MSc Thesis

Business cycle forecasting through economic indicators:

A dynamic approach

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1.0 Executive summary

After a long period of economic growth, USA reached a peak in economic activity in December 2007. Following this peak the economy entered the deepest recession since the great depression, only to confirm the existence of business cycles. Even though there are extensive research proving that the US economy have been moving in cycles, with periods of growth and contraction for as long as we have empirical data[1], there are still signs that market participants find it difficult to adjust to changes in macroeconomic growth. This paper argues the possibility of preparing for future changes in macroeconomic growth, and hence take the best possible advantage of both upside and downside macroeconomic risks, through business cycle forecasting. It also performs a successful ex post forecast of the business cycle peak of December 2007, and show that forecasting indeed can give vital and timely information.

Even though all business cycles of the past have some unique characteristics, they also have some important similarities. In this paper I use these empirical similarities together with economic theory, to extract predictive information from a group of economic indicators in the goal of gaining qualified expectations on the future growth of the business cycle. The forecasting approach used in this paper stress the importance of flexible and dynamic qualities to be able to evolve together with the modern economy. As the analysis put much weight on a broad understanding of the current state of the economy, and on the potential strengths and problems going forward through fundamental analysis of the respective indicators, it also hold enough flexibility to be able to adapt to future changes in economic behavior. These dynamic and flexible qualities strengthen the possibilities of such forecasts being valuable also in the future.

As the economy is constantly evolving, ex post forecasts are important tools for further research on the current predictive powers of economic indicators. Such research help us understanding past business cycles, and give useful insight in regards to what we should expect ahead of future peaks and troughs. The forecast of the US business cycle peak in December 2007 gives a good introduction to the analysis of economic indicators, and confirms the value of business cycle forecasting through economic indicators. This analysis

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[1] Among others, National Bureau of Economic Research has performed research on US business cycles back to 1854.

shows that the signs of the approaching recession were obvious, most notably in the form of an inverted yield curve and an overheated housing market, at dates between 6 and 12 months ahead of the peak. This helps confirming the validity of macroeconomic forecasting, and stands as an example that such analysis could be of great value to macroeconomic risk management and to the preparations of future strategies.

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2.0 Introduction

After years of more or less continuous growth and relatively low macroeconomic volatility during the years named "The Great Moderation"[2], the US economy entered in December 2007[3] what seems to have been the deepest recession since The Great Depression[4]. The recession has been of relatively long duration and contained both a credit-crunch and a significant downturn in the housing market. This has in turn resulted in rising unemployment and a monthly bankruptcy rate which has increased by almost 67%[5] between Q3 2007, which was the quarter before the business cycle peak, and Q4 2008.

Business cycles are returning phenomenons where periods of economic growth are always followed by a downturn associated with negative growth, before the growth turns positive again[6], hence the name business cycle. But despite a long history of recurring cycles, the downturns often seem to come as a surprise to many investors and corporations. In each downturn you can hear managers in trouble deny having prepared the wrong strategy in bad periods by explaining their losses through unexpected external changes in the macro economy (Lai 1994). Since the definition of a downturn in the business cycle indicates falling economic activity and hence profits, external changes can be a viable explanation in some cases. But much research also suggests that managers tend to choose poor strategies ahead of and during changes in the business cycle as a result of misinterpreting the situation (Lai, 1994) (Van Der Stede, 2009). This paper will show how macroeconomic forecasting can help managers in gaining qualified expectations about the future of the business cycle, which creates a broader foundation for managers to prepare their strategies.

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[2] The years from the early 1990s and up until 2007 were a period of high growth, low nominal short term interest rates together with low and relatively stable inflation. This period has been named the "The Great Moderation" in the US and has by some been marked as an important reason for the magnitude of the 2007 recession (Mizen 2008).

[3] The dating of the US business cycle peaks used in this paper is produced by The National Bureau of Economic Research (NBER). All dates of historical business cycle peaks and troughs are available at www.nber.org.

[4] This particular recession will from now on be referred to as "the 2007 recession".

[5] The number of bankruptcies in Q3 2007 was 25925. This number increased to 43546 in Q4 2008. (43546-25925)/25925 = 67,9%. All numbers are collected from Datastream®

[6] Section 4 gives a detailed explanation on the history and theory of business cycles

In accordance with the fact that recurrent phenomenons are easier to predict than random happenings, together with our extensive experience with business cycles, a large amount of research has concluded that economic indicators can be used to forecast the future developments in the business cycle[7]. But as the economic environment seems to be ever evolving, there is a constant need for updated research on these fields. This paper will extend on this field of research through an ex post forecast of the US business cycle peak from December 2007, and show how macroeconomic forecasting can play an important role, also in the future, as part of macroeconomic risk management.

2.1 Problem statement

Even though we know that business cycles are recurring, and forecasting through economic indicators have proven helpful in gaining qualified expectations about the future developments of economic activity, it still seems as business cycle risks are not given the deserved attention in enterprise risk management. The increased stability during the great moderation, the imperfections of forecasting, and biases in decision making, seemed to make economic forecasting and the management of business cycle risks surplus of requirements in regards of risk management. But as the economy again enters a deep recession the importance of monitoring and managing business cycle risks is back on the agenda.

There is already a wide selection of literature on the subjects of economic forecasting, but as the economic environment seems to be ever evolving, it is important to continuously perform new research on these subjects[8]. A relevant question is; how do we know whether the forecasting techniques of the past will continue to produce successful predictions in the modern economy? This question makes the research in this paper highly relevant.

The following research will explore the value of economic forecasting through economic indicators. It will provide a detailed introduction to forecasting and the value and characteristics of economic indicators. To take into account the evolving economic

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[7] Among many studies, James H. Stock and Mark W. Watson researched the forecasting abilities of economic indicators ahead of the 2001 recession in their article; "How did leading indicator forecast do during the 2001 recession?" from 2003.

[8] New technologies, politics, techniques and financial products are continuously being released, changing the environment of the business cycle.

environment, I will suggest a flexible and dynamic approach to forecasting which will be more based on judgmental analysis rather than econometric modeling. While this approach has both strengths and weaknesses compared to more structured econometric methods, its flexibility will help ensure its relevance also in the future[9].

To contribute to the need of frequent updates on the research of the predictive powers of economic indicators, this paper will also provide an ex post forecast of the business cycle peak from December 2007. Ex post forecasts of the latest business cycle turning points play an important role in such research as they help confirming the forecasting abilities of economic indicators on the evolving economy, and give updated information on the performance of the different approaches to economic forecasting.

To cover these topics I will research economic forecasting through the following two problem statements:

P1: "*Show how US business cycles can be forecasted through a flexible and dynamic analysis of economic indicators. The approach should be flexible enough to easily adjust to future economic evolvement, and hence have the qualities to be a relevant forecasting procedure also in the future*"

P2: "*Was it possible to forecast the U.S. recession following the business cycle peak in December 2007 through an analysis of economic indicators?*"

2.2 Delimitations

There is a broad range of external factors influencing the health and stability of the economy. Issues such as politics, wars, and extreme weather have indeed influenced the economy in the past and are likely to carry influence in the future. But these issues will not be considered in this paper, as I will only focus on economic indicators[10].

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[9] Section 8.5 will also point to the fact that the flexible approach in this paper and econometric forecasting is not mutually exclusive. On the contrary these different approaches can indeed gain from each other's strengths.

[10] Arguably changes in other external factors will in turn influence the economic indicators. In this way the forecaster will get the potential warning signs resulting from changes in factors outside the analysis in this paper.

There also exist more specialized economic indicators which demand more of the analyst in terms of specialized knowledge. This can for example be specific and detailed information about the important banking sector. Such specialized information will not be included as the approach in this paper will be of a more general structure. As a result of this the relatively specialized issues behind the subprime crisis will not be given much attention.

This does not mean that such indicators do not hold important information. Instead it means that such indicators are of less relevance if the forecaster does not hold a detailed knowledge of developments and innovations within the markets it explains. If the forecaster does hold detailed knowledge about a relevant market or sector, he should include this in his analysis.

As will be explained in detail, understanding history plays a vital role in forecasting the developments of business cycles. Nevertheless, this paper will not base the analysis on empiric statistical relationships. While measures such as correlations can be of great relevance, the empirical analysis in this paper will instead be based on past trends and negative signs ahead of earlier recessions, and not on statistical measures. More details on the reasoning behind this can be found in the review of the strengths and weaknesses of this forecasting approach in section 8.

2.3 Method

To answer the problem statements I will start by a detailed description and explanation of the problem before I move on to give an understanding on how these problems can be handled through economic forecasting. Finally I will use the methods and theories generated in the answer of the first problem statement to solve the second problem statement.

A vast amount of research on different approaches to economic forecasting have proven that economic indicators indeed are helpful in predicting future developments in the business cycle. Much of this research is made towards econometric approaches which are often constructed to forecast the probability of recessions. While Andrew J. Filardo states that the different models tested in his article "The 2001 recession; what did recession prediction models tell us?" (Dua 2004, pp 134-160) are indeed good models, this paper will use a different approach. Instead of a static econometric approach I will introduce a more dynamic and judgmental analysis with more flexibility. The chosen indicators will first be given an

empirical and theoretical analysis of their behavior ahead of earlier recessions, to create knowledge on what developments we can expect from the respective indicators. After this, predictive information will be extracted from the indicators through analysis of economic theory and a fundamental examination. The indicators will be analyzed both separate and in conjunction with the help of "The Three D's", which is a rule of thumb suggested by The Conference Board (2001).

As a basis of forecasting there need to be a detailed understanding of the different stages of the business cycle. The different stages will be examined through the business cycle model introduced by Victor Zarnowitz from his paper "The anatomy of recent US growth and business cycles" (Dua 2004, pp 43-82). While this model is based on the US economy, it is still relatively broad and many of the components in the discussion from section 3 should be relevant also for forecasts in other economies.

The forecast produced to solve the second problem statement will be made with an as chronologic timeline as possible. Nevertheless, there are numerous of reasons why an ex post forecast cannot be directly compared to real-time analysis. First of all, the interpretation of the indicators by the analyst are of vital importance to the conclusions drawn, and because of my hindsight understanding of the crisis, it should be acknowledged that I might be somewhat biased during the analysis. Second, my data was collected ex post, and some of the time series are likely to have been revised. Third, I have all the data available at the same time. During real time analysis much of the data comes with a considerable lag which makes forecasting more difficult. But with this said, I still believe that both the analysis of the 2007 recession, and the approach to forecasting business cycles introduced in this paper, is of great relevance to economic forecasting and macroeconomic risk management.

2.4   Data and literature

As a basis of the research in this paper I will use a broad mixture of modern and classic literature. Section 4, which provides an introduction to the history and structure of US business cycles, will mainly be based on the work of the National Bureau of Economic Research, mostly represented through the papers of Victor Zarnowitz.

There also exists a broad range of literature surrounding the analysis of economic indicators. While I have gathered information from a wide range of relevant research, the forecasting approach is mostly influenced by Bernard Baumohls book; "The secrets of economic indicators" published in 2007 and The Conference Boards; "Business Cycle Indicators Handbook" published in 2001.

I will also include some theories on how the economy and forecasts are biased by the animal spirits of human behavior. That is, some more or less controversial subjects from behavioral finance. This is mainly influenced by the prize winning book Animal Spirits, which was made available in 2009 by Robert J. Shiller and George A. Akerlof. But also the article; "Enterprise governance: Risk and performance management through the business cycle" by Wim A. Van Der Stede from 2009, and a good and summarizing article by Linda M. H. Lai titled; "The Norwegian banking crisis: Managerial escalation of decline and crisis" published in 1994, have been used as the basis of arguments.

If not stated differently, the quantitative data are all collected through Datastream® on the 13-03-2009. As all data were collected at this date, with no updates during the analyzing process, there might have been some revisions and changes which are not updated in this paper. But this will not have any effect on the quality of neither the forecasting approach nor the forecast of the 2007 recession. But as already mentioned; as the data used in the forecast is collected ex post, they are very likely to have been revised both after the download, and during the period between the business cycle peak and the ex post forecast performed in section 7.

2.5 Project outline

The paper will start with a more detailed discussion on why forecasting the business cycle is important, and why it should be implemented in enterprise risk management. After establishing the relevancy of forecasting, I will give an introduction to the history of US business cycles. As it is vital to all types of forecasting that you have detailed knowledge of the environment you are forecasting, the goal of this section is to provide a foundation for the following forecasting approach.

In the next section I will introduce the role of economic indicators to business cycle forecasting. There will be detailed information on the criteria's that should be met in terms of

choosing the relevant indicators for forecasting, and also some information on how these should be analyzed. A broad range of different economic indicators will then be introduced and explained mainly through economic theory, but also from the light of empirical evidence.

After establishing an understanding of the business cycle, and of a list of relevant economic indicators, section 7 will forecast the recession starting in December 2007. Even though this forecast cannot be directly compared with a real time forecast, it will be done in a realistic and relatively chronological manner to give a better practical understanding on how the forecast can be performed.

As for all forecasting there exist much uncertainty, and for economic forecasting there are many different researched approaches towards predicting the future. After performing the ex post forecast of the 2007 recession, I will explain some of the strengths and weaknesses of this particular forecasting approach and some of the biases from human behavior which indeed can disturb the forecast.

3.0 Managing business cycle risks

The probability for corporate success varies together with the business cycle, and there is no doubt that the state of the macro economy influences the rate of investor and corporate success. This means that the potential risks of changes in business cycle growth rate is a potential threat to all market participants, which needs to be handled through risk management. This does not mean that it is possible to avoid business cycle risks altogether, but it simply means that these risks needs to be accounted for, and managed appropriately as part of a risk management scheme.

The fact that executive directors blame changes in the business cycle as arguments for why their companies are performing below expectations, suggests that business cycle risks are not given enough attention in their risk management schemes. Wim Van Der Stede (2009) states that there are clear tendencies that companies are relaxing their awareness about the business cycle when the economy is growing and performance is good. On the other hand when the economy enters recessions there are clear signs of over-tightening and over-scrutiny. The famous quotes from the former CEO of Citigroup, Chuck Prince, in July 2007; "… when the

music is playing you have to get up and dance"[11] when arguing that the financial markets were still nice and healthy, not long before the burst of the subprime bubble[12], is either a good example of a top manager who is neglecting the potential risks of a business cycle contraction, or simply indicates the existence of behavior like the fully invested bear who keeps investing even though he feels the market might be vulnerable[13]. Nevertheless, this is an example of failure of business cycle risk management, and the likes of Citigroup did indeed get into massive trouble not long after this interview of Chuck Price.

In a later section I will show that it is possible to understand where in the business cycle the economy is at the current, and further generate qualified expectations about how the economy will perform in the future through analysis of economic indicators. These expectations about the macro economy can help managers in creating internal future scenarios and hence implement justified preparations for future macro economic developments.

3.1 Upside and downside risk

Business cycles are by definition a measure of broad economic activity and will hence have an effect on most market participants. But the fact that we cannot remove the risks altogether does not mean that we should neglect preparations for the inevitable downturns incurred from changes in the cycle. We have experienced time and time again that the business cycles are recurrent, and so it seems only rational to monitor and control these risks and to prepare for the next stages.

As the business cycle contains both periods of growth and recession a full removal of its risks would not necessarily be something to go for even if we could. In the discussion of business cycle risk it is often only the risks of recession which are mentioned, but it is important to remember that the subjects of risk management deals with both upside and downside risks. This means that the management of business cycle risk includes both the preparation for periods of growth and recession. I have already mentioned the statements of Van Der Stede (2009) that markets often get overly pessimistic during downturns and overly optimistic

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[11] Financial Times, July 9 2007 – Citigroup chief stays bullish on buy-outs

[12] The analysis in section 6 will show that it was obvious at that time that a recession was in the loom.

[13] Los Angeles Business Journal, March 20 2000 – High-Tech bears could turn vicious if market falters

during periods of growth, but with the correct assessments of future economic activity it should be possible to take advantage of these situations instead of being surprised with poor strategies.

3.2 The illusion of control and insufficient adjustments

While the statements from financial institutions, such as Chuck Prince of Citigroup, ahead of and during the credit crunch of 2007 and 2008 might have been those of fully invested bears, Linda M. H. Lai (1994) points to research suggesting that actions like these are the results of managers entering a stage associated with an illusion of control during periods of growth. She argues that long periods with results above expectations often results in an overconfidence which creates biases in the analysis of external factors such as the business cycle. This endangers their monitoring and interpretation of both threats and opportunities, and seems to make managers neglect the threats altogether.

This illusion of control leads managers to keep working with the same strategies which worked so well in the past, even though changes in business cycle risks suggests that internal modifications could be needed. This results in insufficient adjustments of strategies where the investor or corporation is always struggling behind the business cycle, instead of working proactively towards the threats and opportunities associated by peaks and troughs.

To be able to prepare for both upturns and downturns in the economy, business cycle forecasting through economic indicators could be a vital tool. If we are able to gain qualified expectations about the future developments of the business cycles it is also possible to help managers from entering the illusion of control, and to form the enterprise strategies to fit the future macroeconomic developments in the best possible way. If we have expectations on how the external factors will develop in the future, we can create internal scenarios on how these developments will affect our business, and from this prepare strategies to minimize the internal impact of recessions and maximize the gains from opportunities.

4.0 U.S. business cycles

The vast studies of business cycles are invaluable to the possibilities of understanding the state of the macro economy and to be able to predict the future movements of the economy. Many of the most famous economists in history, such as Keynes and Schumpeter have been researching this subject, but in this section I will mainly use the research by The National Bureau of Economic Research (NBER) as their research is widely accepted among economists in the U.S. today. This section will give an introduction to the different business cycle stages and how they are measured by NBER.

4.1 Defining the business cycle

Burns and Mitchell (1946) defined business cycles as fluctuations in aggregate economic activity of nations that organize their work mainly in business enterprises. They also stated that a cycle consist of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions and revivals that merge into the expansion phase of the next cycle. With this in mind, and to be able to use NBER business cycle dating, I will not use the simplified definition of a recession which is often used by the daily press, that is; the economy is in a recession when it experience negative growth in GDP for two consecutive quarters. I will instead use the following NBER definition of a recession; "… a significant decline in economic activity spread across the economy, lasting for more than a few months" (www.nber.org)[14]. In other words the economy enters a recession when it is suffering negative developments in multiple economic indicators, not just the GDP, resulting in a fall in total economic activity until it reaches a business cycle trough. While this definition is much broader, it also has some clear advantages. First, GDP comes with a considerable lag and often suffers from multiple revisions. With this definition you don't rely solely on GDP data but rather on a mix of economic indicators which give a broader measure of total economic activity. As a measure of this business cycle the conference board has developed a coincident index (CI) which is a weighted group of economic indicators put together to form an index which follows the developments of the total economic activity. The indicators included in this index are; the weighted value of the number of employees on Non-

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[14] http://www.nber.org/cycles/cyclesmain.html. Quote retrieved from this webpage on the 15.06.2009

agricultural payrolls, personal income less transfer payments, Index of industrial production and manufacturing and trade sales (Zarnowitz 2004). Since this index has proven a good track record as a measure of the US economic activity I will refer to this as the main measure of US business cycles (Zarnowitz 2004).
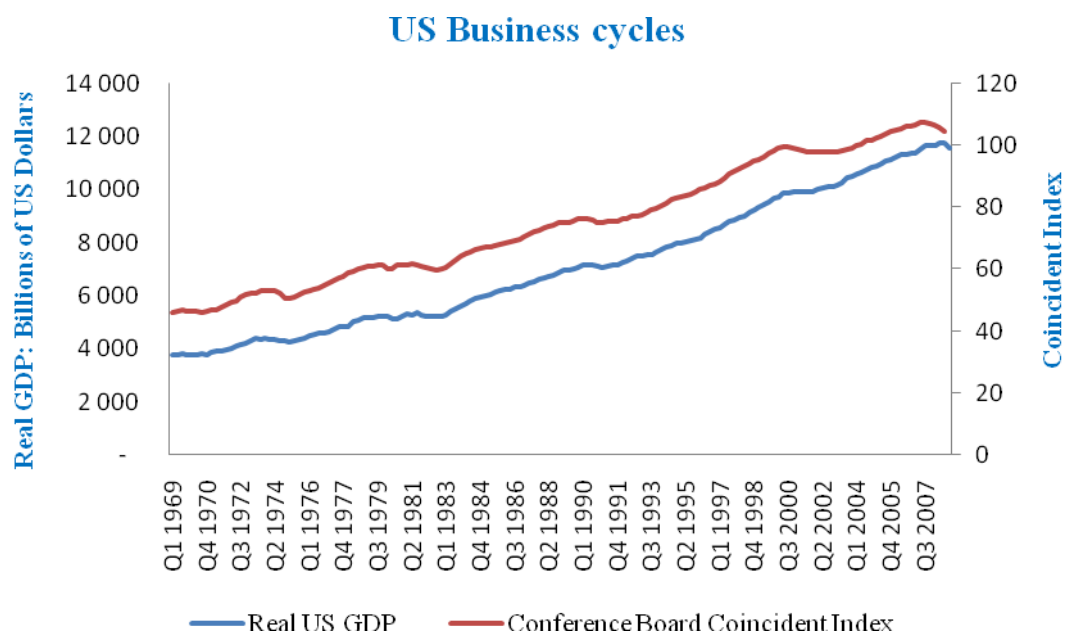
Figure 1 – US Business cycles pictured by the Conference Board's Coincident Index and Real GDP. Quarterly data.

Figure 1 holds GDP values on the left axis in billions of US dollars, while the right axis holds the CI values. The curves show the level values of both variables and visualize the strong relationship between them. Although GDP is not part of the CI it still holds valuable information about the state of the economy, and is moving close to the conference board CI with a correlation at 99.5.

What is striking about figure 1 is that the business cycles seem to hold more magnitude in the CI than in GDP. Especially the recessions starting in 1973 and 2001 holds bigger traces in the CI. This suggests that the total economic activity actually have suffered more during recessions than what is measured through GDP.

Peak	Trough
December 1969	November 1970
November 1973	March 1975
January 1980	July 1980
July 1981	November 1982
July 1990	March 1991
March 2001	November 2001
December 2007	

Table 1 - NBER Business cycle reference dates[15]

Table 1 holds the business cycle reference dates from 1969 produced by NBER. The dates includes the exact month when the economy reached a business cycle peak or trough based upon the coincident indicators and national income available at the time (Zarnowitz 2004). Still after revisions both the CI and GDP follow the NBER dates, and do not seem to hold any other turning points than the ones dated by NBER.[16]

4.2 The different stages of the business cycle

After a closer analysis of the business cycle dates set by NBER back until the peak in June 1857, it is hard to find any other systematic besides the fact that the cycles are recurrent. There are no firm periodic structures neither in the length of the cycles nor the periodicity. The average length from peak-to-peak of the cycles after 1945 has been between 5 and 6 years, although the cycles of the later years seems to have been somewhat longer with an average of close to 9 years for the cycles after the peak in July 1990. But although the cycles have differed in duration and magnitude they share some familiar technical characteristics.

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[15] Data retrieved from NBER from the following web page: http://www.nber.org/cycles/cyclesmain.html on the 15.03.2009

[16] Although in figure 1 the peaks in December 1969 and January 1980 and trough in November 1970 are not as visual as the others.
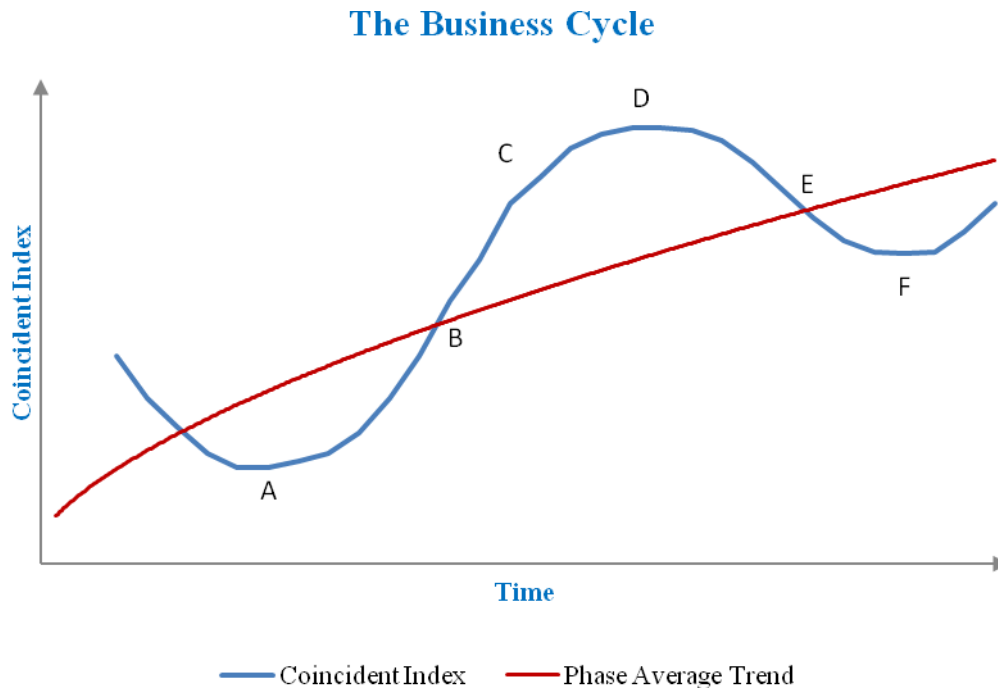
The Business Cycle

Figure 2 - Stages of expansion and contraction (Based on figure 2.3, Zarnowitz 2004)

Figure 2 gives a picture of how a business cycle generally looks like, and gives an introduction to the most common technical characteristics. The economy, represented by the coincident index, first experiences a trough and hence the end of a recession at point A. The economy then enters a recovery stage between point A and B where the negative growth from the last recession, which has lead to developments below the trend line, is regained when the CI reaches point B. In the next stage between point B and C the positive growth sustains as the CI rises to achieve net gains above the trend line and the latest business cycle peak. In this stage the economy often enters a state better fit to terms like "boom" or "euphoria", but this is not a necessity. In point C the business cycle growth rate deteriorates as the economy enters a stage of slowdown followed by the cycle peak in point D. After experiencing positive growth rates from point A up to point D the economy now suffers from negative trends and enters a recession. First with a downturn from the peak at point D towards the phase average trend at point E, and second with a further decline from the phase average trend until reaching a new business cycle trough in point F (Zarnowitz 2004).

This model takes on the assumption that the economy experiences net positive growth between each business cycle peak, which according to Victor Zarnowitz' research (2004) normally has been the case. While this is not a necessity in the future, the simple and

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generalized explanation of the different stages is a good introduction to what the cycles generally look like. As none of the past cycles have been identical, a more detailed model on the different stages is of less relevance in this paper. To this research the importance lies in understanding the basic structures in a goal of creating expectations on how the current business cycle will develop in the future. For a more detailed analysis on the developments in the different stages I will refer to the work of Charles P. Kindleberger and Robert Z. Aliber in their book; Manias, Panics and Crashes: A history of financial crises.

5.0 Macroeconomic forecasting through economic indicators

Even though the different business cycles can be described through relatively simple models such as the one explained in section 4, the underlying reasons for the developments and the amplitude of the business cycles seems to be changing with each cycle. Wesley Clair Mitchell who was one of the early researchers of business cycles and leaders of NBER stated that; "since each business cycle in a sense is unique, a thoroughly adequate theory of business cycles, applicable to all cycles is unattainable" (Dua 2004, Page 1). This suggests the need to take a broad set of factors into consideration when analyzing the state of the economy and when trying to forecast the future developments of the macro economy. The following approach to forecasting uses a broad range of indicators towards different sectors of the economy. This inclusion of many different indicators ensures the forecast from being biased from false signals, and also helps the forecaster in understanding the unique attributes of the future cycles. The forecasts which are based on a too narrow set of indicators, will always suffer from threats of being biased by the changing environments and potential false signals from individual indicators.

5.1 A flexible and dynamic approach

In contrast to the well defined econometric approaches to economic forecasting, the more general approach to economic indicators in this paper gives opportunities for a more dynamic analysis and handling of risks. This is needed because of the ever changing underlying dynamics of the business cycles. As the different business cycles are in many ways independent and unique, they also have different underlying reasons for their developments.

Because of this we cannot set any specific rules to which indicators to use, and we will need to attain a flexible and dynamic approach to their analysis. As already mentioned, my approach will include a pre specified group of different indicators, but as will be seen, they might all need supplemental analysis of different underlying factors to give a thorough understanding of their developments. But despite this, economic theory and empirical data can give us some vital pointers to what we should look for and what predictive information the different indicators might contain.

In the analysis of the indicators, both separately and in conjunction, I will use the three D's presented by The Conference Board in their "Business Cycle Indicators Handbook" (2001) as my main working tools. This approach to economic indicators gives a simple and dynamic analysis which suites well to the ever changing environments of the US economy.

Even though the discussion used in this analysis of the economic indicator approach will be mainly towards forecasts of US business cycles, the same approach can be used on other economies as well. But the forecaster's needs to be aware that some of the different indicators used might hold different information and relevance in different economies[17], and they will need to justify the use of the different indicators through the relevant attributes which will be presented in section 5.4.

5.2   The time horizon and economic forecasting

The time horizon of economic forecasts plays an important role to how much influence the forecast get. As uncertainty grows with the time horizon, the longer periods you try to predict, the more difficult it gets. Because of this forecasts of very long time horizons often gain less influence and attention.

While econometric approaches to forecasting have specifically stated time horizons on beforehand, the analysis in this paper will not have a specific time horizon on the forecast. Instead this approach looks for current trends in the economic indicators to give qualified expectations through economic theory on what trends we can expect in the future. In other words the forecast will not give any specific date where we expect changes in economic activity, but it will simply imply how the economic activity will develop during the next 3 to

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[17] See section 5.4.5

18 months. While this might seem a somewhat diffuse choice of time horizon, it should be noted that no forecasting approach can with certainty tell what will happen at an exact date, but only give more or less qualified suggestions. This means that forecasting the exact date of future turning points in the business cycle is close to impossible. But as will be shown in the later analysis, forecasting future trends for the next 3-18 months are not impossible. These trends are also normally of more importance in developing long term corporate strategies than the exact turning point of the business cycle.

5.3 Economic indicators and their implications

Economic indicators are statistical measures of the economic conditions of a specific market or sector of the economy. They are produced to support economic analysis as snapshots of economic performance at a specific sector at a specific point in time (Baumohl, 2008). Good examples of popular indicators are employment reports and the consumer price index, which respectively gives helpful information on the employment situation and inflation. Through analyzing the history and economic theory behind such time series we can get an understanding of the current state of the US economy, and generate qualified expectations about the future.

Even though there are an almost indefinite number of economic indicators available for the US economy, it is not an easy job to interpret the available information. Some indicators are inaccurate and offer for revisions, while others are made available only with a significant lag so that the information within is of less importance in real time. On top of this there is the problem of contradicting information where the different indicators analyzed tell widely different stories about the state of the economy. An example of two indicators contradicting each other is consumer confidence and personal savings during both the 1990 and 2001 recessions. As consumer confidence was plummeting during both recessions one would expect an increase in personal savings as a percent of personal income as consumers were showing little faith in the health of their personal and the macro economy. But instead personal savings was in both instances low and stable, and even at record low levels during the 2001 recession. In other words, these two indicators are at the same time giving signs of both strong and weak levels of consumption.

The Conference Board (2001) states; "… there is no single time series that fully qualifies as an ideal cyclical indicator", when arguing the need to assess multiple indicators to get an unbiased understanding of the economy. I have already argued that all business cycles are in some way unique, which is the reason why we need to take a broad specter of indicators under evaluation when trying to find answers about the state of the economy in question. This leads to yet another problem; as there are so many different indicators, very few have the time and ability to absorb all information available. The obvious question is how to choose which indicators to concentrate the analysis on. Bernard Bauhmohl (2008) and The Conference Board (2001) both suggest some specific attributes which you should look for when choosing the indicators to form your analysis. I will in the following section concentrate on the more flexible attributes of Bernard Bauhmol, as I believe the attributes of the Conference Board are better suited for an econometric approach.

5.4 Choosing the relevant indicators

As I will be looking to forecast the future trends of total US economic activity I will choose a broad range of different indicators to give a simple all-round understanding of the state of the economy. The following attributes of Bernard Bauhmohl will be some of the main factors behind the choice between the many available indicators for the different sectors of the economy.

5.4.1 Accuracy

The quality of the information within is an obvious and important attribute to consider when choosing indicators. Many indicators are offers for high levels of revisions or seasonality which creates uncertainty and biases to the information within. GDP which is one of the most popular economic indicators, are also well known for being offer for endless revisions. Other indicators such as the consumer sentiment survey hold much information about the behavior of the consumers and are only seldom offer for revisions. As the indicators are the basis of the predictions, it is vital that the data received in real time are as accurate as possible.

5.4.2   Timeliness:

Some indicators are only made available with a significant lag. To make real time analysis you would need up-to-date information, and you should pay attention to indicators whose information are made available relatively early after the end of the relevant period. GDP is again an example of a popular indicator which comes with a considerable lag, while employment reports on the other hand normally are made available only shortly after the closing of a month.

Although this paper is written ex post the start of the 2007 recession, I will try to choose indicators which can be strong also in real time forecasting. This means that both the timeliness and the accuracy will play a part in my choice of indicators, and the approximate release dates and amplitude of revisions will be stated in most of the descriptions of the respective indicators.

5.4.3   The Business Cycle Stage

Sometimes the amount of emphasis put on an indicator changes with the stage of the business cycle. For example, in periods of growth economist often put less consideration to the levels of auto sales. In these times of high growth and high employment, general consumption is normally high and analysts takes high sales numbers for granted. In recessionary periods on the other hand, such sales numbers might get more attention as it gives a good pointer on consumers' economic confidence and might be a good indication to whether the business cycle is getting closer to reaching a trough.

The forecasting approach used in this paper will be general with the possibilities to be used in both forecasting peaks and troughs. But as stated in the problem formulation my main focus will be on the possibilities to forecast the 2007 recession. I will therefore give most attention to the indicators' abilities towards forecasting recessions.

5.4.4   Predictive ability

The predictive ability of the indicator is especially important when you are trying to forecast future developments. The problem with selecting predictive indicators is again that the economy changes over time. But despite this, there are some indicators that seem to be more

consistent in their predictive abilities than others. Zarnowitz and Moore (1982) state that economic time series that represent the early stages of production and investment processes might help forecasting future levels of economic expenditures and output. For example popular indicators such as the number of new orders for durable goods or new housing starts might lead future economic output in the sense that it might take some time from the order of a good, or the building of a house before the actual sales and delivery takes place.

Also market expectations can play an important role in the predictive abilities of the different economic indicators. Share prices are per definition dependent on future dividend payouts, and when stock prices fall it might be a sign that investors expect or know that the future corporate profits and dividends will fall in the future, and hence that the business cycle might be closing on its peak.

There are numerous examples of indicators with such theoretical forecasting abilities, and in section 6 there will be an analysis of a number of different indicators where both their importance for the economy, their theoretical forecasting abilities, and their empirical forecasting performances will be mentioned.

5.4.5   Degree of interest and relevance

It is important to remember that different indicators can be of different relevancy in different economies. A good example is an indicator which will not be examined in detail in this paper, namely the price of oil. While the price of oil can have a negative relationship with economic activity in importing countries such as USA, this can be a very important positive indicator for exporters of oil such as Norway or Venezuela. In these oil producing countries, a higher price would mean increased corporate profits in their most influential industrial sectors. For importing countries on the other hand, increased prices would imply higher costs which would lay negative pressure on profits. I have decided not to include the price of oil in this analysis, although it certainly holds some relevance.

The level of interest in an indicator can also be of importance when choosing what information to include. A popular indicator is likely to carry much influence in the market, and should hence be considered in a forecasting approach. Because of this it can often be

smart to choose the most popular indicator over the most sophisticated, when choosing between two indicators towards the same market.

5.5 *Leading, coincident and lagging indicators, and their value to economic forecasting*

Researchers of business cycles normally classify economic indicators into three different categories; leading, coincident and lagging. Leading indicators are those with the best predictive qualities and therefore start the negative or positive trends of the business cycle ahead of the actual business cycle. These are the indicators which are of most interest for forecasters, and which will get the most attention in this paper.

Coincident indicators are those who move relatively parallel with the business cycle, and experience their up- and downtrends at the same time as the general economic activity. Lagging indicators on the other hand, are the ones who enter stages of growth or decline only after the actual business cycle has already changed its direction.

Because we don't have any forecasting methods that with certainty can give us the exact date when the business cycle is going to experience a peak or a trough ahead of time, the institutions who date the different stages of the business cycles make their announcements with a considerable lag. The Business Cycle Dating Committee (BCDC) of NBER states that they never announce any dates without being perfectly sure that the economy has hit a turning point. This results in a 6-18 month lag on US business cycle dating (www.nber.org) [18].

As the leading indicators are only suggesting that we might be heading towards a peak or trough in the future, without neither stating any specific date nor depth, coincident and lagging indicators can be of great importance when trying to estimate when the economy is actually turning. After receiving strong signs from the leading indicators, the forecaster will thus be waiting for the turning point to materialize in the coincident indicators. As the announcements from the BCDC also come with a considerable lag, understanding coincident and lagging indicators can give important information about whether the economy already has reached its top (bottom) and has in fact entered a recession (growth) stage. In other words the coincident and lagging indicators can be of great value also for forecasters, in terms of

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[18] http://www.nber.org/cycles/recessions_faq.html

understanding more exactly when the economy reaches its expected turning points. The indicators chosen in the following analysis will therefore not be solely leading indicators, but also indicators which normally move more coincident, or with a lag, compared with the CI index.

5.6 Analyzing the indicators

Even though no indicator holds a perfect empirical merit, and even worse; they sometimes show opposite signs, it is nice to have some guidelines to what to look for when trying to analyze economic indicators and forecast economic turning points. The conference board has produced a handbook[19] to help analyzing the leading index ahead of recessions through three important elements; the three D's[20]. Although the approaches suggested in the handbook are made towards the leading index, they are flexible enough to be used on bigger approaches with multiple indicators as well. As the conference board themselves suggests; "… it is imprudent to forecast a recession using a simple and inflexible rule. The US economy is continually evolving, and is so far too complex to be summarized by one economic series" (Conference Board, 2001). In the following I will give a short introduction to the analysis of economic indicators starting with the business cycle and the importance of history, before explaining fundamentals and the three D's. In the following section I will talk most about forecasting recessions, but the methods described can be used in much of the same way when trying to predict business cycle troughs.

5.6.1 Understanding history

With recurrent phenomenons such as the business cycle, history plays a very important role in forecasting. Historical trends contain hints on how the relevant indicators are likely to behave ahead of a peak or trough, that is, are they leading, coincident or lagging. An understanding of the time series' former max and min values and its long term trend, together with its former behavior ahead of peaks and troughs is an important part of forecasting through economic indicators. From understanding history and analyzing what happened ahead of business cycle

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[19] The Conference Board – Business Cycle Indicators Handbook (2001)

[20] The Three D's will be explained in detail in section 5.6.4

peaks and troughs in the past, we can look for similar developments ahead of the business cycles of the future. Because of this, a thorough understanding of the empirical behavior of the relevant economic indicators can be of vital importance, and I will include some empirical details on whether the different indicators in fact did show signs of strength or weakness ahead of earlier business cycle peaks[21]. But as the business cycles before the 2007 recession are generally outside the scope of this paper, the empirical analysis will not be detailed nor hold much descriptive information.

But with this said, it is again important to remember that the economy is evolving and that no business cycles are identical. This means that different times with different developments ahead of peaks and troughs, can give different trends in the indicators. In other words, while we basically learn how to forecast through understanding the past, it is also important to be aware of the possibilities that history will not repeat itself every time. The housing market did for example stay relatively stable, showing few signs of weakness during the 2001 recession, while it was experiencing a significant decline both ahead of and during the recession starting December 2007.

5.6.2   *Where in the business cycle are we?*

To be able to gain qualified expectations about the future developments of the economy it is vital to first understand the cycle theories explained in section 4 and where in the business cycle the economy is today. From that information alone one can get indications of what to expect for the future. Knowing that historical business cycles have an average duration of 5-6 years and understanding what to expect from the different stages of the cycle, the CI alone can hold important information on both the current and the future. If the economy has experienced 5 years of positive growth, history tells us that it is very likely that growth will slow or even turn negative during the coming years. But we have learned from the years of the Great Moderation that the average duration from the past is not necessarily the correct duration for the future, as the last couple of growth stages have lasted for almost 10 years.

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[21] I will only focus on business cycle peaks, but similar analysis could be used to understand their behaviour ahead of troughs.

Through the analysis of a combination of leading and coincident indicators, the forecaster should be able to gain a good understanding of the current state of the economy, and of its strengths and weaknesses going forward.

5.6.3 *Are the developments fundamentally supported?*

As the business cycle grows towards a new peak, some indicators tend to reach extreme levels. Understanding the fundamentals behind these values is vital to gain the correct conclusions on whether the developments are signs of good health or those of a potential bubble. Indicators with positive long term trends often have rational explanations behind reaching these record levels, and might hence not be a sign of an overheating economy after all. But record levels should always be monitored against the fundamental reasoning behind the developments as this could indeed be the developments of a bubble. This means that we might have to include new information to explain the fundamentals behind developments in the indicators which was originally under examination. In other words we control the underlying developments behind the relevant indicator. For the price of a house, such underlying factors could be the costs of construction and the general supply and demand of houses[22]. A sudden increase in the costs of construction while all other factors stay the same, could for example be a rational explanation for an increase in the price of private houses.

A good example is the market for private housing during the years after World War 2 and after the Great Moderation. This market experienced a boom after World War 2 which generated record growth in house prices (Shiller 2005). At this point the housing market boom was well supported by fundamentals which resulted in a natural increase in demand, and the extreme developments were hence not danger signs, but rather positive developments supported by market fundamentals[23].

During the Great Moderation the US housing market experienced another boom. Later in this paper I will show how the economic indicators reached record levels which when controlled against the fundamental data which were supposed to explain the developments, actually

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[22] This is obviously not an exhaustive list of factors influencing the housing market.

[23] Government restrictions had limited the supply of new homes during World War 2. When soldiers returned to settle with their families after the war, there was an increase in the demand for houses leading to high, but justified, growth in house prices. (Shiller 2005)

indicated that this was just the economy blowing a new bubble, and that the record prices were in fact too high.

5.6.4   The three D's

Many economic indicators are very volatile and sometimes suffer from false signals of downturns when single indicators for some reason fall while the economy keeps on going strong. The possibility of different indicators pointing in different directions has also been discussed, and does indeed help to complicate the process of forecasting the future developments of the business cycle. To help structure the analysis The Conference Board suggests use of the three D's; duration, depth and diffusion. They argue that even though we cannot base any conclusions on any single rule, the three D's can be used as guidelines to summarize the information gathered from the many different indicators when trying to predict future recessions. The longer the period, the stronger the magnitude, and the broader the spread of the negative signs produced by the different indicators, should support any conclusions on whether a recession is in the loom, or not.

The high volatility within many indicators means that we are likely to see both good and bad numbers within the same month, but several months in a row with negative developments is often a sign that something is wrong. The Conference Board suggests that three consecutive months with negative growth in their leading index is a sign of future problems, but one would often like to see even longer periods of downward trends to draw any firm conclusions.

As the negative trend over time is relevant, so is the magnitude of the fall. If the fall is only minor then the economy might only be making some periodic corrections, and in these cases it is often easier to stimulate further growth through monetary policy. If on the other hand the depths of the downward trends in the indicators are more significant, it might be a sign that the threat of recession cannot be stopped. It is difficult to make any rules of thumb on what a significant depth is, as this can be different from indicator to indicator, but a thorough empirical analysis of the respective indicators can help the forecaster to understand which levels are regarded as normal. This type of analysis should also be considered in conjunction with the already mentioned fundamental analysis.

Alongside the timeline and depth of the trend, the diffusion among different indicators can tell something about how widespread the economic problems are. Remembering that the definition of a recession points to a broad downturn in total economic activity, it is obvious that the more widespread the trend is between different sectors of the economy, the harder it might be to fight off the recession through monetary policy. A diffused downturn in multiple indicators can also work as confirmation that the trends are not false signals, but indeed an indication of economic problems.

The three D's can be used separately or simultaneously, although simultaneous signs from all of the three D's should be noticed as stronger than indications within only one. Downturns in the economic indicators are signals that the economy might be weaker and hence the probability that the business cycle is closing on a peak increases. But with the help of the three D's we can detect whether the signs are those which The Conference Board (2001) calls a tropical storm, or nothing more than a simple rain shower.

6.0 An assessment of relevant economic indicators

Because of the importance of understanding the status of the economy today to be able to predict the future, not all indicators need to be leading the economy. This means that not all indicators included in the approach will have strong predictive abilities. But as this is a forecasting approach, the assessment of the different indicators will always point towards their possible implications for the future.

The indicators are chosen to give a broad, but still detailed, understanding of the state of the economy. Since the definition of a recession is a broad negative trend in total economic activity, it is important to collect information from several different sectors of the economy. As will be seen I have also chosen more than one indicator for most of the relevant markets, and this is to protect against false signals in single indicators. From analyzing more than one indicator on each market, you are more likely to detect any false signals and to avoid biased forecasts.

The indicators included are picked as good indicators for real-time forecasting based on the attributes from section 5.4. Even though this analysis is produced ex post of the 2007 recession, the indicators included in this forecasting approach are put together so that they

could work as part of a real-time forecasting approach which could easily be implemented by companies and private investors for future forecasting. With this said, the scope of this paper means that I have to eliminate some indicators which can be of great interest such as the number of auto sales and the price of oil. The indicators which will be explained are hence not an exhaustive list, but rather an introduction to some of the most popular economic time series[24].

In the following there will first be a description of broad indicators holding information about the total production levels, the current account, inflation and the yield spreads. The indicators will then shift towards the corporate developments, the employment situation, the propensity to consume and the housing market, before having a look at a leading index created by The Conference Board.

6.1 *Gross Domestic Product and the CI index*

Gross Domestic Product (GDP) is arguably the most famous economic indicator of all. GDP is a measure of total economic output and is as explained earlier moving much correlated to the business cycle[25]. This paper has earlier discussed some of the weaknesses of the GDP announcements, namely its late appearance and numerous revisions. But despite this, one should always pay attention to this release date as there could always be surprises.

In terms of forecasting the lag is a problem and the movements are as explained in section 3 coincident with the business cycle. Still the detailed GDP report contains much specified information which certainly could be used to get a better understanding of the current state of the economy. As the revised GDP is the actual total production in the economy, it could be used as an important control on the coincident index which The Conference Board uses as the measure of total economic activity.

Section 4 has already discussed some of the empirical developments of GDP pictured in figure 1, and explained its cyclicality through a business cycle model. The predictive power

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[24] NBER produces a calendar of the release dates of many relevant US economic indicators. This helpful calendar is available at their web page: http://www.nber.org/releases/

[25] Indeed GDP is by itself often used as a measure of the business cycle. When analyzing economies that do not have a timelier coincident index, the GDP is normally the preferred choice as a measure of the business cycle.

from this indicator comes most importantly from understanding where we are in the business cycle at the current point of time. This information should be used in conjunction with the cycle theories already explained in section 4. Because of the reasons already discussed, the CI will be used as the main measure of the US business cycle during the analysis of the 2007 recession in section 7.

6.2 Current account and the exchange rate

At a quarterly basis the value of the US current account is released by the Bureau of Economic Analysis. The data rarely suffer from revisions, and hold a broad measure of the US trade and investment relationship with other countries. In short the indicator holds the sum of income and payments to and from the rest of the world (Blanchard 2003).
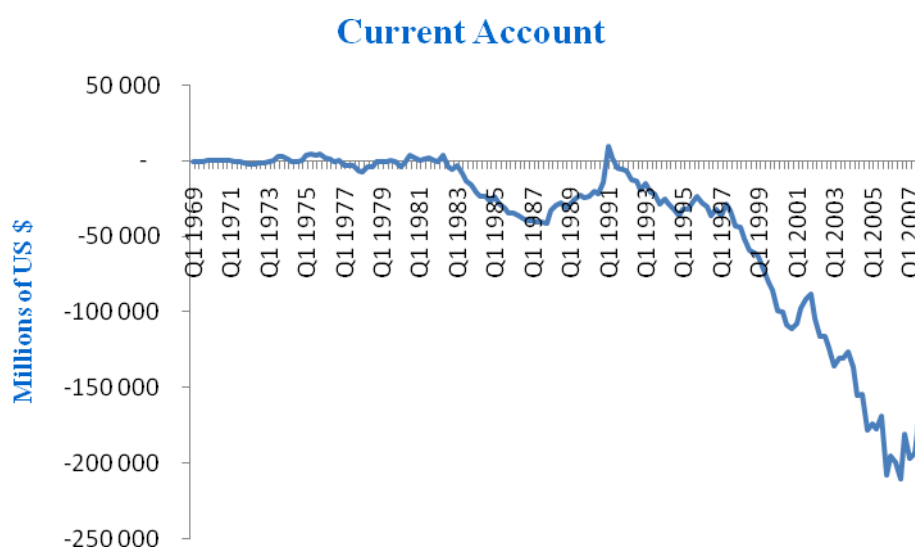
Current Account

Figure 3 – US Current account. Quarterly data.

As can be seen from figure 3 the US current account has been negative for most quarters since the early 1980s, except for a short period at the positive end in 1991. A negative current account means that there is a bigger capital flow into the country than going out, and the country is thus borrowing money from foreign economies. While a deficit could be a sign of overspending or bad planning, it could just as well be a case of a strong economy which is borrowing abroad to help boost further growth at home. It is the latter argument that is mostly used on the US, since the US economy is arguably one of the biggest and most liquid

economies in the world, and because many other countries are so dependent on keeping US dollar reserves[26].

But as with all debt there are some risks involved. This is why the deficit needs to be watched closely, and why this indicator is of importance also for the forecaster. One of the many potential dangers connected to the US current account deficit, is if any of the countries which have pegged[27] their currencies toward the dollar decides that they want less exposure towards the US economy[28]. If they decide to do this they will also need less US dollar reserves and are likely to invest less in the US stock markets. If this is to be the case one can expect the stock markets and the currency to weaken as foreign investors pull out some of their investments.

Another negative view on the deficit is that it is actually showing that the US economy is losing competitiveness compared with the rest of the world. As will be examined later, the US savings rate is at approximately zero percent which means that the US consumers are very willing to spend. But the record high current account deficit suggests that much of this spending is going abroad resulting in a negative trade balance and finally a weaker local industry. Fears are that this will eventually mean lower profits to the local industry, and hence less future jobs (Ferguson 2005).

From figure 3 there is a tendency of positive growth in the current account during recessions[29], and as the deficit is so large it could be a useful indicator to follow in conjuncture with for example the stock markets and the currency. If foreign investors were to decide that the deficit is too large and that they want to remove some of their exposure to the US economy, we can expect to see a drop in the stock markets together with a weaker currency as they pull some of their funds out of the country. As the deficit is at record levels

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[26] Because the US dollar is arguably the most liquid currency in the world and many countries have a fixed exchange rate system towards the US dollar, some central banks are keeping substantial US dollar reserves.

[27] When a country pegs their currency, they lock the value of their currency towards a foreign currency. This is in other words a form of fixed exchange rate system (Blanchard 2003)

[28] This is an especially hot topic after the global financial crisis starting in 2007 was mostly blamed on the US, and hence some countries are feeling the risks of being so dependent to one economy. Also the Euro area has grown to be a strong contender.

[29] One of many possible explanations for the positive growth in the current account during recessions could be falling imports as consumption falls during the downturn.

this could be a real threat, and there is broad agreement that there is bound to be improvements and that the deficit cannot be allowed to become much larger (Ferguson 2005).

This indicator is in other words represented by a deep negative trend, which has lasted over a substantial duration. The relatively low cyclicality of the indicator means that this should not be expected to lead the business cycle, but the possibility of a broad financial crisis as a result of the amount of US government debt, means that the developments indeed could be a danger sign which should be considered by forecasters and analysts of the US macro economy.

6.3 Inflation

The rate of inflation is an important part of the economy which is relevant for all consumers and investors. Volatility in prices is important both in terms of costs of consumption and doing business, as well as it's a vital factor when negotiating labor contracts. To control the price volatility and give consumers and investors a more predictable economic environment, price stability is normally one of the main objects of the national bank. Some even sets long term inflation targets which they use monetary policy to control. As this indicator carries so much influence in the markets, it is only natural that it also should carry influence in a forecasting analysis.

In the US the Federal Reserve (Fed) stated in January 2009 that they were currently working with an inflationary target of 2%.[30] Even though this might be their first concrete long term inflationary target, this might not influence much change in the way the Fed works towards price stability. The US Fed has already been working with a goal of price stability and low inflation for years, and Alan Greenspan managed during his period as chairman of the Fed to successfully stabilize the core inflation rates between 0 and 1%.[31]

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[30] The Telegraph – The Fed sets first inflation target as it warns US recession will deepen. 19.02.2009.

[31] Core inflation is total inflation excluding some of the products with the most volatile prices, such as food and energy. Because of high price volatility within these products they can bias the inflation rate such that it seems as the general price volatility is greater than it really is. Because of this the Fed normally refers to the core inflation.
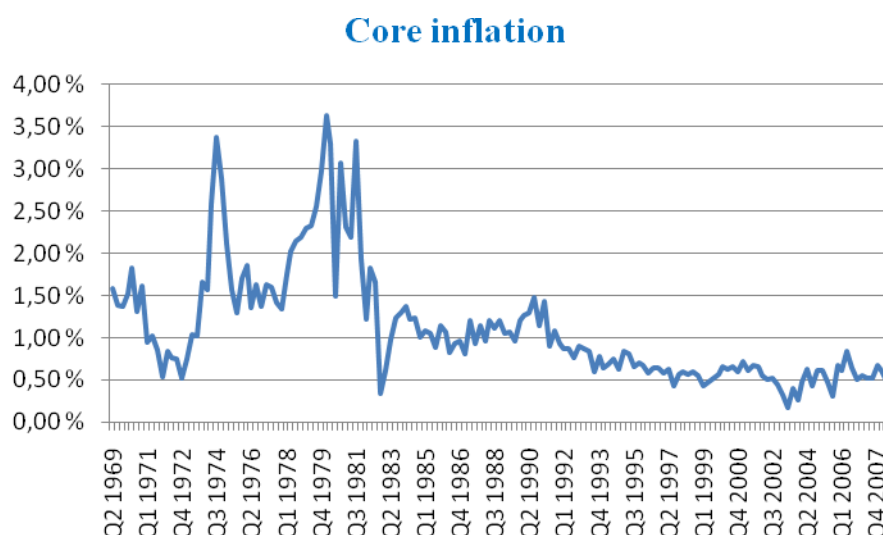
Core inflation

Figure 4 – Core inflation, calculated from CPI less food and energy[32]

Figure 4 clearly shows the increased stability in price changes since 1985. This price stability enhances resource allocation and the efficiency of markets as it becomes easier for consumers and investors to foresee future price changes.

Whether National Banks should choose to use an inflation target is out of the scope of this paper, but the decision is still of importance in terms of forecasting. If the National Bank successfully follows an inflationary target the developments of inflation should as a result be more stable and it might be easier for the forecaster to predict when the National Bank will change the direction of their monetary policy to keep inflation within their goals.

Inflations above normal are often followed by a contraction in monetary policy, which again often results in a slowdown in consumption and economic activity. The rate of inflation can in other words hold important predictive information on monetary policy, which again is a vital influence on the business cycle.

From figure 1 we can see an increase in inflation ahead of the 1991 recession, from 0,96% in Q4 1989 to 1,30% in Q2 1990. The increase is significant, but still within levels which was normal at the time. In Q1 of 2001 there was an inflation of 0,73% up from 0,44% in Q1 1999. The best sign was probably in Q2 2006 when the inflation reached 0,85% which was the

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[32] CPI is short for Consumer price index

highest levels since the early 90s, and which hence was very likely to be followed by increased interest rates.

During times of recession the inflation rates might hold more information also for countries with target levels. Specifically it might hold information about the amplitude of the recession. Japan has become a classic example of an economy suffering from a liquidity trap[33] and deflation which saw the once so strong high-growth economy suffer during the lost decade[34] of the 1990s. The other extreme can currently be seen in Zimbabwe where economic growth is at a minimum while they at the same time are suffering from hyper-inflation[35]. Both scenarios are extreme and put policy makers in difficult positions when trying to get their economy stabilized again. These examples show that sometimes inflation become harder to control during recessions and hence hold important information on the depth of the downturn.

The fact that the Fed stated a specific long term target at a time when the economy was suffering from the worst recession since the great depression is probably no coincident. Core inflation was for Q4 2008 at only 0,16%, while interest rates were already at levels close to zero and other monetary adjustments to increase liquidity had already been implemented. Through deciding on a specific inflation target the Fed tried to increase consumers' confidence in the market and further increase the transparency of their policies. But still at the time of writing, economists with high influence, such as Alan Meltzer and Nobel Prize winner Paul Krugman, are stating their respective warnings about the possible dangers of deflation or inflation in the US economy.[36]

As a sum up the rate of inflation is important for understanding the state of the economy and can indeed give pointers on how the interest rates will change in the future. For countries who are working with specified targets for their inflation we should not expect any great volatility but it should still not be underestimated as an economic indicator which can hold predictive information, especially about the future yield curve and the depth of economic downturns.

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[33] A liquidity trap refers to the situation where national banks has used their possible anti-recessionary actions through monetary policy, but still are unable to stimulate economic growth. For more information see Olivier Blanchard 2003

[34] The lost decade refers to the period of economic downturn in Japan from the early 1990s up until year 2000.

[35] Hyper-inflation refers to a situation with extremely high inflation.

[36] The Economist – The greater of two evils. May 7th 2009

6.4 The yield curve

The yield curve has probably been the most consistent predictor of future business cycle peaks in the US, and has gathered much attention from researchers of the business cycle. The reasoning behind the strong relationship between the yield spread and the business cycle has been heavily debated with most researchers concluding that investor expectations and monetary policy are the main reasons behind its predictive properties.

6.4.1 The influence of monetary policy and investor expectations

During periods of high economic activity and strong demand for credit, we often see a tightening of monetary policy as a way to control inflation and to stop the economy from blowing bubbles. This means that we can expect interest rates to be increased in times of high economic activity, as monetary policy enters a phase of contraction. As monetary authorities increases the interest rates, the yield curve experiences a jump in the short end while the long end, which reflects the long term expectations, are less influenced by short term policy changes (Estrella and Trubin 2006). This increase in the short end diminishes the slope of the yield curve which either flattens or becomes inversed[37] depending on the developments in the long term expectations.

The theory that investor expectations influence the yield curve helps explain movements in the long rates. The cyclical nature of the macro economy leads to expectations that the slowdown in investments as a result of the contracting monetary policy, will result in lower future profits and employment. This is eventually expected to evolve into a downturn in inflation and total economic activity[38]. As downturns in inflation and total economic activity are normally followed by a more expansive monetary policy, interest rates are hence likely to fall in the future. As a result we might see a drop in the long end of the yield curve while short

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[37] An inverted yield curve is a yield curve with negative slope. That is the short term rates are higher than the long term rates.

[38] As new investments are abandoned because of the increased interest rates, there is a loss in potential employment and future profits. The loss of profits and the stagnating employment creates eventually introduces a slowdown and downturn in total economic activity. For more information see Estrella and Hardouvelis (1991) or Blanchard (2003)

term monetary policy is contracting. This further deteriorates its slope and results in a yield curve inversion.

The cyclical nature of the business cycle means that periods of increasing interest rates are often followed by a slowdown and downturn in economic activity. This together with the role of investor expectations means that we should expect the yield curve to be forward looking and a leading indicator

6.4.2 Empirical evidence
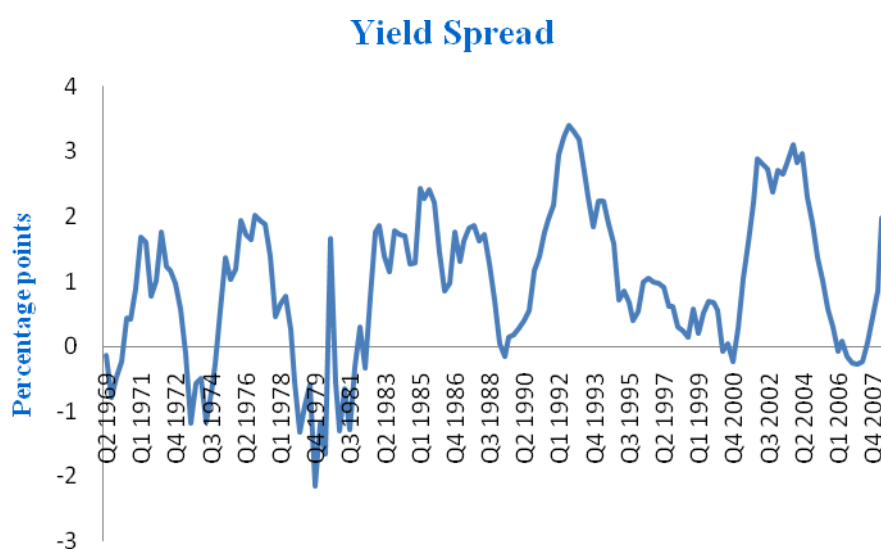
Yield Spread

Figure 5 – The Yield spread between 10 year and 1 year US treasury

Figure 5 show the yield of a 10 year US treasury less the yield of a 1 year US treasury, and it gives a clear picture of the tendency of an inverting yield curve ahead of recessions. The yield curve inverts ahead of each of the dated recessions from table 1, and in most of the cases as early as one year ahead of the business cycle peak. The relationship does not hold any false signals over the period examined, and seems to hold crucial information about future economic activity.

Figure 6 – Empirical yields for a 10 year US treasury and a 1 year US treasury

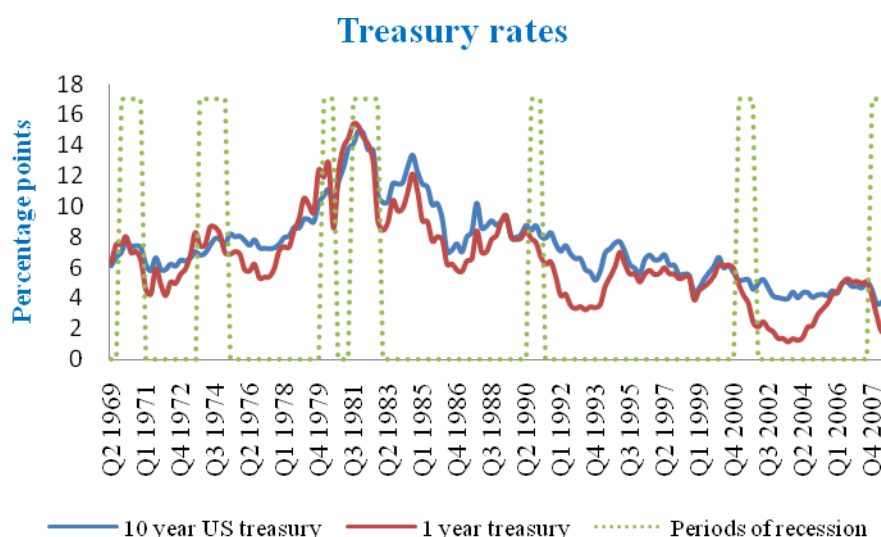Through a closer look at the respective rates' separate developments in figure 6, we can see that the short rates increases in the periods of yield curve inversion. This is as indicated by the underlying theories explained in section 6.4.1. The long rates are as expected not as volatile as the short rates, and are not consistently falling or increasing in the times of yield curve inversion. During the early recessions in the data shown in figure 6 the long rates increases in the periods in question but not as much as the short rate. Ahead of the 2001 and 2007 recession on the other hand, the long rates falls or are relatively stable. This inconsistency suggests that it is the movements in the short end of the yield curve that are the main reasons behind the inversion. But Estrella and Hardouvelis (1991) show that there is more predictive information in the yield curve than explained by the movements in the short interest rate alone, indicating that expectations towards inflation and future levels of investments are indeed relevant, and that the spread is more relevant to forecasters than the short rate alone. This can also be seen through figure 6, where an increase in the short rate is not necessarily followed by recessions. As monetary policy is mainly used in the goal of stabilizing the economy, there are relatively long periods of increasing short term interest rates in the years 1983-1984 and 1993-1995 respectively, which did not result in any immediate recessions. This supports the view that the yield curve contains information beyond short term monetary policy.

6.4.3   Choosing between interest rates

How to choose the interest rates used to compute the spread is also a relevant question. As many different researchers have tried many different combinations of interest rates in their work, Estrella and Trubin (2006) had much empirical evidence when suggesting some ground rules to the choice of yield spread. The first consideration is that you choose rates with much and consistent historical data. The treasury yields are the natural choices in the US as they have a long and consistent history. They also suggest that spreads between interest rates with maturities far apart give the best forecasting results. With this in mind, the 10 year treasury rate becomes the natural choice in the long end[39]. At the short end the choices are many with positive forecasting evidence from the use of the 3 month, 1 year or 2 year treasury, or the federal funds rate[40] (Estrella and Trubin, 2006). My choice of using the 10 year and 1 year treasury rates fits well to these categories, and show excellent empiric forecasting abilities.

Also the choice of data duration is relevant to the analysis. With lower duration the data often becomes more volatile, and on daily and weekly data the yield curve often gives false signals. Estrella and Trubin (2006) found over 100 false signals from yield curve inversion when analyzing daily data for the period 1968-2005. In contrast they found no false signals using monthly data. I chose quarterly data as this gives less volatility, and even more reliably signs of recessions than the monthly data. In real time forecasting it might be a good idea to use both monthly and quarterly data if possible. Monthly data could give strong indications, but if the yield curve average over the quarter is still negative, the duration of the signal should be interpreted as a significant increase in the probability that the economy will be reaching a business cycle peak followed by a recession within the following 12 months.

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[39] These are the longest maturities that have been available in the US over a long period (Estrella and Trubin 2006).

[40] It should be noted that the bigger the difference in maturity on the rates used, the bigger the spread. This also means that spreads between rates with closer maturity might have a higher tendency to invert than spreads between rates with a greater difference in maturities.

6.4.4   *Will the yield spread forecast equally well in the future?*

Even though an indicator has played an invaluable role in past forecasts, there is always uncertainty connected to whether it will prove equally successful in the future. This is also the case for the yield curve. While past performance have been impeccable, changes in future market behavior could result in the yield curve becoming less powerful as a forecasting tool. Estrella and Hardouvelis (1991) argues that one potential threat to its usefulness in the predictions made by private forecasters is that monetary authorities start actively using the yield curve as a leading indicator in their approach towards monetary policy. They argue that the relationship between the yield curve and economic activity is not necessarily policy invariant, and it is hence likely to change as the authority changes their approach to monetary policy. As a result the yield curve is only likely to keep its predictive qualities if future monetary policy and market behavior is executed in a more or less similar fashion to what we have experienced in the past, or if future monetary policy is neutral[41] such that the developments in the yield curve are only explained through future expectations.

Even with these potential problems it is important to remember that it has successfully forecasted all recessions after the article by Estrella and Hardouvelis in 1991, and it still stands out as the indicator with the strongest predictive abilities. Nevertheless, it is an important point that a change in future market behavior, for example as a result of a shift in the work of monetary authorities, could indeed have an impact on the future predictive power of the yield curve. This again points to the importance of including multiple indicators in economic forecasts, and to the dangers of blind trust in past correlations from single time series.

6.5 *Corporate developments*

The developments within corporate profits, valuation and activity are obviously of great importance for the state of the economy as a whole. This is first and foremost because the general wealth of business set the standard for the possibilities of consumers to get employment and general financial prosperity. In this section economic indicators with information in regards of the state of the corporate developments will be examined through

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[41] A neutral monetary policy is a policy which neither stimulates nor slow total economic output and activity (Anderson, Buol and Rasche, 2004)

the light of economic forecasting. First the corporate profitability and stock returns will be examined, then the amount of new orders of durable goods and finally the NAPM[42].

6.5.1   Corporate profits and stock markets

The growth in corporate profits gives important information towards the value being created and what we can expect in terms of future corporate investment and employment. The growth rates of corporate profits are relatively volatile, and has over the years carried some false signals of business cycle turning points. But this does not mean that this indicator cannot be used as part of a forecasting procedure. Analyzed as part of a broad specter of economic indicators, corporate profits tend to hold interesting information in the months before business cycle peaks and troughs.
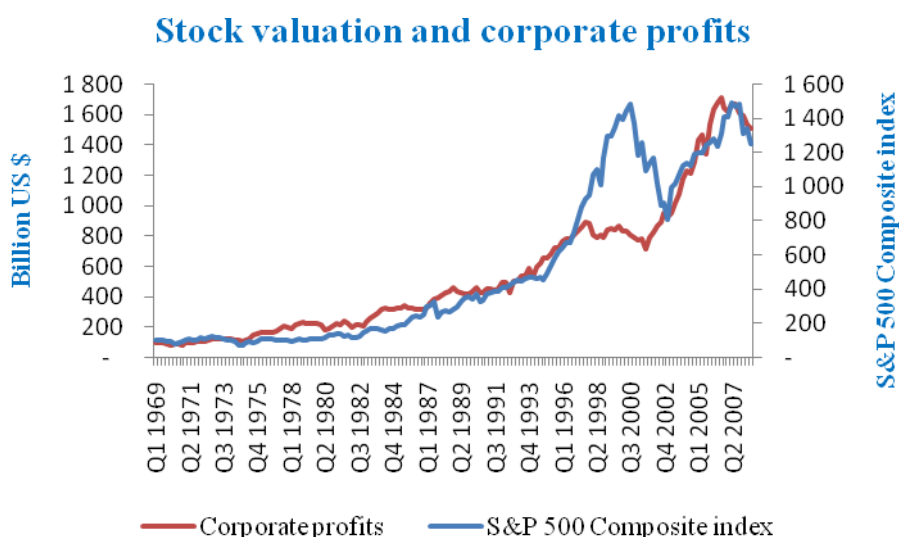
Figure 7 – S&P 500 composite index and US corporate profits. Corporate profits are found on the left axis, and the S&P 500 composite index is on the right axis[43].

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[42] National association of purchasing managers (NAPM). This indicator will be examined in section 5.5.3

[43] The Corporate profits in figure 7 are US total, and do hence include some corporations which are not in the S&P 500 index. This means that one should be careful with comparing the two time series, but it still gives a useful indication of the developments.

From figure 7 we can see that both in the months before the recessions starting in December 1969, January 1980 and March 2001 there were clear signs of negative growth in corporate profits[44]. This supports the view that even though its volatility makes it hard to analyze as a single leading indicator, this indicator might still hold valuable information as part of a broader analysis.

The developments of corporate profits also play an important role for the valuations on the influential stock markets.

$$(1.0) \quad P_0 = \sum_{t=1}^{\infty} \frac{DIV_t}{(1+r)^t}$$

Equation 1.0 holds the definition of the pricing of stocks, where the stock price (P) today is the sum of the future dividends (DIV) discounted by the proper discount rate (r) (Brealy, Myers, Allen, 2006). In other words, the valuations on the stock markets are based on the future expected dividends which again are strongly linked to the announced and expected future corporate profits. This gives a theoretical expectation of a drop in stock markets ahead of recessions as a result of changes in investor's confidence in the future. If the economy enters a recession the future corporate profits are expected to fall, and hence so are the future dividend payouts. As investors think there might be a downturn approaching, with lower corporate profits and dividends, they per definition also expect an increased risk of falling stock prices. While this fear of a recession increases, investors often want to reduce some of their portfolio risks and seek to sell stocks and secure some of the profits generated during the growth phase of the business cycle.

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[44] Generally the signs appeared 1-2 quarters before the dated turning points. I have interpreted 2 consecutive quarters of changed growth from negative to positive (and vice versa) ahead of business cycle turning points as signals.
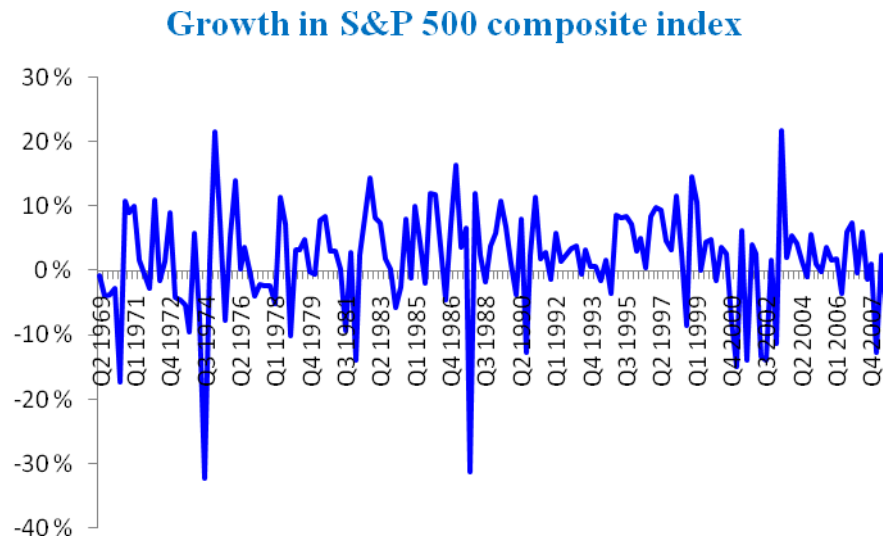
Growth in S&P 500 composite index

Even though figure 8 is based on quarterly data the growth rates in the S&P 500 composite index have been relatively volatile. In the same way as for corporate profits this means that one should be careful with putting too much emphasis on this indicator alone. But the fact that the prices are based on the forward looking expectations of investors, gives a theoretical foundation for the inclusion of stock markets in economic forecasting.

Empirically we can find tendencies of negative growth in the S&P 500 composite index ahead of almost all the recessions from table 1. Both ahead of the 69 and 73 recession there were 3-4 quarters of negative growth in the index just before the recession. Before the recession starting in January 1980 there were some signs of investors taking profits especially in May and October of 1979. Ahead of the 1990 recession you could see the same trends of investors taking profits during November 1989, and January and February in 1990. Before the 2001 recession the S&P 500 index experienced a steep decline in October 2000, and finally before the business cycle peak in 2007, the index experienced a significant decline in August 2007. It should also be noticed that there have been some false signals. 1977 is an example of a generally bad year for the S&P 500 composite index, but there were no official recession before January 1980.

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[45] I am using quarterly data in the graph to remove some of the volatility and get smoother lines. In the discussion below I will discuss mostly monthly data, but most of the trends discussed should be visual also in the graph with quarterly data. But as is obvious even from the graph with quarterly data, the index is relatively volatile, and graphs might not be the best analysing tool for these types of indicators.

Figure 7 pictures how corporate profits and the S&P 500 index moves relatively correlated. But by viewing these two indicators together one can also see some tendencies that corporate profits are leading the stock market. This can be seen ahead of the recession starting in 2007, where corporate profits flattened and started falling before the S&P 500 index flattened. But what seems to have been the most obvious period of imbalance between profits and stock prices are the years ahead of and during the dot.com bubble. During these years the expectations of future efficiency and profits resulted in an investment boom and souring stock prices, while in fact corporate profits were stagnating during the whole period.

In the analysis of such volatile indicators it can sometimes be useful to collect extra information to help interpreting the developments. The Tobin's Q formula[46] could be of good use in times of uncertainty of the valuation of stock prices. Figure 1 in appendix 1 pictures the developments of Tobin's Q ratio, which shows especially high valuations in the periods before the 2001 recession and the business cycle peaks in 1969 and 1973. This together with the imbalance during the same period in figure 8 should have been seen as indications that something was wrong in the stock market pricings. These findings support the decision to analyze stock prices and corporate profits in conjunction during economic forecasting, and that periods of extreme growth in the stock market should be explored through fundamentals such as the Tobin's Q.

6.5.2   *New orders in durable goods*

The value of new orders in durable goods is a popular leading indicator with high market sensitivity (Bauhmol 2008). The theory behind its predictive abilities comes from the lag between the placing of new orders and the actual deliveries. First, an increase in the orders of durable goods indicates that consumers are having positive expectations for the future, and hence feel confident enough in their personal economy to spend on relatively expensive goods. Second, and more importantly, it also means that production lines still have much work and are likely to generate future profits. A significant fall in orders will on the other hand suggest that we might see a fall in profits with the result of employment lay-offs and

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[46] Tobin's Q is a valuation ratio where you compare the firm market value with its asset value. The ratio is

calculated as follows: Tobin's $Q_t = \dfrac{TotalMarket Value_t}{TotalAsset Value_t}$

shut downs of production lines in the future. The indicator is available at a monthly basis, but it does suffer from revisions.

In this paper I will be looking at monthly data even though they can be relatively volatile. Also one should be aware of any large single orders of for example aircrafts or defense goods which can distort the information in these indicators.
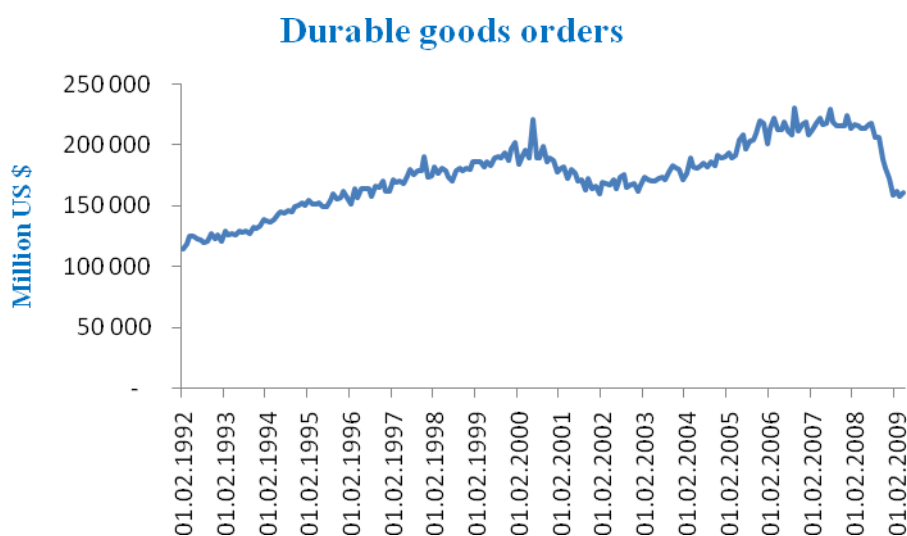

Figure 9 – New orders in durable goods. Monthly data[47].

From figure 9 we can see that there was a 6%[48] fall in demand for durable goods ahead of the 2001 recession. These tendencies were obvious before the stock market crash, and might have been one of many factors making investors uncomfortable. Ahead of the 2007 recession there was stagnation but no significant fall in new orders.

6.5.3   National association of purchasing managers (NAPM)

The national association of purchasing managers (NAPM) is one of the most popular of the many indicators calculated by private organizations. The index is based on a survey of

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[47] It should be noted that these numbers are not corrected for inflation. To analyze this indicator in real terms one could compare the growth rates with the inflation rates. In this paper this issue is of little relevance since I will only use the data to look for trends ahead of business cycle peaks and troughs.

[48] On the 15.07.2000 there were new orders worth $189.644 million, while there were new orders worth $178.257million on the 15.1.2001. 6% = (178.257-189.644)/189.644. All numbers are collected from DataStream®.

purchasing managers where they are asked questions about their company and its market performance on issues regarding new orders, production, employment, deliveries and inventories. The respondents are asked whether their company has had a positive, negative or unchanged development within the respective issues, and the answers are later calculated into an index (Forex brokerage firms).

The index is regarded as a leading indicator, and as the questionnaire is made towards purchasing managers it is expected to have especially good qualities in predicting future inflation.

The index holds an interesting trigger point at 50% where results below this level are meant to be a sign that the economy is in a recession, while results above means that the economy is growing. With this said, empirical research has noticed that in practice it seems as results between 43% and 50% is only a sign that the manufacturing sector is in decline while the total economic activity is only slowing. But values below 43% have indeed only been seen in recessionary periods (Forex brokerage firms).
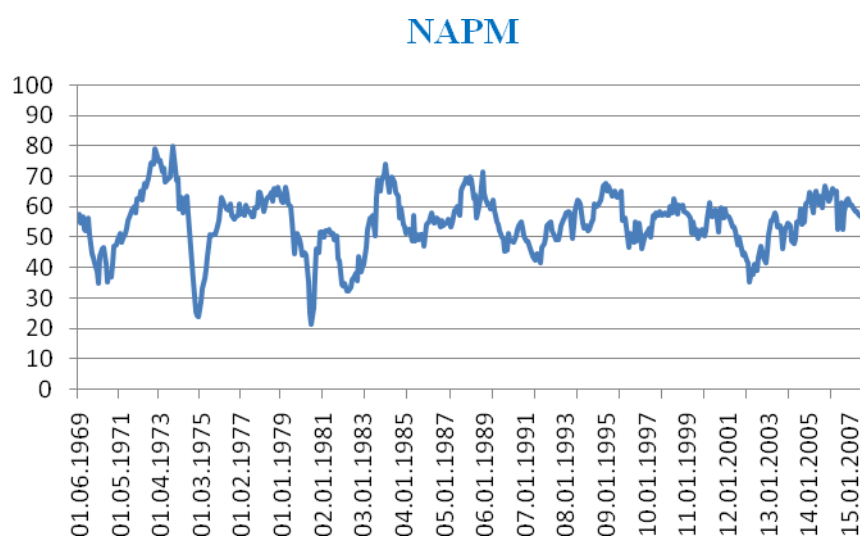
Figure 10 – National association of purchasing managers index. Monthly data.

From figure 10 we can see clear trends of falling values ahead of all recessions after 1980. In the years just before the dated recessions there are periods with values around 50% which supports the theories that values around 50 means that the manufacturing sector might already be in trouble while the total economic activity is only slowing down. Further we can find

values below 43% during all recessions. Also ahead of the 2007 recession there are signs of a falling trend and values around 50% in the months ahead of the business cycle peak.

6.6   The employment situation

The economic indicators towards the employment situation are arguably the most influential information about the business cycle available. These indicators alone give a broad understanding of the state of the economy, and also include some pointers on what might lie ahead. While the unemployment rate obviously holds information about the amount of potential consumers being without jobs, it also holds information about the expectations of future corporate profits and demand for goods. A high or growing unemployment rate might signal that a business cycle peak is imminent, and that future demand and income is expected to fall since enterprises lay off workers. This only continues a bad circle of low expectations since higher unemployment means an increasing amount of potential consumers are without jobs, and are hence likely to spend less.

In this section the history of the forecasting ability and the importance of the unemployment rate and the number of new claims for unemployment insurance will be examined.

6.6.1   The rate of unemployment

The release date at the beginning of each month is one of the big advantages of this indicator. As it is one of the first indicators available for the past month and because it carries so much influence throughout the economy this indicator gets a lot of attention. This is even though revisions are sometimes major and going back several months (Baumohl 2008).

During the growth stage of a business cycle you would expect to see a low (diminishing) unemployment rate which means that the economy is growing and both producing profits and jobs for the consumers. As both the demand for workers and the employment increases, employees get more strength in their contract negotiations and wages are hence expected to increase. From the much debated Phillips curve which again has received some positive arguments in the prize winning book by Robert Shiller and George Ackerlof in 2009; Animal

Spritis, we expect inflation to increase as unemployment falls[49]. This means that at one point of the diminishing unemployment rate, we might expect an increase in inflation resulting in monetary policy contraction and a future business cycle slowdown. This does not mean that increasing employment is bad for the economy. Quite opposite is increasing employment a great sign of a prosperous economy. But nevertheless, knowing that it with high likelihood will be followed by a monetary policy contraction and that the economy historically moves in recurrent cycles, these signs simply mean that we should be aware of more information from other economic indicators on whether the economy might be heading towards a slowdown or continuous growth.

At the other end of the business cycle, recessions normally brings an increasing unemployment rate. As corporate profits diminishes and consumers decides to save rather than spend because of the possible threat of losing their jobs, the economy often enters a vicious circle where consumption falls and corporations experience lower demand for their goods or services. This again results in even more potential consumers without jobs and consumption keeps falling. At these recessionary times we often see expansions in monetary policy to counteract the downturn and to nourish private investment and corporate profitability.

Shiller and Akerlof (2009) argue that laying off workers is the last step of many companies as they try other possible savings before going to this step. This means that we probably should not expect the unemployment rate to be leading the economy by many months. Instead we could expect to see low levels of unemployment to be accompanied with increasing interest rates, as the Fed is working to avoid bubbles, and to support a more stable economic activity. This monetary policy contraction is in turn likely to slow down growth, and should hence give a warning that a business cycle peak could be close.

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[49] The Phillips Curve has gained little support in most modern empirical research. But Shiller and Ackerlof suggests some interesting theories on why we still should take this theory into consideration. I acknowledge that the Phillips Curve needs further research after this, but this does not change my arguments that monetary policy tends to contract at times of very high employment.
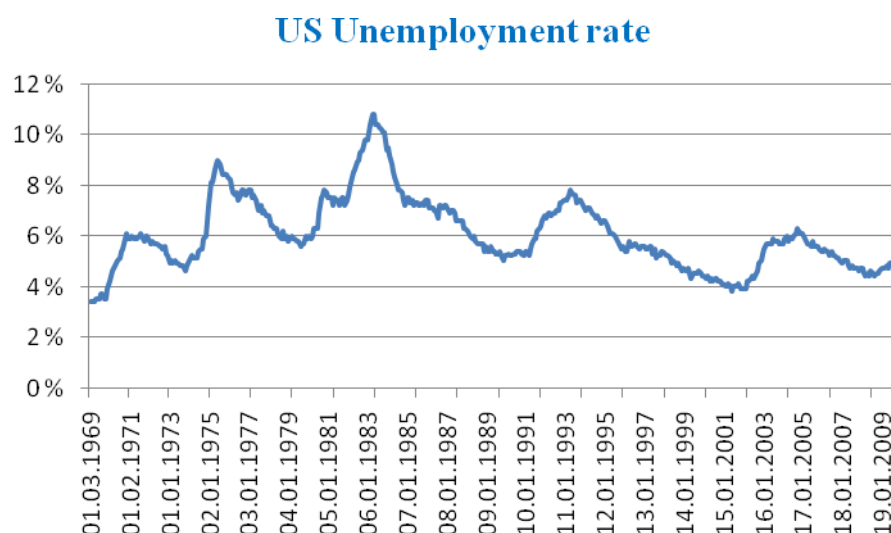
US Unemployment rate

Figure 11 – US monthly unemployment rate.

From looking at the developments in the unemployment rate in figure 11 and the 1 year yields over time in figure 6[50] there is much evidence supporting these theories[51]. In general there is a trend where the unemployment rate is reaching its low in the months before the dated business cycle peaks. At the same time we can see from figure 6 that the yields on the one year Treasury bond is increasing at the same time, which is already stated to be a possible sign that the business cycle is moving towards its peak[52].

The expected opposite results are evident when looking at the empirical tops of the unemployment rate. As the unemployment rate is increasing towards high levels, interest rates tend to fall. But while the unemployment rate falls relatively steadily during periods of economic growth and hit its bottom levels in the months before the business cycle peak, it

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[50] From Figure 6 I look at the short term rate because this rate is as discussed earlier more affected by changes in monetary policy and the business cycle. Again in this analysis one could decide to use other rates such as the Federal Funds rate, but for simplicity I will use the same rates as in my analysis of the yield curves. As he Federal Funds rate and the 1 year treasury yields have a correlation calculated at 0,95 the conclusion of the analysis would be the same with either interest rate.

[51] In figure 6 I used quarterly data to create better graphs for the purpose of that section. In this analysis I am using monthly unemployment data because of the timeliness of the availability and the general popularity of analyzing this indicator with monthly data. But as I will only be looking for trends over time and not specific results on specific dates, it is not a problem that the two data-sets are of different durations.

[52] As discussed earlier, the potential signs from recessions should be analyzed through the yield curve and not through single interest rates. See section 5.4.

tend to increase quickly during recessions. During the 90-91 and 2001 recessions it also didn't hit peak before over a year after the NBER dated business cycle trough.

6.6.2   *New claims for unemployment insurance*

Even though this economic indicator has been available since 1967 it is only in the later years, after improved monitoring by the Labor Department, many economists have started using this indicator in their forecasting approach (Baumohl 2008). The number of initial claims for unemployment insurance is made official on a weekly basis and gives a good indication on whether the economy is growing and whether jobs are being created or lost. The reasoning behind this indicator is that most employees that lose their job in the US have rights for compensation in form of unemployment insurance for up to 26 weeks[53]. This means that we can get a good pointer on where the unemployment and the economy are moving through monitoring the growth in the number of new claims.

As people lose jobs both in periods of growth and in periods of recession, the weekly data usually carry high volatility. I have therefore chosen monthly numbers in level terms to get a good and practical visualization of potential trends ahead of business cycle turning points.

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[53] It differ whose illegible for unemployment insurance and for how long can vary between states, but on general most employees that have lost their job are illegible for a period of compensation (Bauhmol 2008).
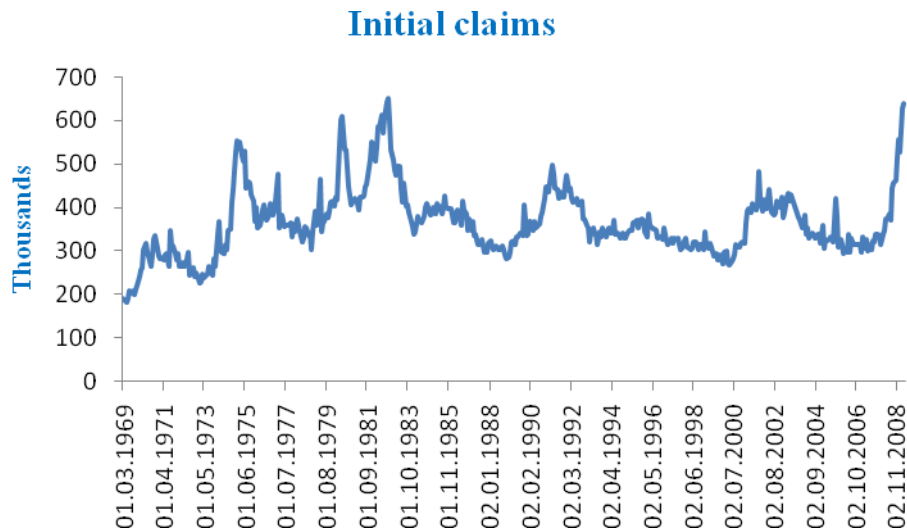
Figure 12 –US Initial claims for unemployment insurance.

From figure 12 the high variation is evident, especially in the years before 1984. But before the recession starting in July 1990 there was a clear trend, although with some high variations especially in October/November 1989, of increasing demand for unemployment insurance. During the period 12.1.1989 – 12.1.1990 there was an increase of 70.000, or 23,4%[54], in the monthly number of new claims for unemployment insurance. This means that 6 months before the dated business cycle peak there had been a year of relatively consistent and significant growth in the number of new claims which certainly indicated that the economy was losing jobs, and that a business cycle peak could be imminent.

Ahead of the 2001 recession the sign was perhaps even clearer as the trend was sharper and of shorter notice. After reaching a period low of 268.000 new claims in 12.04.2000 it sustained a growth of 17,5% during the months until 12.08.2000[55], and kept growing towards the dated business cycle peak in March 2001. Again there were signs of significant growth at least 6 months ahead of the macroeconomic turning point.

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[54] On the 12.01.1989 there were 299000 new claims while there were 369000 new claims on the 12.1.1990. 23,4% = (369-299)/299 = 70/299. All numbers are collected from DataStream®.

[55] On the 12.08.2000 there were 268000 new claims while there were 315000 new claims on the 12.1.1990. 17,5% = (315-268)/268 = 47/268. All numbers are collected from DataStream®.

During the years before the business cycle peak in December 2007 the signs were not as clear. The number of new claims was mainly between 300.000 and 350.000 during the whole period with no specific growth trends before the start of 2008.

The high variation means that one would need a clear pattern over several months before the number of new claims for unemployment insurance can give us any expectations for the future developments in the business cycle. To get more information and better understanding of the developments one could include the numbers of job-cuts and job-openings. The data for these time series are also available at a monthly basis, and could bring some confirmative information about the employment situation.

6.7   Consumer confidence and spending

As the economy drives through its different stages of the business cycle one would expect consumer confidence and spending to be moving parallel with other factors such as the interest rates and the employment situation. For example we have often seen that interest rates are at high levels, and unemployment is increasing, as the economy is approaching its peak. In this section I will examine how this affects the propensity of private consumption and the confidence of consumers, and why this is important to understanding the economy and predicting its future path.

6.7.1   Consumer sentiment

During long periods of economic growth the confidence and trust within the economy increases as consumers gain more wealth. As the wealth grows and income and employment is increasing, we often see an increase in risk taking and in the belief of the markets and its participants[56]. Recent examples of this are evident both in the 2001 and 2007 recession. The way the stock market boomed during the dot.com bubble without any clear signs on increasing corporate profits, was the result of great expectations and confidence in future growth. The 2007 recession was also the result of immense risk taking by banks, among others, with the result of the so called subprime and housing bubble.

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[56] The amount of risk taking in financial markets can for example be analyzed through corporate bond spreads between bonds from different asset classes (Shiller and Akerlof 2009).

During recessions on the other hand, this confidence and trust deteriorates as investors are losing money on their projects, and employees are losing jobs and income. The current chief economist of IMF, Olivier Blanchard, have also argued that changes in confidence as a result of the Kuwait invasion in 1990 was one important factor behind the recession that followed (Shiller and Akerlof 2009). Bank runs, most recently on Northern Rock, is another good example on how low levels of trust and confidence in financial institutions can create, or worsen, financial instability.

There have been performed several tests in several different countries on the causality between changes in confidence and the changes in the respective countries' GDP. These tests confirm that the level of confidence is indeed provoking changes in GDP, and not the other way around (Shiller and Akerlof, 2009). This is also one of the reasons why one often hear politicians and economists talk about the need to "restore confidence" during recessionary periods[57].

The two most popular surveys on US consumer confidence are the Conference Board's Consumer Confidence Index (CCI) and the University of Michigan's Survey of Consumer Sentiment (SCS). They are both put together from questionnaires on consumer's belief in the strength of the economy, and their expectations for the future.

Because of the fact that the questionnaire for the CCI put more emphasis on the developments in the labor market while the SCS concentrate more on income, some researchers states that the CCI is more of an indicator towards the developments in employment rather than the economy (Bauhmol 2008). As discussed earlier the level of employment is a vital factor in the state of the economy, so it will arguably be relevant also for predicting the business cycle as a whole. But in this paper I will use the SCS since this is the more popular of the two and hence should be the most market sensitive (Bauhmol 2008).

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[57] One of many examples is Franklin J. Roosevelt' speech on the great depression in 1933 (Shiller and Akerlof 2009).
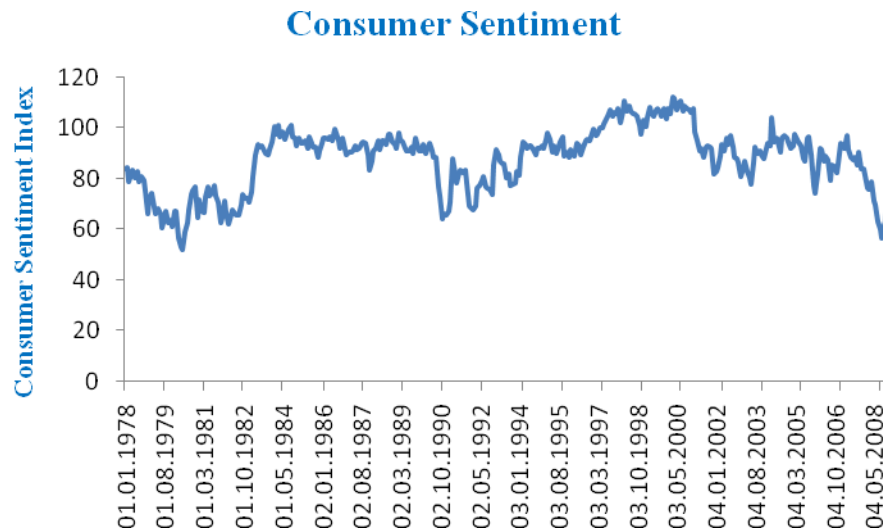
Consumer Sentiment

The SCS is released twice a month with monthly data, and relatively low revisions (Bauhmol 2008). From the data which figure 13 is based on we can see signs of falling consumer confidence during the years ahead of the 1980, 2001 and 2007 recessions, although the fall in confidence in 2007 seems to have been more coincident with the business cycle. As recognized by Blanchard there was a steep fall in confidence in 1990, relatively coincident with both the business cycle peak and the Iraq invasion of Kuwait[58].

6.7.2   *Consumer spending and saving*

As the levels of consumer confidence, employment and interest rates changes one would arguably expect to see changes in the levels of savings and consumption as well. The intuition behind this is that when the future economic expectations are low one could expect consumers to save more for what could be a troublesome future. On the other hand, when the future prospects are bright one could expect the marginal propensity to consume[59] to increase. Indeed one can often find press headlines stating that "high levels of consumption are driving

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[58] As stated in the introduction I will not include any detailed discussions on external factors such as wars or political changes, but this is a good example that these factors indeed can be of great significance.

[59] The marginal propensity to consume is the factor of your income which you are willing to spend instead of saving for the future (Akerlof and Shiller 2009).

the economy". This is not a coincident as consumption is the largest single influence on US GDP (Bauhmol 2008).
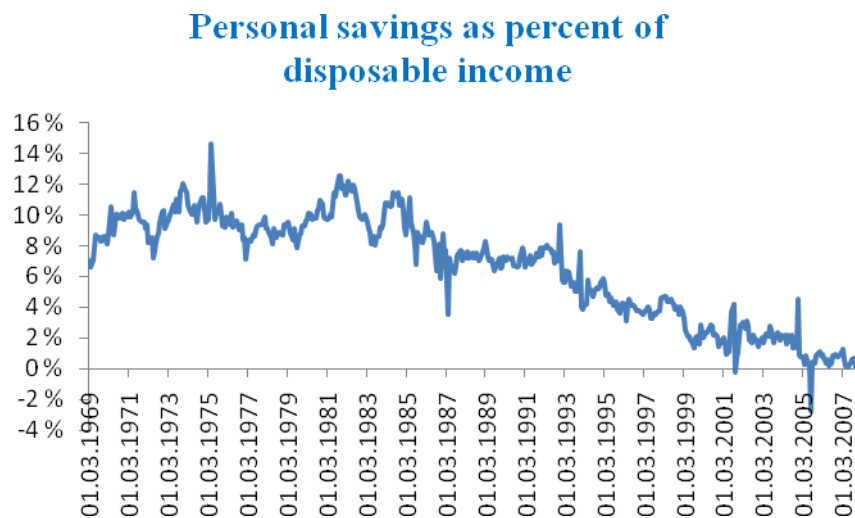

Figure 14 – Monthly US personal savings as percent of disposable income.

The empirical evidence for this is mixed, but there is a tendency of increased savings during recessions and of increased spending at the business cycle trough. But what is striking in figure 14 is that the US savings rate is very low and has been on a falling trend since the early 1980s. As was seen from figure 1 the US economy has, despite some recessionary periods, had a positive trend line. This high growth together with high returns both from the stock markets and in real estate, coupled with a high availability of cash through a credit card boom, has caused the rate of savings to enter negative values in 2005 and staying close to zero after that (Shiller and Akerlof, 2009). The implications of this if the economy should enter a significant downturn with an increasing unemployment rate, is that some of the consumers who lost their income will on general have only scarce backup resources. This could mean that the economy will experience a more significant drop in consumption during a downturn compared to if consumers had backup savings. It should be noted that the main reasoning behind the unemployment insurance discussed in section 6.6.2, is to stimulate consumption also in times of recessions and high unemployment. This means that even if you were to lose your job you would still have some backup finances. But nevertheless, there is a relevant trend of increasing levels of personal bankruptcies which indeed suggests that the US savings rate might be dangerously low (Akerlof and Shiller 2009).

For forecasters the marginal propensity to consume (MPC) holds information on how the growth rate will look like. Keynes would argue that high MPC's would generate high future growth as a result of economic multipliers, and this might indeed be what we have seen during the high US growth in the period of 1990s and up till 2007. But for forecasters it should be obvious that negative savings are not healthy in the long run, and that one would expect savings to increase as unemployment and interest rates are rising and the economy are moving towards a business cycle peak. The size of the jump in savings will also have implications on the magnitude of the recession. A growing unemployment rate which considerably reduces potential consumer's ability to consume, coupled with significantly increased savings from the ones still employed, could have major implications on the depth and duration of a recession.

6.8 The housing market

Buying a new house is arguably the biggest and most important investment of the average consumer. As a result of this the housing market is a good indicator on consumers' confidence in their current jobs and income, as well as their belief in the future. A housing market with a strong demand side signals that consumers are comfortable enough with their personal economy that they are willing to make substantial investments.

It should also be noticed that the National association of realtors could report that as much as 21% of all home purchases in 2007 were made as pure investments without the buyer having any intentions of using the property as their home (Bauhmol 2008). This means that investors are also using the housing market as a financial vehicle for long term investments[60], which again suggests that this market is forward looking and that the demand side holds information about investors' expectations about the future.

There is a wide selection of available indicators to the housing market, but I have chosen the S&P Case-Shiller national homeprice index and the number of new housing units started.

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[60] I expect these investments to be, in general, relatively long term because of the fact that real estate investments are less liquid than most other financial investments.

6.8.1 S&P Case-Shiller national homeprice index

The S&P Case-Shiller national homeprice index is a composite[61] of single family home price indices calculated each month for each of the nine US census divisions[62] (S&P). The national index is only made available once every quarter, which is a big drawback in terms of short term forecasting, but it should be noticed that the different indices for different US regions are available at a monthly basis[63]. One of the arguments that this index still is useful in this analysis, despite it is only updated every quarter, is that one should be vary of using monthly data when analyzing house prices because of biases as a result of for example changes in the size of the houses sold in single months. Dean Baker (2007) from the Center of Economic and Policy Research argues that single months could by coincidence hold bigger sized houses or houses with greater standard than normal, and hence score higher than normal house prices for that single month. He also argues that research results suggests that exogenous variables such as the weather can have a significant effect on the amount of houses sold and the prices paid for the houses. With this in mind, the methodology behind computing this index is recognized as the most accurate for this asset class, and should hence hold only minimal biases.

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[61] A composite index is an index created by putting different smaller indexes together and standardizing to get a broad statistical measure.

[62] The nine US census divisions are a grouping of US states to give a good subdivision of statistical data.

[63] The availability of regional indices is also one of the strengths of this index. This means that you can analyze the growth of different regions compared to the national average. Nevertheless, such an analysis will not be relevant in this paper.
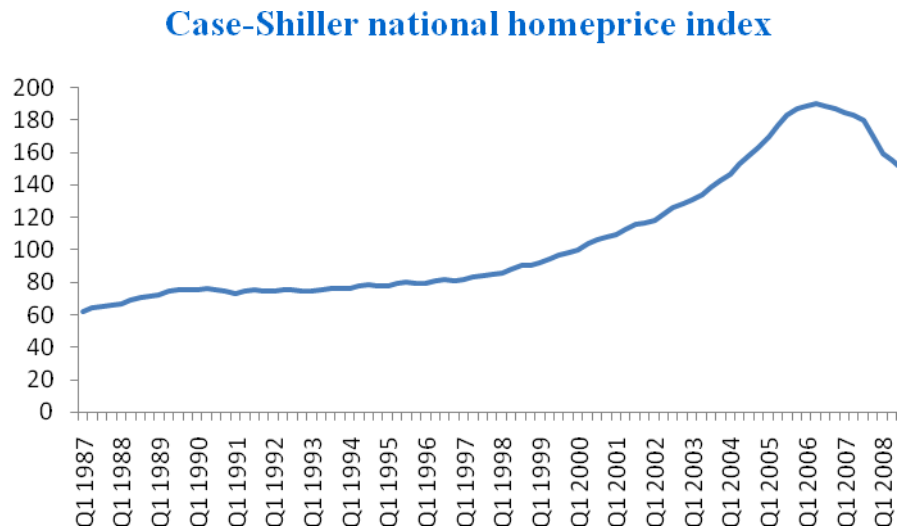
Case-Shiller national homeprice index

Figure 15 – S&P Case-Shiller national homeprice index, quarterly data.

From figure 10 it is obvious that the national home prices were relatively stable in the years between 1987 and up till the buildup of the dot.com bubble. At that point the house prices experienced a period of great growth up until its peak in 2006. While the prices suffered a downturn during the 1990 recession, they were growing relatively steadily during the 2001 recession, and noting a growth of 63,4%[64] in the period after the business cycle trough in November 2001 and up to the index peak in 2006. Considering this abnormally high growth in prices, and the fact that the index only experienced negative growth in the months after the peak in Q2 2006 until the business cycle peak in December 2007, the signs of a possible home price-bubble was very evident. Also as explained earlier, this deep and durable decline after the peak in Q2 2006 was an important negative sign on the consumers' confidence in their private economy and in the housing market as a whole.

6.8.2   *New private housing unites started*

The number of new private housing units started is simply the number of houses currently under construction. This number holds the predictive information from consumers' confidence in their personal economy and future as explained in the introduction to the housing market section. But this indicator holds more possible multipliers to the rest of the economy than most other housing indicators. The reasoning behind this is that the building of

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[64] Index value in Q4 2001=116,23. Index value in Q2 2006 = 189,93. Growth = 63,4%

new houses normally needs more working power in terms of construction workers, carpenters, electricians etc, than the sales of existing homes. In fact Baumohl (2008) refers to an estimate suggesting that the construction of 1000 houses will generate 2500 full-time jobs, and about $100 million in subsequent wages.

As with most big investments, the number of new private housing units started are expected to be negatively correlated to the cost of capital. For most average consumers the interest rates are close to being their cost of capital. This is because most consumers need to take on significant amounts of debt to be able to pay for a new home. This makes another suggestion that we should expect the demand for new homes to fall ahead of business cycle peaks, and we should hence see a trend of falling numbers of new housing units starts in these periods.

The data for this indicator is updated every month, and suffers from only modest revisions. As with the house price data one should be vary of possible seasonality problems in this indicator.

Figure 16 – New private housing units started. Annualized monthly data.

Baumohl (2008) suggests that "a healthy housing market is typically one where starts are running at a 1.5 million to 2 million unit annual rate." Looking at the empirical data which figure 16 is based upon we can see clear tendencies of a falling number of housing starts in times of increasing interest rates ahead of business cycle peaks. The exception is during the

2001 recession where the housing market seemed relatively stable. There is also a tendency that the number of new starts falls below, or is moving down towards the lower point of Bauhmols rule of thumb when the business cycle is moving towards a new peak.

6.9 The Conference Board's leading economic indicators index (CLI)

Earlier I argued that the conference board coincident index is a good choice as the primary measure of economic activity, and as the conference board also produces an index with the purpose to lead the coincident index, it is only natural that this should be taken into consideration.

	Conference Board US leading economic index	Weights
1	Average weekly hours, manufactoring	25,5%
2	Average weekly initial claims for unemployment insurance	3,1%
3	Manufacturers' new orders, consumer goods and materials	7,7%
4	Index of supplier deliveries - vendor performance	6,7%
5	Manufacturers' new orders, nondefense capital goods	1,8%
6	Building permits, new private housing units	2,7%
7	Stock prices, 500 common stocks	3,9%
8	Money supply, M2	35,8%
9	Interest rate spread, 10-year treasury bonds less federal funds	9,9%
10	Index of consumer expectations	2,8%

Table 2 - The indicators included in the CLI (Conference Board 2009)

The leading index is put together from 10 different economic indicators which have proven empirically to be leading the developments of the US business cycle. Table 1 shows the respective indicators which are included and their weights in the index[65]. While most of the indicators included in this index have already been discussed in separate sections, the others are given a short introduction in Appendix 2.

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[65] The weights are inversely related to the standard deviation of the changes in each component (Conference Board 2009). But the actual calculation of weights is outside the scope of this paper. More information can be found on www.conference-board.org
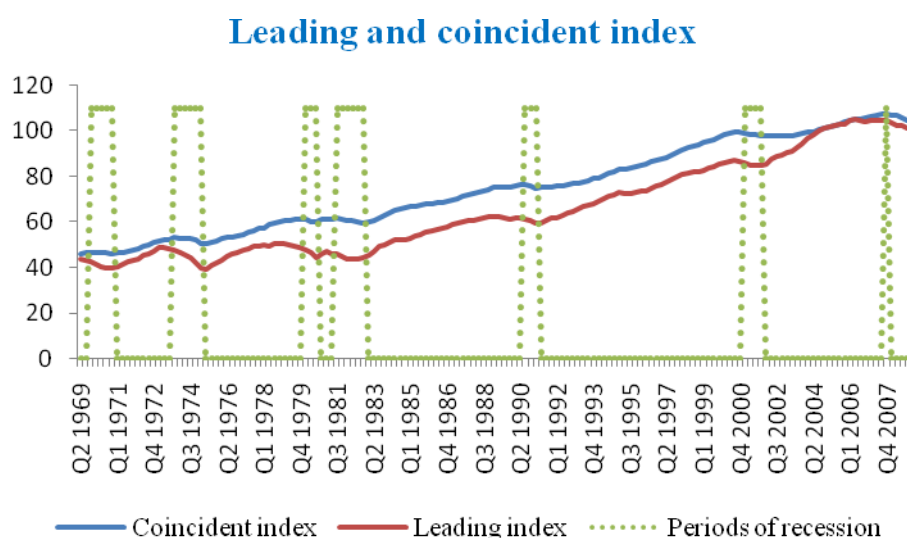
Leading and coincident index

Figure 17 – The Conference Board's leading and coincident index. Quarterly data

As can be seen from figure 17 the downturns tend to be of higher magnitude in the leading index, and indeed the peaks and troughs are normally found at earlier dates in this index than in the coincident index. The signs seems to be evident between one and three quarters before the turning points in the CI, but ahead of the 2007 recession the leading index reached its peak in Q2 2006, leading the business cycle by over a year. The Conference Board suggested a rule of thumb in their handbook (2001), stating that 3 consecutive months with negative growth in this index should be treated as a sign that the economy is entering a recession. And it should be noticed, that even though the CLI reached its peak in Q2 2006, it didn't suffer from 3 consecutive months of negative growth before Q4 2007, which was the same period the business cycle reached its peak.

Indexes like this can be a very helpful shortcut to economic analysis, especially when looking at bigger regions or at the global economy. In a globalized world the economic wealth of your trade partners can hold important information about the future of your own economy. As analyzing the global economy or the economy of all trading partners are difficult and time consuming, global or regional indexes created by for example OECD can be a smart shortcut. I will not analyze any of these indexes in this paper, but the global financial crisis in 2008 is a perfect example of the influence a global economic downturn can have on single-country economies.

7.0 Forecasting the 2007 recession

After the introduction to economic indicators in section 6, this section will look at the possibilities of predicting the recession starting in December 2007 using these indicators. Again it is important to remember that as this paper is written ex.post with revised data and a broad understanding of what went wrong[66], it could easily be pointed at numerous of relatively detailed and complicated indications that something was fundamentally wrong with the US economy ahead of the recession. But instead this section will show how investors and corporation could have kept track of the business cycle and forecasted the 2007 recession using a broad, but still simple, analyzing approach towards the US economy. This means that many vital factors and details on why the US economy entered a recession will not be discussed.

The analysis will include all indicators from section 6 and follow a relatively chronological order from the time the different indicators in the different sectors show signs of weakness, and use the three D's as tools when looking at the signs in conjunction. The analysis will start with a look at the developments in the CI to get an understanding of where in the business cycle the economy stood in the period before the recession. It will then analyze the rate of inflation together with the yield curve, before analyzing the housing market. Next are the indicators towards the corporate developments and finally the very important consumers.

7.1 The stage of the business cycle

In March 2004 the CI index again reached the record values from the peak of the business cycle which ended in the 2001 recession. From this, and the cycle theory in section 4, we can expect that the business cycle is close to the trend line at point B in figure 2. If we are above or below point B is not of major importance, but from the historical perspective which created Zarnowitz' cycle theory, the forecaster should acknowledge the likelihood that the economy might keep growing towards new record levels at point C, above the trend line.

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[66] As already stated in section 2.2, this approach should not be directly compared to "real-time-forecasting" as long as the data used is revised. It is also a possibility that the forecaster is biased from detailed information about what caused the recession.

Knowing that the CI has reached point B and is moving towards point C, the forecaster should expect the next stage to be a slowdown. This means that even though the economy is at that point still expected to grow, forecasters should keep their eyes open for where the slowdown is likely to enter first. Looking at the indicators discussed in section 6, the housing market should have seemed as a clear candidate for a future slowdown as early as in 2004. The housing market had at that point experienced successive years with record price levels which from the indicators discussed, especially the Case-Shiller index, arguably seemed to be heading towards a bubble. Indications like these towards a single market could suggest the need to seek more detailed information towards this sector through more indicators, to see whether the price growth could be correctly driven by fundamentals like it was in the boom after World War 2. Throughout the boom explanations for the price growth was many. One theory was that land is scarce and the population is growing, and as a result we have an unbalance between increasing demand and decreasing supply. A different plausible explanation could be that the costs of construction had increased, and hence pushed prices upward. In his book Irrational Exuberance from 2005, Robert J. Shiller explains why neither of these are good explanations as the price of houses have increased at a much higher rate than both population and income growth. He also argues that while land is indeed scarce, this is not a problem big enough to explain the price growth.
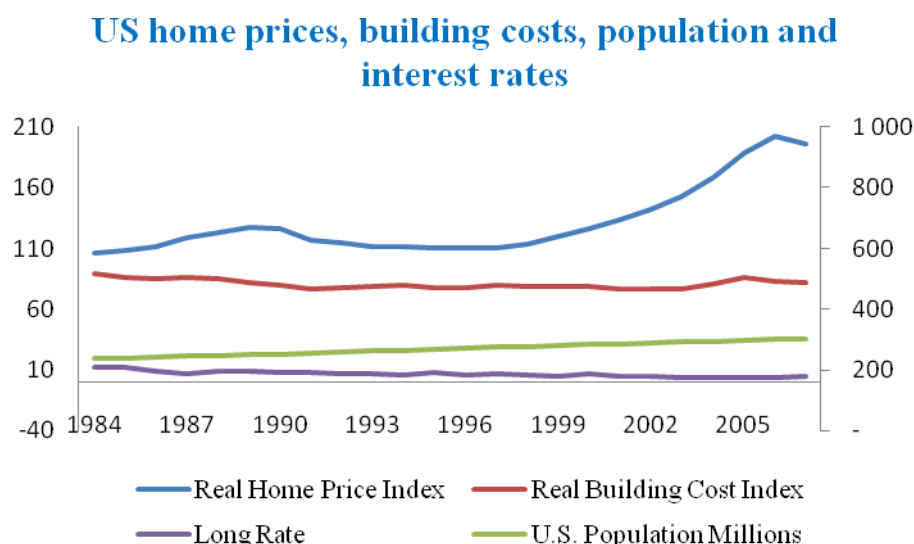
US home prices, building costs, population and interest rates

Figure 18 – The left scale: Real Home Price Index for the US, real building costs index and the long term interest rate. On the right scale: US population in millions. [67]

Figure 18 show that building costs have actually fallen since it's top in the late 1970's, and it also pictures that neither population nor the long interest rate hold the explanation behind the growth in prices. In other words it is difficult to explain the price increase on the basis of underlying fundamentals, and it should hence have been hard to justify the developments.

7.2   Higher inflation and an inverting yield curve

Critiques argue that the long period of low short term interest rates during the Great Moderation[68], created a credit boom which finally resulted in the credit crunch of 2007 (Mizen 2008). The reasoning is that these years of stable and broad economic growth created an incentive to increase both the supply and demand for credit in a goal to add to future yield[69].

From the indicators discussed in section 6, the savings ratio gives a good indication that risk taking and consumption was at very high levels. With negative savings ratios in 2005, and

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[67] The figure is based on the data behind figure 2.1 in Irrational Exuberance by Robert J. Shiller (2005). The data is updated by Shiller, and downloaded from the following web page on 23.08.2009: *www.irrationalexuberance.com/Fig2.1Shiller.xls.*

[68] Especially in the period after the 2001 recession and the 9/11 attacks.

[69] A situation where investors often take on investments with higher risks as they seek to increase profits.

reports of increasing debt-to-disposable income ratios from 75% to 120%[70] during the years of the Great Moderation, there was a story of high economic activity and low reserves for a rainy day. As housing prices increased at a higher rate than income, lenders who wanted to add to their yield increased their multiples on mortgages which reinforced a bubble both within housing and credit markets (Mizen 2008). Acknowledging these high levels of debt and the fact that house prices increased at a higher rate than income, it should have been obvious that the magnitude of a possible downturn with a burst of a housing and credit-bubble, could result in a deep and dispersed recession.

As the short term interest rates at that point were increasing and housing prices were at record high levels, the potential danger signs should have been evident even at this early stage. As the debt-to-disposable income ratios were operating at very high levels, and inflation increased to the highest levels since the early 1990s in 2006, the interest rates were very likely to stay at a higher level in the coming year. Knowing that interest rates carry an important and negative influence on housing prices and that much of the consumer-debt was invested in real-estate, it was clear that the downturn was getting more imminent and that a fall in the housing market was a potential trigger of a recession.

An inversion of the yield curve has arguably been the most powerful forecasting tool in the US economy over the years covered in this paper, and in Q1 2006 the yield curve inverted for the first quarter since before the 2001 recession. This came as a result of a monetary contraction with increasing short term interest rates which created the expectations of a peak in economy activity. From reasons explained in section 6.4 the monetary contraction were believed to be followed by a slower economic growth and possibly end in a downturn in the business cycle.

7.3 The expected downturn in housing

At the end of 2006 the fall in the housing market was no longer potential. The prices from the Case-Shiller index was negative for all quarters since the peak in Q2 2006[71], and the number

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[70] Paul Mizen – The credit crunch of 2007-2008: A discussion of the background, market reactions and policy responses. PP 534.

[71] It is again important to remember that the data for the Case-Shiller index is not very timely. But two consecutive negative quarters had not been seen since the mid 1990s.

of new housing startups was also experiencing a falling trend during the whole year of 2006. This was in other words a downturn in the real-estate market which already seemed to be relatively deep and dispersed, and with a duration of over 6 months. Taking into account that the yield curve was inversed for three out of four quarters in 2006[72], the probability of a broader stagnation and recession in 2007 grew stronger.

I argued in the introduction that forecasters with specialized knowledge about important sectors should use this knowledge to get a broader understanding of the economy. The approach used in this paper however is very general, but it is still not possible to write an analysis about the 2007 recession without mentioning the subprime loans[73]. The increase in subprime mortgage defaults during 2007 was arguably one of the main triggers of the recession. Still the average forecaster without specialized knowledge about the subprime loans would probably not have detected in advance that this would be an issue of such magnitude. But as we at this point already had poor expectations about the housing and credit markets, the news about the subprime problems generated much attention. During the spring and summer of 2007 the subprime problems resulted in large scale bankruptcies and rescue packages by the Fed. Even though some of the banks tried to talk down the problems, there were strong indications that the economy was stagnating and that there was a significant downturn in the loom.

7.4   More dispersion with signs of negative corporate developments

As the subprime defaults resulted in some significant bankruptcies and instability in the credit markets, on top of the struggling housing market, also corporate profits seemed to become more volatile. Both Q4 2006 and Q1 2007 were negative, suggesting that a negative trend in profits had already started. But as the profits are only updated at a quarterly basis and Q2 was positive, it was neither possible to be sure about the depth nor duration of the negative trend before the announcements of the Q3 2007 profits, which was also negative.

This was important indications influencing falling expectations of future profits in the stock markets as well. Investors were worried about a potential future downturn and started selling

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[72] The yield curve was positive in Q2 2006.

[73] Subprime normally represents mortgages to individuals with poor credit history (Mizen 2008)

to reduce risk and secure some of the profits earned during the great moderation. This was one of the reasons behind the increased volatility of the S&P500 composite index during the year of 2007, especially after the magnitude of the subprime problems became more and more obvious.

During 2007 the NAPM index also experienced volatility, but most of the time held values just above 50. This was signs that the manufacturing sector was indeed struggling, but the volatility made it difficult to create any clear expectations about the future.

Looking at all the indicators of corporate developments they all, except the number of new orders for durable goods which was only stagnating at this time, experienced negative growth. The fact that the number of new orders remained at a relatively high level throughout 2007 indicated that the depth and duration of the downturn could be short, but the dispersion and duration of negative trends over the year of 2007 gave strong signals that the corporate downturn had started.

7.5   *The employment situation held strong*

While the housing market was struggling and the signs of negative corporate developments became stronger, the rate of unemployment remained relatively low ahead of the recession. The rate of unemployment reached its latest low of 4,4% in March 2007, and while it increased to 4,9% in December the same year, the developments were not of any significant magnitude ahead of the recession. As neither the number of initial claims for unemployment insurance made any noteworthy increase, the employment situation seemed stable. Even though the rate of unemployment normally is coincident with the business cycle, this suggested that the depth of the downturn could of a lower magnitude than feared.

While the employment situation remained relatively strong, the consumer sentiment started falling in 2007. But even though the index fell with a total of 22% during the year, it did not fall to any historically low levels before the start of the recession. From section 6.7 we would expect consumer sentiment to lead the economy, but even though one could see signs of a falling trend, the fact that the indicator remained at relatively high levels in historical terms, it was difficult to get any clear pointers to how imminent the recession was. The rate of unemployment is, as explained earlier, normally coincident to the business cycle, so even

though it too was stable at a low level this was not necessarily a sign that the recession was not coming, but simply implied that the economy had still not reached its peak.

Initial claims of unemployment insurance on the other hand is expected to lead the unemployment rate, but as there was no sign of a trend it could have be argued that a recession was still not of any immediate danger.

7.6   The current account

The current account did show some signs of improvements during 2007 as the US dollar lost value against both the Euro and a basket of major currencies[74]. This was found as the understanding of the improvements resulted in a need to implement indicators towards the trade balance and the value of the dollar. The improvements seem to be a result of positive developments in the trade balance[75] as a result of the falling dollar which decreased the purchasing power of imports for US consumers[76].

While positive growth in the current account was in itself a positive development, the fact that one of the reasons behind this was the falling purchasing power of US consumers, it was likely that these necessary developments could also be a problem in regards to short term growth. One can also argue that an economic slowdown in the US could have provoked lower demand for imports, and hence increased the current account.

While the current account gained much negative attention at the time it was also understood that improving the deficit could prove costly in terms of short term local growth, and this also seemed to be the case as the deficit started falling. The falling and more expensive imports could arguably have positive long term implications on the current account, but was at the same time likely have a negative effect on short term total economic activity.

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[74] See figure 1 and 2 in appendix 3

[75] By positive developments I refer to decreasing imports compared to exports.

[76] A graph of the developments in the trade balance is included in figure 1 in Appendix 4.

7.7 Peak in the CLI

The Conference-Board's leading index experienced stagnation and a peak during 2006. The index was increasingly volatile and suffered twice from two consecutive months with negative growth. This resulted in a total negative growth both for Q2 and Q3 of 2006. In 2007 the index was still very volatile with more negative months than positive, resulting in a negative trend at the end of the year.

From this broad index the stagnation in economic activity was obvious, and by the start of 2007 the signs of recession became even clearer. But with this said, the Conference Board states as a rule of thumb that the indicator should experience three consecutive months of negative growth before you can call the developments a sign of a future recession, and not simply the sign of a smaller market correction (Conference Board, 2001). This did not happen before October, November and December of 2007.

7.8 Summary

Indicator	Development	Time ahead
GDP and CI	The business cycle grows above its trend line	31 months
Current Account	Positive developments in the current account	12 months
Inflation	Reached highest levels since early 90s	18 months
Yield curve	Inversion	18 months
Corporate profits	Peak	12 months
Stock market	Increased volatility and peak	10 months
New Orders	Stagnation	12 months
NAPM	Peak, followed by levels around 50	12 months
Unemployment	Reached lowest level in March 2007	9 months
Initial claims	No sign	
Consumer sentiment	No significant sign	
Personal savings	Negative savings	24 months
S&P Case-Shiller national homeprice index	Peak followed by streak of negative growth	18 months
New housing starts	Only values below 1,5 mill. during 2007	11 months
Leading index	Peak followed by negative trend	12 months

Table 3 – Summary of developments in relevant economic indicators ahead of the business cycle peak in December 2007

Table 3 holds a summary of the developments in the discussed indicators during 2006 and 2007. As can be seen, the increased inflation followed by a yield curve inversion and a fall in the housing market during the spring of 2006, was the first signs that the total economic activity was heading towards a recession. At this point the probability of a business cycle stagnation followed by a recession during the next 6 to 18 months was increasing by the day. Nevertheless, it was still difficult to predict whether the Fed would be able to stop the economy from entering a recession through monetary expansion. But as the downturn in the indicators towards housing grew deeper and gained longer duration every month, and recognizing that much of the very high levels of consumer debt were generated from speculative financial investments in real-estate[77], the likelihood that this would result in a dispersed recession recognized through all the three D's grew significantly.

In 2007 the indicators towards the wealth of the US corporations also started showing weaknesses, and the housing market seemed to grow even more depressed. With the burst of the subprime bubble leaving the economy in a credit squeeze, the downturn in the indicators became deeper and more and more dispersed. The dispersion towards US corporations was expected as so many sectors of the economy are vitally dependent on both these respective markets.

It was somewhat surprising that the consumer sentiment kept relatively high values up until the start of the recession. This is probably a result of the low rate of unemployment, which started increasing but still remained at low levels in historically terms throughout the year. Neither the initial claims for unemployment insurance, which was such an important indicator for the 2001 recession, experienced any significant increase. This could suggest that the Fed might be able to save the economy from a deep recession, but recognizing that the problems indicated from the other sectors seemed to grow deeper, a recession seemed inevitable[78].

After the peaks in housing in the spring of 2006, that is 1,5 years before the dated start of the recession in December 2007, it should have become clear that the economy was entering a stage of slowdown and stagnation. In 2007 the likelihood of a future fall in economic activity increased substantially as time passed. In other words the indicators produced both deep and

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[77] 21% of all home purchases in 2007 were made as pure investments. See section 6.8.

[78] Remember the theories of Shiller and Akerlof (2009) from section 6.6 that employment should not be expected to lead the economy.

dispersed negative developments which only grew in duration during the months ahead of the recession.

As we passed December the weakening health of the US corporations and housing- and credit markets proved that the stagnation was a fact, and during the first quarter of 2008 all indicators agreed that the economy indeed was in a recession. Because NBER published the date of the business cycle peak in December 2008, a year after the actual peak, this was an important understanding as the forecaster could acknowledge that the business cycle had turned and that the economy in fact was in a recession before it was official (NBER 2008).

8.0 Strengths and weaknesses of the forecast

From using the forecasting method above it should have been possible to predict that the economy would stagnate, and with high likelihood enter a recession, about 1,5 years before the dated recession. Also I argued that forecasters using this method should have been able to predict that the future recession would with high likelihood be of great magnitude at least 6 months before December 2007. But with this said, this forecasting approach carries a number of more or less vital strengths and weaknesses. With this in mind the following discussion of quality is not exhaustive, but carries some of the most important points. The discussion will be much compared to a more econometric approach to forecasting which arguably carries the biggest differences from the approach described in this paper.

8.1 The quality of the forecast

While most econometric approaches has a specified time horizon and give more exact predictions, the flexibility of the approach from this paper makes the analysis less specified. There is a rule for all forecasting that longer time-horizons are more difficult to predict, but with the discussed approach you create qualified expectations for the trends of the next 6-18 months, while the magnitude of the expected trends are often revised as more information is made available. From the earlier analysis it was possible to predict the 2007 recession in 2006, but the expectations about magnitude was only obvious 6 months ahead of the peak. But with all the uncertainty that comes with forecasting you cannot depend on any models to

forecast with a hundred percent accuracy. This means that it is the forecasted future trends which are of importance, and not necessarily the exact day the business cycle is going to turn.

This is probably the most argued drawback of forecasting in general. If the forecaster is not able to predict anything with certainty, then why should we spend time and resources on trying to predict the future? While it is for obvious reasons true that the forecast performed on the 2007 recession would not have eliminated all uncertainty in real time, the expectations created from the analysis would have been a great preparation, and of such quality that it should indeed have been taken seriously. Economic forecasting have been researched for many years, and while this paper only holds evidence on the possibilities of forecasting the 2007 recession, other research have proved the possibilities of forecasting earlier recessions[79].

8.2 The basis for scenario building

While it is impossible to remove all uncertainty, the information gathered from the forecast gave clear indications that there was a recession coming, and that the housing market was likely to experience a significant downturn. This was known at a relatively early stage and could then have been used as the basis of realistic internal and external scenario building. As the expectations on the depth of the recession did not come around until 6 months before the peak, forecasters could have used the information available to create scenarios on how a recession triggered by increased interest rates, high levels of debt and unwarranted growth in house prices, would affect company performance. From this managers could get expectations on whether the markets they are competing in would be leading or lagging the business cycle, and approximately how much this would pressure their individual cash flows, and the demand for the goods or services they were providing. This could help creating potential strategies to take the best possible advantage of both the upside and downside risks. In turn, this means that even though the future still holds uncertainty, also after performing economic forecasts, forecasting can help limit the surprises of the internal effects from changes in the business cycle.

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[79] See footnote 7

8.3 Technical strengths and weaknesses

The most evident strength of the forecast above is its flexibility. While both the society and the economy are constantly evolving, flexibility is arguably a vital and much needed attribute. The freedom in the choice of indicators means that you can easily include different markets and sectors which are of importance to your particular analysis. And as the markets are continuously changing, the forecaster can easily change the indicators towards new information which are of more importance to the modern economy. This can sometimes be a problem for more specified econometric approaches where you often are more dependent on a few time series with strong empirical data, and a long and stable statistical relationship. An example of a time series which suddenly became relevant is the number of initial claims for unemployment insurance. While this time series suffered from such high volatility that forecasters did not find it useful, the increased monitoring by the Labor Department have made it a helpful forecasting tool in the modern economy, and it certainly gave important signs of trouble ahead of the 2001 recession.

While historical relationships are important in terms of confirming the theories behind the indicators used and to make it possible to learn from the past, it plays a more direct role in econometric modeling. In those approaches you often depend on the movements from the past to be the same in the future. While this indeed can be helpful, you must at the same time remember that these approaches move away from the possibilities of new and different correlations in the future. A good example of this is the famous Fed-model, from which Alan Greenspan predicted a negative relationship between short-term interest rates and the stock market. This proved empirically correct for many years and also seems intuitively correct. But nevertheless, it failed fundamentally during the dot.com bubble where the stock markets crashed while the interest rates were falling (Shiller 2005). The approach explained in this paper on the other hand would have seen the unusually high prices, and would have found that the prices were not fundamentally justified[80]. The same was also the case for the housing market in the forecast just performed for the 2007 recession. From history and theory one would expect house prices to stabilize as the interest rates kept falling, but as the record prices were not driven by fundamentals, the prices kept falling towards a new equilibrium even after the interest rates were set to record low levels. In other words, while econometric approaches

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[80] There would probably be a need to use more indicators than the ones used in this basic approach, but it would not be a problem to gain this information.

are expecting the same to happen in the future as in the past, the approach described in this paper learns from the past but is still flexible enough to evolve together with the economy.

The point that more statistical approaches follow a certain methodology can arguably be a strength compared to more flexible approaches. This often makes them easier to work with and return more straight forward results. While econometric models have carefully designed steps which are done the same way for each forecast, the approach in this paper on the other hand leaves more freedom to the forecaster on how to interpret the indicators and draw conclusions. This leaves more weight to the analytical skills and experience of the forecaster which arguably could bias the forecast. As most forecasting approaches learn how to make qualified predictions about the future through understanding history, experience can make an important difference especially in flexible approaches.

8.4   The biased forecast

While I have argued that the flexibility in the forecasting approach from this paper makes the forecast stronger in the ever evolving world of economics, this flexibility could certainly bias the forecast as well. The statements from Van Der Stede (2009) on overly positive and negative markets arguably support Linda M. H. Lai (1994) in the view that some psychological phenomenons also play an important role in business cycle economics. As the forecasting approach analyzed in this paper is flexible and gives much freedom to the interpretation and choice of indicators, this approach could be especially prone to suffer from forecaster biases.

8.4.1   Overconfidence and the confirmation trap

Linda M. H. Lai (1994) argues that managers overestimate their own abilities and enter a stage of overconfidence in upturns, while they get overly pessimistic when the economy enters recessions. Such behavior is in accordance with Van Der Stede's (2009) suggestions that the level of scrutiny moves inversely to performance. A god example is how strong beliefs in the "new economy" resulted in stock prices far beyond rational and fundamental pricing during the dot.com bubble. Equally the housing bubble and credit crunch ahead of the 2007 recession was fueled by high risk taking in a goal to add to future yields in the growing

market. The confidence gained from long periods of high performance seems to remove the respect of fundamentals and business cycle risks, and make managers overly risk-loving.

The bubble in the housing market is a good example which we have seen before, and which is often explained through the same reasoning; that because the population is growing and land is scarce, house prices always have to grow at a high rate. As already discussed, Akerlof and Shiller (2009) and Shiller (2005) show that this is fundamentally wrong[81], and that real house prices actually have not grown at such an impressive rate at a long term perspective, except during short term bubbles. Linda M. H. Lai (1994) suggests that managers, especially those of crisis-prone organizations, often give little attention to potential signs of a crisis and ignores indications that a bubble is under development. Instead they seek information which confirms that their actions towards further investments and risk taking are correct while they look the other way to conflicting information. This phenomenon is named "the confirmation trap", and could indeed be part of an understanding to why some bubbles explained by the same rational are recurrent. A forecaster biased through such phenomenons is also likely to produce overly positive forecasts, and hence put even more fuel to the potential bubble.

In other words, managers seem to neglect the business cycle after long periods of growth. This tendency is confirmed by the vast amount of articles and literature produced during booms suggesting that the business cycle might be dead. During the Great Moderation these stories were supported by the theories such as the existence of a Greenspan Put. This theory suggested that the US stock markets were safe from downturns of any significant magnitude because the Fed would be expected to increase liquidity at signs of weakness (Miller, Weller and Zhang, 2001). This resulted in increased risk taking much based upon a theory which was based on the confirmation trap. Investors sought confirmation to justify increased risk taking, and to why markets would keep on growing. While the theory that the Fed would expand monetary policy in times of trouble is correct, both the dot.com bubble and the housing and credit crunch of 2007-2008 stands as proof that even the Fed cannot stop bubbles from bursting, and the business cycle from living.

The flexibility in the interpretation and choice of indicators means that these psychological phenomenons are of especially great importance to such forecasting analysis as the one

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[81] They argue that house prices increased at a higher rate than can be explained by population growth, lack of land, increased costs of building or increased income. See section 6.

presented in this paper. As managers forecast the future environment for prestige projects and investments during growth stages, they are likely to have short term incentives towards investing, and while also suffering from overconfidence, the forecast might be biased through the confirmation trap. But with that said, the vast availability of indicators means that this forecasting approach has great opportunities to discover developments which are not supported by fundamentals. This should have made it harder for overconfident managers to justify their investments to the executive board.

Nevertheless, a forecaster biased by overconfidence and the confirmation trap is likely to produce biased predictions, and corporations should hence be careful with the choice of incentives put on forecasters to protect their objectivity. While macroeconomic forecasting does not come without uncertainty, it certainly creates qualified expectations about the future which can be of vital importance to the planning of corporate or investor decision making. Carried out with the right experience and with an unbiased and analytical mindset, it can indeed help managers prepare for changes in external macroeconomic factors which often gets the blame when things are going downward.

8.5 *The possibility of a combined forecast*

While both econometric and judgmental forecasts have different strengths and weaknesses, they are not mutually exclusive. As the econometric approaches are based on strong empirical relationships, but come with less flexibility, the judgmental approach introduced in this paper leaves much freedom and flexibility to the forecaster, but are sometimes an offer for human biases. Many of the advanced computer programs such as SAS makes programming forecasts through econometric models such as the probit model a quick and easy job, and even though this model will not be examined in detail, Andrew J. Filardo (Dua 2004, pp 134-160) argues that this model have much empirical success in forecasting recessions, and could hence be valuable as a combined forecasting procedure together with the judgmental approach suggested in this paper.

9.0 Conclusion

This paper has argued that the ever recurrent business cycle is still very much alive and continues to possess a relevant risk to all market participants. But even after all these years with booms and busts, and with extensive research performed on business cycles, many market participants still seems unprepared as the economy reaches a period peak and enters a recession.

While the economy is moving in cycles, this paper has introduced a forecasting approach to help managers prepare for the future macroeconomic developments. It has produced relevant and updated research on a number of different economic indicators, and tested the flexible and dynamic forecasting approach on an ex post forecast of the business cycle peak from December 2007.

The forecasting approach suggested in this paper take both the importance of history and future flexibility into consideration. It learns from the past through an understanding of the physics of the business cycle and through empirical analysis of past developments in the economic indicators ahead of peaks and troughs. From this the forecaster generates clear expectations on what to experience as the business cycle moves towards a change in growth. But while it learns from the past it still has the dynamics needed to notice the differences in the modern cycles from the cycles of the past. The new developments in the relevant economic indicators are also controlled against underlying fundamentals which gives a more focused picture on the validity of the current developments.

With this said, we must expect that future changes in the economic environment will affect the forecasting abilities of the different economic indicators. But the flexibility of this approach in regards of easily including or excluding indicators combined with the fundamental analysis where we get an understanding of the reasoning behind the current developments in the indicators, helps ensuring its relevancy also in the future. False signals in single indicators will be detected through the fundamental analysis, and from the information gathered from other indicators. Also, if a single indicator for some reason should lose its relevance in the future, it can easily be switched with other indicators of bigger importance.

In the ex post forecast of the 2007 recession, the signs towards a future recession was unmistakable. Both business cycle theory and the developments in the respective indicators

painted a clear picture of the potential dangers that lied ahead. As I have stressed throughout this paper; the fact that this forecast was made ex post, with the power of hindsight, arguably makes the interpretation of the developments easier, and somewhat biased. But still the signs from the different indicators were at such a magnitude and without fundamental support that a similar real-time analysis should have generated the same conclusion; that a recession was inevitable. Another important acknowledgement from the ex post forecast is that the signs of the approaching recession were available at such an early point in time that it indeed could be of value to enterprise risk management. This means that the economic indicators, and the approach to economic forecasting analyzed in this paper was still of high relevance ahead of the business cycle peak of December 2007, which again increases the likelihood that this approach will carry relevancy also in the future.

As with all forecasting, this approach and the forecast of the 2007 recession, is far from perfect. It holds some important strengths and weaknesses, both technical and human, which the forecaster needs to be aware of. But this does not mean that economic forecasting is not a vital resource to macroeconomic risk management. We will probably never be able to predict the future with a hundred percent accuracy, but I have shown in this paper that we certainly can generate qualified expectations which can be used as the basis of internal awareness of future upside and downside risks resulting from changes in the growth of the business cycle.

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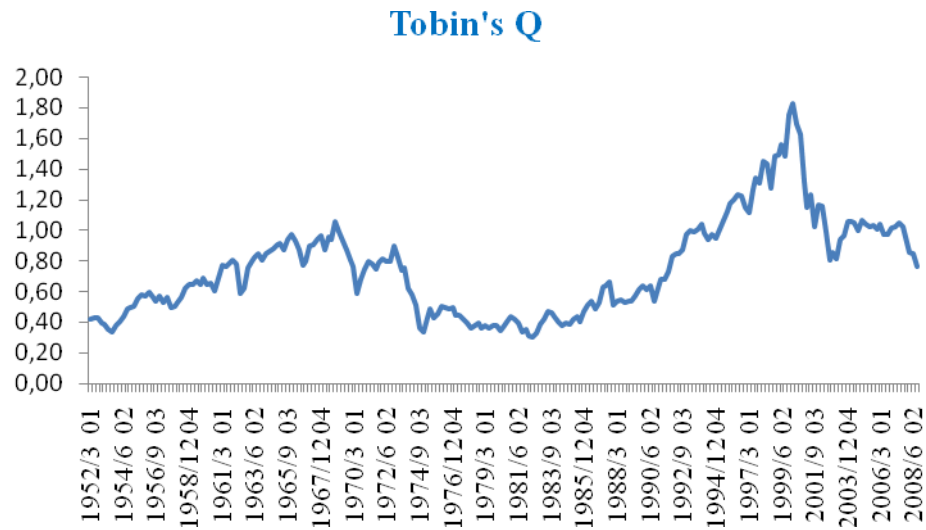Figure 1- Tobin's Q - The data is downloaded from the following web page on 18.05.2009:
http://mla.homeunix.com/q-ratio/

Appendix 2 – The Conference Board's Leading Economic Index

A short introduction to the indicators which are not discussed in the paper

Average weekly hours are connected to the employment situation. The average weekly hours indicates how efficient companies are running, and the future need of new employees. If the indicator is increasing there might be signs that companies are having a high amount of incoming orders and will hence be in the market for new employees in the future.

The index of supplier deliveries holds information on the demand side of the economy, and on the levels of consumption. The vendor performance is measured in an index put together by the Institute for Supply Management's manufacturing survey. The index is a measure of the amount of time elapsed from an order is made and sent to delivery. Long delivery times are signs of a surge in orders so that the suppliers are facing difficulties with fast deliveries. On the other hand, quick deliveries could be a sign of a low amount of orders so that deliveries could be made at shorter notice (Baumohl 2008).

In section 5.8.2 the number of new housing startups is discussed in detail. The number of new building permits can be interpreted as a predictor on how many housing startups there will be in the future. The reasoning behind this is that before you start building a house you need to file for permission. This means that from the number of building permits you have a very good indication on how many houses will be built in the near future.

M2 represents a part of the US money supply. It covers most types of deposits, the availability of currency, retail money market funds and more[82]. Controlling the M2 used to be the Federal Reserve's main target, but this is no longer the case as the Fed is now more concerned about the rate of inflation[83]. Because of the fact that this measure no longer plays an important part in the monetary policy, it is no longer of much interest in the market either[84] (Forex-brokerage-firms).

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[82] There is more information on what is included in the M2 on the homepage of the Federal Reserves: http://www.federalreserve.gov/releases/h6/about.htm

[83] The money supply was one of the main targets up until 2000 (www.forex-brokerage.com)

[84] I will not do an in debt analysis on why it does not hold much predictive information, but for one of many articles on the matter you can see "What was behind the M2 breakdown? by Lown, Peristiani and Robinson from 1999.
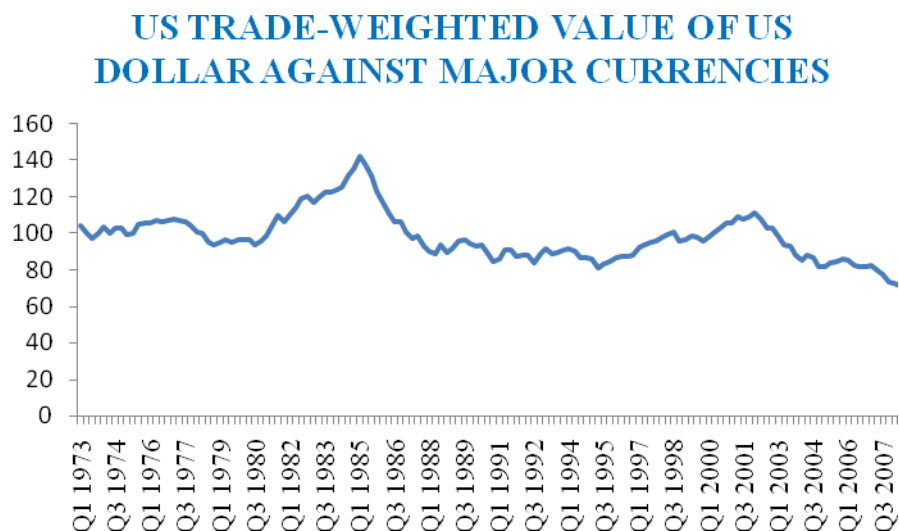
Figure 1 – US Trade-weighted value of US Dollar against basket of major currencies – Datastream ®

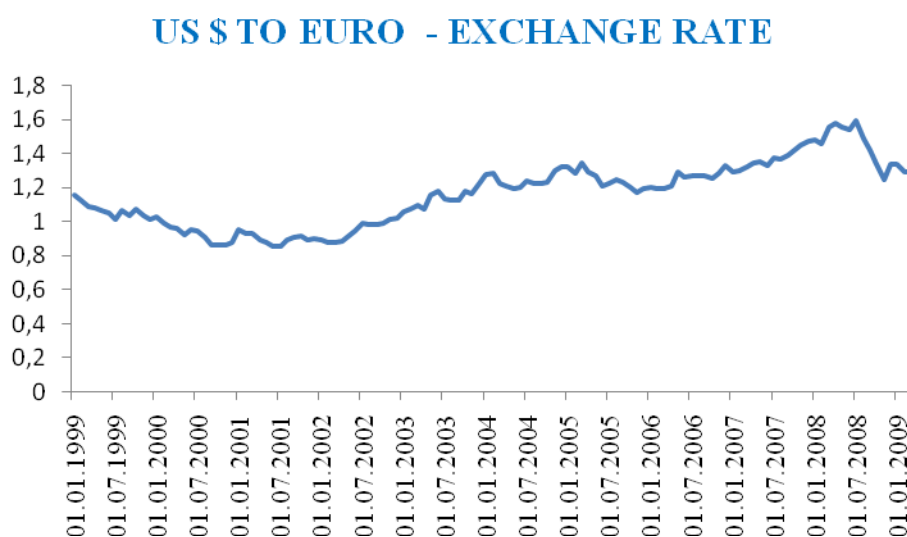**Figure 2 – Euro / US Dollar – Datastream ®**

Appendix 4 – The Trade Balance
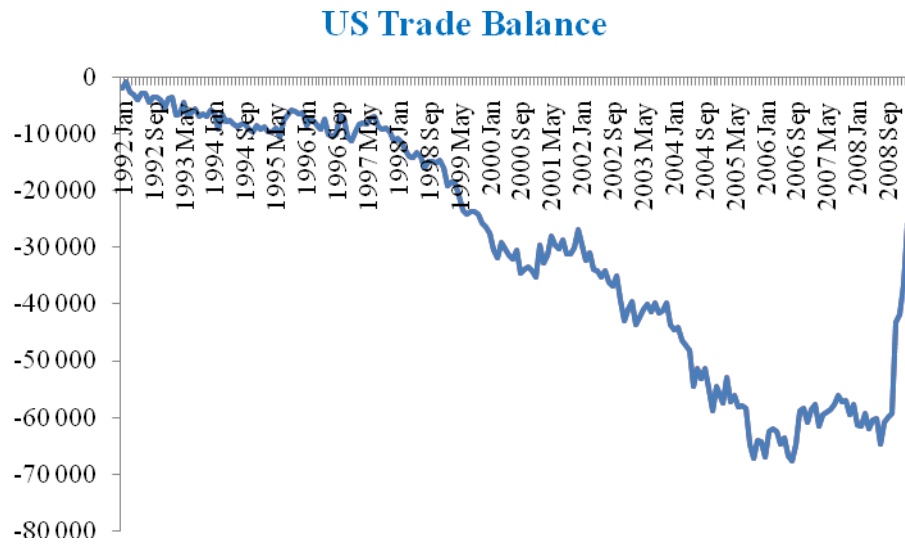

US Trade Balance

Figure 1 – US Trade balance – Data downloaded from Bureau of Economic Analysis on the 23.09.2009: http://www.bea.gov/newsreleases/international/trade/tradannnewsrelease.htm