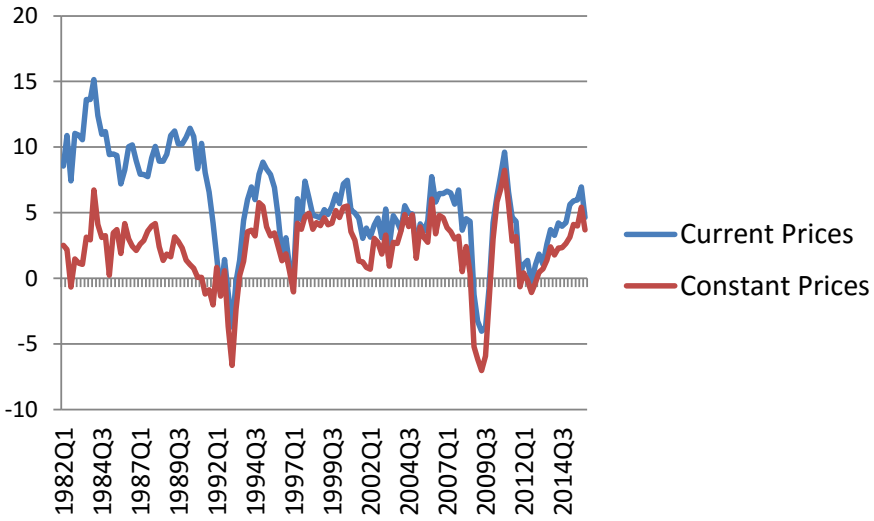
Note. The income and expenditure series from which the changes are calculated are a four-quarter moving average. All series are in nominal prices

The case for using nominal variables in business cycle analyses

Describing and analyzing business cycles is normally done in terms of real variables such as the growth of GDP in volume terms. In this paper nominal variables are used. Can the two approaches be reconciled? Yes under the condition that the real component explain a big share of nominal growth and conversely that the price component explain a small share. In figure 12 growth in GDP is shown in both current and constant prices over the period 1982-2016. Current growth clearly exceeds constant growth during the inflationary 1980s. Since then the two growth series are more aligned, suggesting a case for using nominal variables in business cycle analyses. To

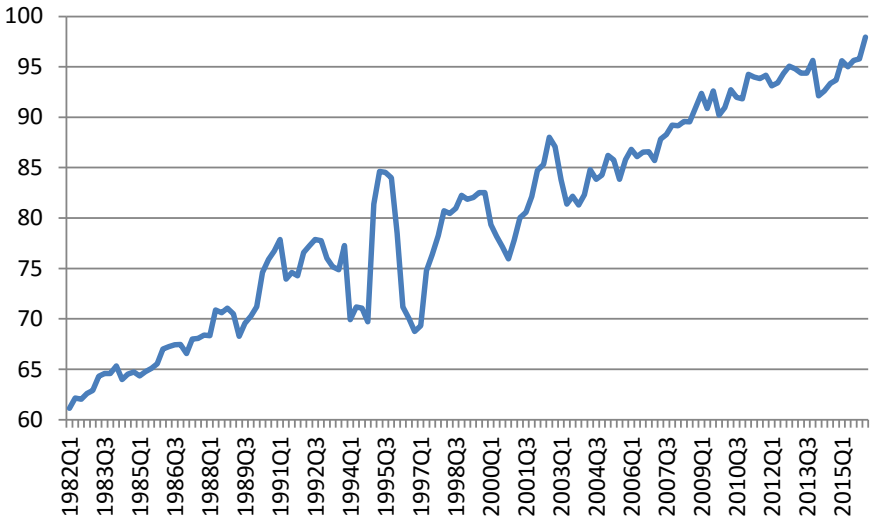
know better, the share of the real component to the growth in nominal business spending has been calculated. Figure 13 shows that the share has risen from about 60 percent in the early 1980s to above 95 percent 2016.

Figure 12. Swedish GDP Growth 1982-2016 (% y-o-y)



Source. Statistics Sweden

Figure 13. Volume share of nominal growth (q-o-q) in fixed gross business investments 1982-2016



Source. Statistics Sweden and own calculations

Note. The series is a four-quarter moving average

Concluding remarks

The main take away from this paper is the introduction of financial savings as a dynamic concept in business cycle analysis. The concept provides the link between the real and the financial side of the economy. Financial savings is identical whether calculated from the real economy or from the balance sheet which here represents the financial side of the economy. Non-financial corporations drive Swedish business cycles by increasing expenditure more than income during positive business cycle phases and vice versa. This requires funding which mainly comes about in the form of short-term and long-term loans. The shift in business expectations of future investment is seen here as the trigger or exogenous factor driving business cycles whereas the funding part is endogenous or reactive to the business needs. It is beyond the scope here to analyze why such shifts occur. It is however necessary not to confuse the possible reasons for such shifts with the role of money / funding in enabling shifting expectations to be realized.

In macroeconomic textbooks it is taught that savings equal investments (S=I). In terms of financial savings this would mean that the private sector (corporations and households) spend exactly what they earn showing up as zero financial savings. This is not confirmed by the real sector account database of Statistics Sweden. In the real world financial savings among sectors is not zero suggesting that actors constantly spend differently from what they earn. Such real economy choices show up in the balance sheet either by transaction changes on the asset side or the liability side (or both). This is the rationale for the link between the real economy and finance. Or put differently, in a world where financial markets exist, the rule is that S is not equal to I. There are however limits as to how much private expenditure (I) can be dislodged from private income (S) highlighting the role of income as setting the budget constraint for expenditure. One may here think of the limit where expenditure can´t increase more relative to income as it is no longer considered compatible with borrowers´ and/or lenders´ risk/profit analyses. A relevant theoretical framework in terms of business cycles would be the positive and negative limits of (S-I) around the S=I position.

As economic actors constantly spend differently from what they earn, an aim of this paper has been to get some structure and pattern behind this seemingly messy real economic world far away from neat macro theoretical equilibrium conditions. Business investment was concluded to be the main variable driving Swedish business cycles as the sector decreased financial savings in positive phases and vice versa. Note here that this holds true for the sector non-financial corporations. Remember also that this sector consists of buying and selling units (of capital goods) respectively. A silver

thread through the paper has been to credit buyers the upper hand over sellers. In equations (17-20) it was shown how positive growth can come about solely within the sector non-financial corporations as expenditure increased among the buying units and income increased equally much among the selling units. In the example there is no dynamic financial savings effect (like the negative one mentioned above) as the decrease in financial savings among the buying units is offset completely by an increase in financial savings among the selling units. So how then is it possible to draw the conclusion that the whole sector is driving the business cycle and not only the buying units of the sector? The answer has to do with all other sectors (mainly general government) which jointly increase their financial savings during positive business cycle phases with the income side being more sensitive and more highly correlated to the business cycle than the expenditure side. In a positive phase, the rising income in the other sectors emanate from the non-financial corporations and their rising profits. Increasing profits is for instance a condition for more hiring and more tax payments. The mechanisms in place here are the events after the growth transactions illustrated in equations (17-20). After the increase in profits among the selling unit, it may find it worthwhile to increase production by hiring and buying capital goods. The selling unit becomes a buying unit. This means that a part of the increase in financial savings of the selling unit leaks out to other sectors in the form of income (wages and taxes). The chain of events continue as increased wages and taxes lead to more consumption which then in turn benefit non-financial corporations in the form of rising profits.

The special role of non-financial corporations as drivers of the business cycle is that rising debt is income generating within the sector as buying units become selling units and so forth. This stands in contrast to other sectors as well as debt used to purchase financial assets. Households for instance would not be able to drive business cycles by borrowing to buy products as income would arise in other sectors. A debt-financed purchase of a financial asset by any actor would amount to what Hyman Minsky (1986) described as speculative or Ponzi finance as an actor would not be able to pay the principal out of income cash flows. This stands in contrast to hedge financing where all contractual payment obligations can be fulfilled by cash flows.

Given that non-financial corporations increase expenditure more than income in positive business cycle phases, the role income plays in setting the budget constraint for expenditure may not seem obvious. The budget constraint clearly appears to be relaxed. Remember here the result in figure 6 that income increases much more in positive than in negative business cycle phases. The increase in income during positive phases serves, apart from the mentioned positive leakages to other sectors, as collateral for new

debt-financed expenditure. This enters the risk calculus both on the part of both the borrower and the lender. An increase in income, all things alike, increases the probability that a debt-financed expenditure comes about. The reason is that both parts of the debt transaction view this deal as less risky. The mechanism in play runs from income to risk/probability of a debt-deal. The deal is of course two-sided. One implication of this is that for an economic boom to come about and be sustained, both the borrowing corporation driving the national income and the lender need to agree on a financing deal. This puts the finger on the vital role business profits play in business cycle phases. If profits are weak initially, both potential borrowers and lenders may find it too risky to engage in a debt-deal. And even if one part is willing to go, if the other is not there will be no deal.

The above reasoning modifies the finding that shift in business expectations of future spending is the exogenous business cycle variable and funding the endogenous one. The causality remains correct but the funding side is not merely reacting to funding requests. The lenders have the choice to approve or reject funding requests; a decision based on risk and profit analysis under uncertainty. This summarizes both the power of money in business cycles and the relatively more difficult task of getting a business cycle upswing going than a downswing.

Appendix – Regression Analysis

Discrepancies between real sector accounts and financial accounts mean that one or more items are false in either or both of the accounts. The assumption here is that the real sector accounts show correct financial savings and that the main problems exist in the financial accounts, partly due to dubious data quality for some items, partly because there is a tendency for revaluations to be booked as transactions.

The regression analysis is based on equations (12) and (13) which can be rewritten here as:

$$I_t - E_t = FS_t \qquad (12')$$

$$(\sum TR\ A)_{item,\,t} - (\sum TR\ L)_{item,\,t} = FSf_t = \sum FSf_{item,\,t} \qquad (13')$$

$$FS_t = \sum FSf_{item,\,t} \qquad (12') = (13')$$

with

I = income

E = expenditure

FS = financial savings calculated from the real sector accounts

FSf = financial savings calculated from the financial accounts

TR = transactions

A = assets

L = liabilitites

Letting E_t stand separately and rearranging gives:

$$E_t = I_t - \sum FSf_{item,\,t} \qquad (28)$$

The regression analysis follows from equation (28) with expenditure growth among non-financial corporations being the dependent variable; income growth among non-financial variables and the financial account items from figure 9 being the independent variables. The main results presented in table 6 are that the income component is positive and highly statistically significant which makes perfect economic sense. Among the financial accounts items only short and long-term loans show statistical significance. The minus sign is correct given that it is the financial savings of loans that enters the regression (asset transactions minus liability transactions). The interpretation is that an increase in financial savings of short-term and long-term loans has a negative effect on expenditure and vice versa. Looking more closely at this relationship, Swedish non-financial corporations increase their liabilities in term of short and long term loans in positive business cycle phases as a means of financing investment expenditure. The opposite holds true in negative phases.

Table 6. Regression Analysis explaining variation in expenditure growth (y-o-y) among non-financial corporations

Independent variables	*Coefficients*	*T-quote*
Constant	-0,33	-0,5
Deposits (TR A)	0,12	0,7
Debt securities (TR A - TR L)	0,00	-0,1
Short and long-term loans (TR A - TR L)	-0,27	-5,0
Intercompany loans (TR A - TR L)	0,14	0,7
Equity (TR A - TR L)	0,40	1,3
Trade credits and advances (TR A - TR L)	0,48	1,1
Other accounts receivable/payable (TR A)	-0,07	-0,8
S11 INCOME (from real sector accounts)	0,57	4,9

Source. Statistics Sweden / Sector and Financial Accounts and own calculations

Note 1. All series are in nominal prices and four-quarter moving average.

Note 2. The regression period is 1998:Q4-2016:Q1

Note 3. The R^2 is 75 procent

Note 4. The Financial Account variables are measured as a change in transactions.

Note 5. TR = transactions, A = assets, L = liabilities and S11 = non-financial corporations

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