

Master Thesis for the Master of Philosophy in Economics Degree

The American Economy Towards Stagflation?

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I. PREFACE

I would like to thank my supervisor, Jørgen Heibø Modalsli, for his patience and quality, letting me work independently, get lost, before rescuing me when needed, and for leading me in the right direction.

I would like to thank my loving husband for being supportive and participating in fruitful discussions. And for always being there.

Thank you, Åshild Emma Tresland Breidalen, for your irreplaceable linguistic work and for saying yes in such a short time notice. I would also like to thank Linn Birgit Sørensen for her linguistic assistance and being the best friend when needed.

What is suggested or insinuated in this paper must be taken with great caution. I take the full responsibility for all information that could possibly be misleading. All my assumptions are based on information available at present, but as the economy is constantly changing, not all the information presented will be up-to date.

Walk with me.

Silje Gunlaug Yun Eng

2nd of May 2008

II. ABSTRACT

Every day since New Year 2008 have the front pages of newspapers been covered with dramatic headlines printed in blood red letters regarding the economic situation in the American economy, especially in the financial and housing markets. And when Stiglitz (2008), previously awarded the Nobel Prize for his economic work, wrote a newspaper article in Aftenposten¹ that stagflation in the American economy is on its way, I started to get really worried. I am too young to actually have experienced stagflation. But according to my text books is it apparently among the most dramatic situations an economy can experience, and not to forget among the most costly. As I have understood is it most likely to be triggered by a negative cost-push shock.

The similarities between today and the 1970s are striking: never have the food prices been as high since the 1970s, never has the dollar been as weak since the 1970s. And in April 2008 the longstanding oil price record from April 1980 was broken.

Is it true that the U.S. is going to go through the 1970s all over again? Is the American economy going to experience the worst of both worlds?

¹ “Aftenposten” is one of the largest daily newspapers in Norway.

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“THE AMERICAN ECONOMY TOWARDS STAGFLATION?”

1.0 INTRODUCTION

The title of this paper is: “The American economy towards stagflation?” What is stagflation? Iain McLeod, Chancellor of the Exchequer in UK in 1965, was the first who formally used the expression stagflation. The word combines “stag” from a *stagnating* economy (reflecting the negative output gap² and the increasing unemployment) and “flation” due to high *inflation*.³ In other words stagflation is a recession⁴ with the occurrence of high inflation at the same time. This was incompatible with the traditional trade-off between low and stable inflation and low and stable unemployment as the original Phillips Curve predicted. The first incidents of stagflation in the 1970s and 1980s led to a change in the perception of the Phillips curve.

What caused stagflation? I expected to conclude that the high oil prices and increasing food prices observed today would lead the American economy into stagflation alone, due to a negative cost-push shock. A cost-push shock is the most common explanation for the stagflation that occurred in most OECD countries in the 1970s. Economists that support this “conventional” wisdom are Blinder, Ball and Mankiw, and Samuelson as referred to in Barsky and Kilian (2004). But several other economists, such as Friedman, Cagan, McKinnon, De Long and Houthakker as referred to in Barsky and Kilian (2000), as well as Barsky and Kilian themselves, argue that it was not the oil price, but rather the monetary policy that caused an abnormal level of inflation and a slow down in the GDP growth.

This paper is divided in three parts, Part A: theory, part B: empirics and part C: discussion. Part A begins with defining the most central measurements for stagflation; Gross Domestic Production (GDP) deflator, consumer price index (CPI), Gross Domestic Products (GDP), and the misery index.

Furthermore the Aggregate Supply –Aggregate Demand (AS-AD) model will be presented, as it will be used to illustrate both explanations for stagflation presented in this paper. With the occurrence of a negative cost-push shock, the AS curve will shift inwards and the AD

² Sørensen and Whitta-Jacobsen (2005) refer to *output gap* as the percentage difference between the real GDP and its trend value.

³ Inflation is sustained increase in price development (Blanchard (1999)).

⁴ Recession: At least two consecutive quarterly decreases in GDP (Blanchard (1999)).

stay unchanged. This will lead to higher inflation and lower production than the initial long-run equilibrium; stagflation.

According to Barsky and Kilian (2004) there have been several other periods with a cost-push shock and high oil prices which did not lead to stagflation, for example in 1990-1991, 2000 and 2003. They claim it was not the high oil prices in themselves that created the stagflation, but inappropriate monetary policy. Stagflation can occur without a supply shock, as long as the inflation is staggering and the monetary policy follows a rule which prescribes a sharp contraction response to increases in inflation. In the AS-AD model framework it will be illustrated with a positive AD shift due to expansive fiscal policy or lowered interest rate. The inflation and production will be higher compared to the initially long-run equilibrium levels. The next period the AD will shift down to deflate the economy due to higher interest rate. The production will react fast and drop but the inflation due to sticky prices and wages will stay high and a period of stagflation will occur. If several episodes of policy regime changes occur it is likely to lead to a deep and more serious stagflation. There is evidence of such incidents of stop-go-policy from the 1970s/80s.

In part B empirics from the 1970s and present will be presented. The liquidity in the market due to monetary policy (AD shift) and the food and oil prices (AS shift) will be emphasized. The assumption made is that the financial crisis present has driven the American economy into recession.

Part C: discussion will focus on the development of inflation. To be able to discuss how likely it is for the American economy to head towards stagflation, the inflation will be decisive as the assumption about recession is already made.

The oil prices are high due to low supply, uncertainty about the future and a weak dollar. The food prices are increasing due to “agflation”⁵. The oil and food prices are more volatile than the rest of the commodities in the CPI and are therefore subtracted in the core inflation. The core inflation should be the best predictor for future inflation but both the CPI for all items and CPI excluding food and energy will be discussed. Higher input prices, as food and energy, might with a lag lead to higher prices through the price mark-up. More expensive

⁵ “Agflation”: Higher food prices are caused by increased human demand and food used to fabricate an alternative energy resource. “Agflation” is a combination of the words “agriculture” and “inflation”.

imports will directly increase the core inflation. Will this raise in general commodity goods prices drive the labour to demand higher nominal wages, in order to keep the real wages at a desirable level?

Summary

Due to the knowledge about the cost of stop-go policy from the 1970s and 1980s, it is not likely that the American economy will experience stagflation of the same degree again. Stop-go-policy is typical when the monetary policy tries to stabilize both the inflation and the output. As the inflation increases, the interest will be increased to suppress the inflation. Then the output will fall and the interest rate will be lowered to stimulate the economy again, which leads to a further increase in the inflation, and the interest rate will be raised again.

The inappropriate monetary explanations and the cost-push shock theory are not necessarily contradictory to each other, but can be complementary. I believe that it might be the combination of these two theories which could lead the American economy into stagflation. It is expected that the economy will grow beneath trend in the first half of 2008. But if the effects of the stabilization policy actions are sufficient, the economy will pick up again in the second half of 2008 and beginning of 2009, and for the American economy to experience a period of stagflation, the inflation will have to increase the periods in between.

I have used the software Microsoft Excel to create graph 2 and graph 3. There will also be referred to acronyms in the following text, for explanations please view the appendix.

PART A: THEORY

2.0. MEASURES

The most common definition of stagflation is a period⁶ of high inflation and high unemployment at the same time (Blanchard (1999), Sørensen and Whitta-Jacobsen (2005), Burda and Wyplosz (2001)). Barsky and Kilian (2000) have a more specific definition: “*Periods of low or negative output growth and inflation that is high by historical standards*”.

This part will present some facts about the most essential units of measure for stagflation. It is crucial to be aware that the choice of data reported and analyzed as evidence for stagflation explanations might be selective and be chosen in favour of a specific theory. For example, the economists that believe in a cost-push shock due to higher oil prices as the main cause for stagflation will present CPI numbers and not the GDP numbers from the first period of stagflation in 1973 as evidences, as the GDP deflator decreased instead.

2.1. Inflation measures

Inflation is defined as a sustained raise in the general level of prices (Blanchard 1999). There are two measures of price indexes, consumer price index (CPI) and gross domestic development (GDP) deflator, both of which will be presented in this paper.

2.1.1. Consumer Price Index

The consumer price index (CPI) is a measure for the average prices of goods and services consumed by households over time. CPI is based on the prices of food, clothing, housing, fuel, transport, doctor- and dentist services, medicine and other products and services that people need to live from day to day (BLS (2008)).

The inflation is measured by the change in CPI from period t to period $t+1$. Energy and food prices fluctuate more than the rest of the commodities in the CPI basket and are therefore subtracted in the core inflation. The CPI is also divided into seasonally adjusted and not seasonally adjusted. The seasonally adjusted CPI is best suited for economic analyses

⁶ One period is equal to one quarter (Blanchard (1999)).

because it eliminates the effect of changes that normally intervene at the same time every year, like fluctuations in price because of climate changes, holidays, production cycles and model changes. It is basically consumers that would be interested in the not adjusted CPI, as it would tell them how much they actually pay for the goods and services (BLS (2008)). I will refer to data which is seasonally adjusted, if not otherwise is noted. It is also important to notice that not all the goods consumed are produced at home but might be imported from abroad, therefore some of the measured inflation in the CPI will stem from imported inflation.

Another version of the CPI is the larger and broader Personal Consumption Expenditures Price Index (PCEPI). The PCEPI ranges over 25 percent more goods than the CPI, including goods which are not directly paid for straight out of the pocket, as Medicare and Medicaid and also the spending by the rural households (Gavin and Mandal, Federal Reserve Bank of St. Louis (2002)). The BLS will present CPI numbers for inflation, and the Bureau of Economic Analysis (BEA) and the Federal Reserve Banks⁷ (the Fed) use PCEPI number.

2.1.2. Gross Domestic Production deflator

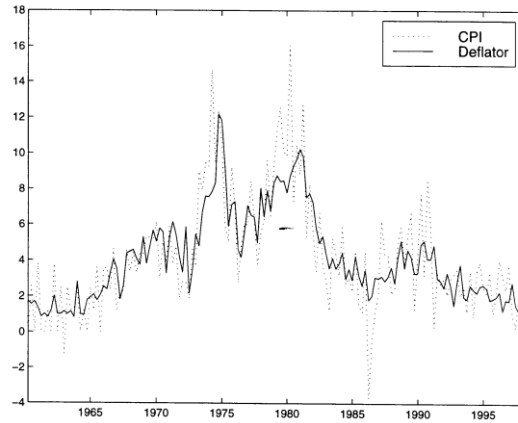
A different measure for inflation is the gross domestic production (GDP) deflator which measures the average price of final goods and services produced domestically. This is an index number that measures the rate of change over time (Blanchard (1999)). A close price index to the GDP deflator is the producer price index (PPI). PPI has a fixed weight corresponding to a basket representative for national production (Burda and Wyplosz (2001)).

The GDP deflator differs from the CPI because price-sensitive items such as food (whether imported or not) compared to CPI is given lower weights in GDP deflator (Barsky and Kilian (2000)). Therefore it is not reasonable to expect the GDP deflator and the CPI to always be at the same level. The CPI numbers contain imported inflation. This inflation will harm the consumers directly. But the higher prices for products and services which are reflected in a higher GDP deflator will not necessarily harm the consumers because these products may be sold to other firms or the government or be exported abroad (Blanchard (1999)).

⁷ The Federal Reserve changed their reporting numbers from CPI to PCEPI in 2000 (Gavin and Mandal (2002)).

The wedge between the CPI and the deflator inflation data is illustrated in graph 1 beneath. From the graph it is clear that the CPI is more volatile relatively to the deflator, especially between 1972 and 1974 and again in 1979 and early 1980.

Graph 1: Quarterly U.S. Inflation Rates for 1960.I- 1998.II



Graph: Barsky and Kilian (2000).

2.2. Gross Domestic Products measure

Gross domestic products (GDP) are a measure of aggregate output in the national income accounts. Blanchard (1999) has divided the GDP into three: firstly GDP is the value of the final goods and services produced in the economy during a given period; secondly GDP is the sum of value added in the economy during a given period; thirdly the GDP is the sum of incomes in the economy during a given period. In classic Keynesian theory private consumption, investment, governmental spending and the trade-balance decide the level of GDP. The GDP in this paper will be emphasized in analyzing whether the economy is growing, on trend or in recession. The economy is in a recession when it grows slower than the trend for two periods (Whitta and Wyplosz (2001)). How good GDP is as a measure has been discussed and will not be discussed any further in this paper.

2.3. Misery index

The misery index adds the level of inflation and unemployment together. The higher the number gets, the more certain is a period of stagflation. In 1980, the second period of

stagflation, the misery index reached an all time high and measured 20.76⁸ (The United States Misery Index 2008). In February 2008 the misery index was at 8.33, and was not at the time indicating any signs of stagflation.

3.0. AGGREGATE-SUPPLY AND AGGREGATE-DEMAND MODEL

Knowledge about the Aggregate Supply–Aggregate Demand (AS-AD) model is one way to get a good understanding of the explanations for stagflation and how stagflation today may arise by shifts in the AS and AD curves. The AS–AD model includes three markets in one model: the labour market, the product market and the money market (Blanchard 1999). I have chosen to present the AS-AD model based on Sørensen and Whitta-Jacobsen (2005) and the equations are also collected from them.

3.1. Aggregate Supply and Phillips curve

The trade-off between low inflation and high unemployment was a general opinion among economists from after the Second World War and until the 1970s. In 1958 A.W. Phillips plotted a diagram between the rate of unemployment against the rate of money wage-inflation from data collected in the United Kingdom in the period 1861 to 1913, and replicated for data between 1948 and 1957. He found clear evidence of a negative stable relation between the change in the wage rate and the unemployment rate (Blanchard (1999)). In 1960 Paul Samuelson and Robert Solow replicated Phillip's exercise with data collected from the U.S. between 1900 and 1960. They also found a negative correlation and the relation was baptized the Phillips curve. The Phillips curve was fixed and the movements were up- and downwards the curve. A certain level of unemployment was reflected in a consisting level of inflation.

In the 1970s the original trade-off principle broke down because data from most OECD countries showed an incident of simultaneous high unemployment and high inflation. The previously so clear trade-off was moderated; data from the U.S. now indicate that high

⁸ Please view figure 1, the US Misery Index- December 1960 to 2007, in the appendix.

unemployment does not necessary lead to low inflation but *decreased* inflation (Blanchard (2003)).

The breakdown was caused by changes in the expectations for inflation. Before 1960 the prices had been stable, and therefore the expectations for inflation were constant and equal to zero. Thus the inflation could be associated with a certain level of unemployment. But as the prices started to increase steadily for years, expectations about increased inflation became systematically and raised the level of actual inflation too, independently of any level of unemployment. Together with the increase in oil prices were the expectations the main reasons for the high inflation in the 1970s. The short-run trade-off would only hold if the expectations were constant. This is reflected today in the short-run Phillips curve; if the expectations changes, the Phillips curve shifts.

Friedman and Phelps are the founders of what we know today as the Phillips-augmented curve, or accelerations Phillips curve, where high unemployment leads to decreasing inflation and low unemployment leads to increasing inflation in the long-run.

3.1.1. The labour market

In the labour market the firms demand labour and the labour supply their services. I will start by introducing the reasoning for labour demand, and follow up with the supply of labour.

In the model it is assumed that the wage setters and the price setters are aware that wages are rigid in the short-run whereas prices adjust immediately to changes in demand and/or marginal costs. It also takes time before the change in expectations feed into the actual price level. The nominal wages are therefore sticky for longer periods than product prices (Sørensen and Whitta-Jacobsen (2005)). This will be useful later for the discussion how the increased input prices will affect the wages and future inflation.

The production function consists of the two input factors capital and labour. The labour has a productivity factor connected to it which decides the real volume produced. Since this paper is going to emphasize the short-run, the capital stock in the production will be fixed and therefore left out of the production. Since labour is the only variable input factor in the production, the marginal cost will be equal to the cost of an extra unit labour, the nominal

wage, divided by the marginal product of labour. Because of the fixed capital-stock, the marginal productivity of labour diminishes when labour input increases. This is the reason why the inflation increases as the production increases in the AS relation.

For the firms to maximize their profit the marginal cost will be set equal to the marginal revenue. As it is not perfect competition in the market due to production of differentiated goods, the firms will have monopolist qualities and can set a price mark-up, m^p , over the marginal costs to its price. The size of the mark-up depends on the competition in the market and the price demand elasticity.

The demand for labour from the producers depends on the demand for the goods produced and the cost of the labour. If the wage rate increases the marginal cost of the firm will be driven up and the prices for the end-user will increase. On the other hand the wages must be high enough for the labour to supply their services. If the wages are lower than the outside opportunity, which for an example the unemployment benefit, they will not choose to work. Therefore the minimum wage should be higher than the unemployment benefit.

As the workers are unionized and/or there are individual wage bargains, the workers will also set a mark-up, m^w , on the minimum wage. In this paper the minimum wage means the minimum wage rate set by law and also the wage the producers will offer, which will equal the marginal revenue. The size of the mark-up depends on how much the union is emphasizing the importance of low unemployment and keeping the real wage at a desirable level. The lower the unemployment, the more bargain power do the unions have. The mark-up depends on the unemployment benefit; if it is large the mark-up can be higher. Those who will not get a job as the high real wage reduce the demand for labour by the producers will be compensated by the unemployment benefit. This will not imply equally well in the American labour market compared to stronger welfare states like Canada, Norway, Sweden and Denmark, as the unemployment benefit is only provided for a limited amount of time. Therefore the cost of unemployment might be larger for workers in the U.S. if they are not able to get a new job, before social benefit transfers are ended. In practice the illegal working immigrants from South- and Latin-America are also pressing the nominal wage rates downwards. Since they have no rights or protection against being underpaid and receive no

unemployment benefits, they are forced to accept lower wages due to no outside opportunity. This can lead to reduced wage bargain power and reduce the size of the wage mark-up.

The wage takers can only set the nominal wage and are therefore dependent on guessing the price level which will actually be realized in the future to achieve the desired level on the real wage. Real wage is the nominal wage divided by the price level.

The producers consider the information about the wage formation⁹ as they set the prices, as illustrated in equation (1)¹⁰.

$$(1) P_t = P_t^e (1+\mu)F(u_t, z)$$

The price is set by the expected price from the wage setters in the period before in order to set the real wage. The level of unemployment, u , reflects the wage bargain power the unions have. If the unemployment is low and business struggle to get labour it will be easier to get through with higher wage demands. z is a collecting term for other factors than unemployment that affect the wage setting, for example the unemployment benefit (Blanchard (1999)). $(1+\mu)$ is the mark-up factor for both the workers and the producers.

The price function can be written as the expectations-augmented Phillips curve, equation (2), which illustrates that the negative relation between the inflation and the unemployment is a short-run trade-off as long as the expected rate of inflation remains constant (Sørensen and Whitta-Jacobsen (2005)).

$$(2) \Pi_t = E_{t-1}\Pi_t + \alpha(\bar{u} - u_t) + s_t, \alpha > 0$$

Π_t , the actual rate of inflation is decided by $E_{t-1}\Pi_t$, the expectations made last period about the inflation level in period t . I assume that the expectations are rational, meaning that they take into consideration all information available at the time the expectations are formed. Agents will change their expectations when they observe change in the previous inflation level. Therefore the inflation will accelerate when there is an unemployment gap, percentage

⁹ The wages are set $W = P^e F(u, z)$ (Blanchard (1999)).

¹⁰ Equation 1 is collected from Blanchard (1999).

deviation from the natural level of unemployment. Further it is assumed nominal inertia; as long as the unemployment is at its natural rate the expectations level will be unchanged. If the monetary politicians wish to drive down the inflation, they will have to press the actual level of unemployment below the natural level too. The α is a parameter larger than zero and decides how much the gap between the actual level of unemployment and the natural level of unemployment will drive up the inflation. The s_t captures the supply shocks as changes in the price and wage mark-up and the unemployment benefits around their trend levels. There will be given more information about the supply shock under the AS presentation.

3.1.2. The Aggregate Supply (AS) curve

The Phillips curve can be written as the aggregate supply (AS) curve. They are inverted versions of each other because the wages decide the prices, and as the labour cost is the largest cost for the producers, higher wages will give higher prices, which again will affect the inflation. \bar{y} , the natural output or potential output can be replaced with \bar{u} . The natural level of output is the volume produced when unemployment is at its natural level and the productivity is at its trend level. Equation (3) is one way to present the short-run AS (SRAS¹¹) equation:

$$(3) \Pi_t = E_{t-1}\Pi_t + \gamma (y_t - \bar{y}) + s_t$$

$$(4) \gamma = \frac{\alpha}{1-\alpha} > 0, 0 < \alpha < 1$$

$$(5) s_t = \ln\left(\frac{m^p}{m^p}\right) + \ln\left(\frac{m^w}{m^w}\right) - \frac{\ln(B/\bar{B})}{1-a}$$

Equation (5) reflects supply shocks as fluctuations in the wage and price mark-ups, shifts in productivity, and in the prices of production costs which will shift the AS curve. According to Sørensen and Whitta-Jacobsen (2005) productivity shocks which shift the AS are for example an exogenous increase in the real price of imported raw material (which will be central in this paper), loss of output due to industrial conflict and bad harvest. They further claim that all exogenous change in the economy's international terms of trade is a productivity shock. The expected value of supply shock is zero. The s is the collecting term

¹¹ SRAS = AS. I will not consider any changes to the LRAS as I will discuss the short- and medium-run perspectives.

for all exogenous disturbances affecting the production costs. γ is positive if the output exceeds its target the inflation will increase. $(1-\alpha)$ will always be positive as α lies between zero and one. Therefore will the inflation increase as the output will exceed the natural level and the inflation will increase less if the productivity will increase. It is also the stability condition so the long-run multiplier will be well defined.

The AS curve is upward sloping. $(y_t - \bar{y})^{12}$ is the output gap, the percentage deviation of actual output from the output trend. The inflation varies positively with the output-gap. If the output increases, the demand for labour will increase. But as the capital stock is fixed the marginal productivity from the labour will be diminishing and the labour costs will increase and drive up the prices. Because the natural rate of output is independent of the rate of inflation, as the natural level of unemployment is independent of inflation, the long-run Phillips curve will be vertical. Here is the expected inflation equal the actual inflation (Sørensen and Whitta-Jacobsen (2005)). According to equation (3) the only level of production/unemployment which will lead the expectations to be perfect is when the output/unemployment level is equal to the natural level $y = \bar{y} / u = \bar{u}$. There is no permanent trade-off here. The long-run AS curve will be used to illustrate the initial steady-state level of the economy. The natural level of unemployment is decided by the level of outside opportunities and the size of the mark-ups.

The SRAS curve for a closed economy is the same as for an open economy as long as it is effectively wage setting (Sørensen and Whitta-Jacobsen (2005)).

3.2. Aggregate Demand and Monetary policy

Before the Great Depression it was widely believed that the total level of output and employment was determined by the supply side of the economy (Sørensen and Whitta-Jacobsen (2005)). This realization changed after 1930 when John Maynard Keynes claimed that resources being underutilized caused the changes in unemployment and output, not the scarcity of resources. He also introduced many of the fundamentals which macroeconomics are built on today, like the multiplier-effect, the demand for money and how the monetary

¹² ($\bar{y} \equiv \ln \bar{Y}$)

policy can affect the interest rate and effective demand, and the importance of the expectations as factors behind the shifts in the output and demand (Blanchard (1999)).

Neo-Keynesian theory is trade-marked with monopolistic competition, sticky prices and rational expectations. The focus is on the importance of the time horizon of the effects of the changes in the monetary policy, and how the wages adjust to the price level. Keynes is today considered as the founder of the modern macroeconomic.

The decision of economic activity can be captured by the intersection between the AS and the AD in the short and the medium-run, and the LRAS curve is setting the long-run level.

3.2.1. Putting together the goods market and money market

When the goods market is in equilibrium the total supply is equal to the total demand by the private agents and the government. Equation (6) shows how the aggregate output (GDP) on the left hand side must equal the aggregate demand on the right hand.

$$(6) Y = C + I + G$$

Total private consumption is the private consumption and investment added together. I assume that the savings are equal to the investment, which is a quality of a closed economy.

$$(7) C = C(Y - T, r, \varepsilon)$$

Equation (7) shows that the consumption is decided by the disposable income, real interest rate and the expectation for the future. If disposable income (income minus tax) is increased the consumption will also increase, but not by one to one proportions. The result of an increase in the real interest rate is ambiguous. The substitution effect is negative, as it becomes more profitable to put the money in the bank and get a higher savings rate compared to consume or invest. But on the other hand due to the income effect people get richer and can therefore increase the consumption (assumed for an agent who is saving). If the interest rate decreases the credit will become cheaper, people will increase their consumption and the investment will increase. The ε is a parameter that catches the “state of confidence”, which reflects that if the expected growth of income and demand increases the

consumption will increase. This confidence parameter will be important in the discussion about the size and the speed of the stabilization politicians' actions.

$$(8) I = I(Y, r, \varepsilon)$$

The investment will increase if the income (GDP) increases and the expectations for the future are positive and if the real interest decreases. The size of the governmental spending is set by the fiscal policy. This will be discussed more detailed in chapter 10.

When the aggregate demand increases the demand for liquidity and money is also increased. In equilibrium must the money demand and supply be equal, as illustrated in equation (9). The right hand side is the demand and the left hand side is the supply of real money. The demand for the real money is increasing in output and decreasing in nominal interest rate.

$$(9) \frac{M}{P} = L(Y, i)$$

As both the demand for goods and investment depend on the real interest rates, the monetary policy will be central. The monetary policy can decide the money growth and the liquidity, the unemployment and output in the short- and medium-run, due to sticky prices and wages. When the income increases, so do the transactions and the demand for money.

The interest rate is also the link between inflation and output. And the nominal interest rate can be set by using a rule or principle which will prescribe how the interest rate should be set. I assume that the Fed is following the Taylor Rule and use their instrument, the federal funds rate over night (FFO), according to the deviations of inflation and output from their target levels to stabilize the economy. Equation (10) presents the Taylor rule.

$$(10) i = \bar{r} + E_{t-1} \pi + h(\pi - \pi^*) + b(y - \bar{y})$$

implying

$$(11) r = \bar{r} + h(\pi - \pi^*) + b(y - \bar{y})$$

The goods market can be rewritten like equation (12), and illustrates the percentage difference between the actual variable value and the trend values. Insert (11) for r in (12) and the real interest rate gap, $\alpha_2(r - \bar{r}) = \alpha_2 (h (\Pi - \Pi^*) + b (y - \bar{y}))$, and you end up with equation (13).

$$(12) \quad y_t - \bar{y} = \alpha_1 (g_t - \bar{g}) - \alpha_2 (r - \bar{r}) + v_t, \quad \alpha_1 > 0 \text{ and } \alpha_2 > 0$$

$$(13) \quad y_t - \bar{y} = \alpha_1 (g_t - \bar{g}) - \alpha_2 (h (\Pi - \Pi^*) + b (y - \bar{y})) + v_t$$

Solve out for inflation on the right hand side to get the AD function.

$$(14) \quad \Pi = \Pi^* + (1/\alpha) z - (1/\alpha)(y - \bar{y})$$

$$\alpha \equiv \frac{\alpha_2 h}{1 + \alpha_2 b} > 0$$

$$z \equiv \frac{v + \alpha_1 (g - \bar{g})}{1 + \alpha_2 b}$$

The z captures the aggregate demand shocks that can be caused by fiscal political changes and changes in the private sectors expectations about the future is reflected by v . This variable will be important for the discussion in chapter 10. α will always be positive since h and b is larger than zero. The size of α is dependent of the what kind of policy regime. $(1/\alpha)$ from equation (14) illustrates how the monetary policy influences the slope of the AD curve as well as its position. If the h is large reflecting great concern for the inflation stabilization and less for the production and the b will be small and the AD curve will be flat. A large α illustrates a strict inflation target and a smaller α a strict inflation output target. Therefore will the $(1/\alpha)$ from equation (14) illustrate how the monetary policy influences the slope of the AD curve as well as its position. If the h is large reflecting great concern for the inflation stabilization and less for the production and the b will be small and the AD curve will be flat.

On average, output, inflation and the real interest rate will be on their long-run equilibrium values according to this rule. The parameters b and h are set by the policy makers. The h should be a positive number, so when the inflation is higher than the target, the nominal

interest rate should increase¹³. According to Clarida, Gali and Gertler (1998), as referred to in Sørensen and Whitta-Jacobsen (2005), the Fed has weighted h to 0.83 from the period 1982 to 1994. This reflects that the Fed is most eager to stabilize the inflation. Therefore the slope of the AD is more flat, compared to if the Fed was more concerned with the output gap and employment. The b was weighted to 0.56. I underline that the weighting of the inflation and output might have changed since 1994, but I will continue to base my paper on these numbers.

The U.S. has an open economy with a floating exchange rate regime, which will also affect the slope of the AD curve. The AD curve will be flat, compared to a fixed exchange rate regime. The AD curve is downward sloping as the higher the inflation, the less production since the interest rate will be increased to deflate the economy.

Since I am going to implement the AS-AD model to the American economy, which is large and open, and this model is created for a small and open economy, some explanations are needed. I will treat the U.S. economy with the “qualities” of a small open economy because it can not affect the world market prices in the short or medium-run. I will assume that food and energy prices are set at the world market. But in the long-run the U.S. is a large open economy and will have impact on the prices through their demand. In addition the U.S. is still reckoned as the engine of the world economy and will by its economic growth affect the economic growth of other economies and therefore their demand for oil too in the long-run.

In the following the open economy and the exchange rate will not be presented theoretically, but I will assume a flexible exchange rate regime and that will be reflected in a more flat AD curve. I also want to underline that the dollar has an additional role; besides being the currency for the U.S. money it is also the currency with which most of the international trade is done. The oil is traded in dollar, and therefore the depreciation of the dollar has led to an increase in the oil price as an adjustment. As a consequence the real oil price did not increase just as much for countries whose currency has appreciated towards the dollar as it did for the U.S.

In practice a negative shift in the AS in an economy with flexible exchange rate will cause a larger negative output gap compared to a fixed exchange rate regime. Because a small

¹³ According to the Taylor Principle should the nominal interest rate increase more than the inflation increase in order to have impact on the inflation.

increase in inflation leads to a fall in the international competitiveness and a decrease in the demand for domestic products, the change on the output will be larger. This would also be the consequence if the stabilization policy was mostly concerned with stabilizing the output gap, and the AD had to be steep.

4.0. STAGFLATION EXPLANATIONS

In this section I will define what stagflation is, how it might arise and why it should be avoided. The two explanations that will be presented are not necessary independent of each other, as the inappropriate monetary policy supporters argue that they might be complementary. The inappropriate monetary policy suggests that the oil price shocks are caused by a monetary expansion. Therefore an oil price shock is endogenous in the inappropriate monetary policy model and contributes to worsen the stagflation period. This is in contradiction to the cost-push shock theory which argues that the supply shock is exogenous.

4.1. A negative cost-push shock

In most macroeconomic text books, as for an example Sørensen and Witta-Jacobsen (2005) and Blanchard (1999), the main explanation for stagflation is a negative cost-push shock. Other supporters of this point of view is according to Barsky and Kilian (2000) Samuleson (1974), Blinder (1979) and Ball and Mankiw (1994). A cost-push shock usually appears when there is low supply of a raw material or resource, which there exists no good substitute for. The low supply might be due to scarcity of the resource, declining productivity, excessive regulation, industrial conflict, cartel allocation, natural disasters or contrived shortages of raw materials and energy through production controls.

The effect of a temporary negative supply shock is stagflation. Assume that the economy is in the long-run equilibrium, also referred to as steady state, in an AS-AD model. The short-run AS curve shifts upwards because of low supply, while the demand curve stays unchanged¹⁴. The shift in the AS will cause higher prices but people will not change their consumption of the goods and rather pay higher prices to be able to keep up their current

¹⁴ Or that the AD curve at least not shifts proportionally as much as the AS curve shifts.

level of consumption, due to the theory of smooth consumption or habit formatted preferences.

The shift in the AS curve lowers the production below the natural level and raises the inflation above the original equilibrium, which is the steady state value of inflation (often on the target level, Π^* , in the case of an inflation target regime). The inflation is caused by exogenous increase in production costs. When the price of raw material increases, the producers reduce the quantities produced and/or they increase the prices to cover the high increase in costs, which usually would lead the labour to demand higher wages. The higher production costs and the reduced production level also force the producers to lay off labour. In addition the production will decrease due to higher interest rate as the Central Bank tries to fight inflation.

Figure 1: A negative cost-push shock

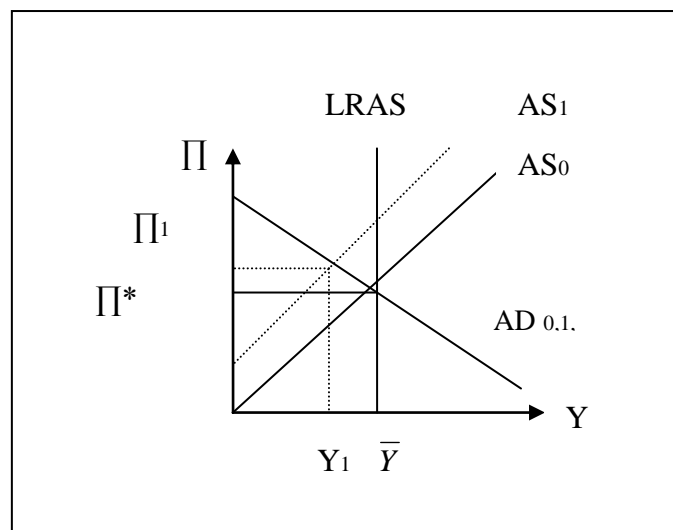


Figure 1: All figures following, which illustrate the AS-AS model is made by Eng, S.G.Y. (2008) based on figures from Sørensen and Whitta-Jacobsen (2005). The inflation, Π , will be measured along the y-axis and the output, Y , along the x-axis.

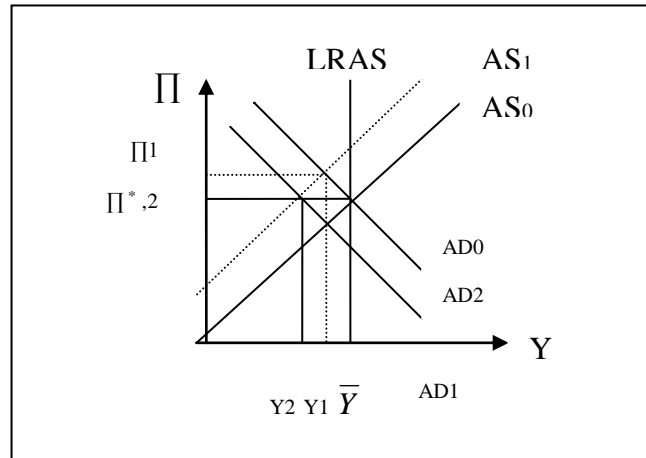
A negative cost-push shock is a reduction in the s term according to theory that captures supply shocks such as fluctuations in the wage and price mark-ups and shifts in productivity (Sørensen and Whitta-Jacobsen (2005)). How long the effects of a temporary shock¹⁵ will last depends on how the expectations about the inflation are formed. Before Lucas brought the rational expectations into the theory, it was common to consider static expectations or

¹⁵ A temporary shock here means that the AS curve is back to its long-run level next period.

backward-looking expectations, meaning that individuals expect the inflation to be at the same level as last period. Today it is more common to assume rational expectations, meaning that individuals' expectations will be correct on average. The expected increase of inflation is proportional to the actual raise of inflation. Therefore, if the central bank has credibility, the reaction time for the inflation to move back on target will be shorter compared to models with static expectations.

If stagflation should occur as an effect of a negative cost-push shock, the best short-run solution will be to find a proper substitute for the raw material which has become scarce. In the medium and long-run it will be best to develop ways to increase economic productivity and energy efficiency; produce more with less input and restore the supply of the raw material. The monetary politicians, on the other hand, can cut the money supply to deflate the stagflation and when the inflation is reduced, they can increase the money supply to spur the economic growth again. To the extent that stagflation is due to exogenous supply shocks, any attempt to lower inflation would worsen the recession (Barsky and Kilian (2000)).

Figure 2: Inflation stabilization after a negative supply shock



As illustrated in figure 2, there has been a negative supply shock in the first period. The inflation increases and the output decreases. Assume that the cost-push shock last for more than one period and need to be reacted on. Since the AD curve is relatively flat, it implies that the policy regime desires to keep the inflation on the target. Therefore the interest rate is increased in the second period, illustrated by the negative shift in the AD2, to deflate the economy, and the inflation is back on its target level but on the cost of a larger negative output gap, Y_2 . In the case of a socio-democratic monetary policy regime which targets full

employment, the AD would be steeper and would have to be shifted further out to stabilize the output gap so it would be back at \bar{Y} , the interest rate would be lowered and the cost would be higher inflation.

However, as Blanchard (1999) points out there still remain questions to be answered around an oil price shock. Does it have symmetric effects on the output? Data shows that since the decrease in the oil prices starting in 1982, the positive effects have been smaller compared to the negative effects a decade earlier. Sørensen and Whitta-Jacobsen (2005) compare the negative price shock in the 1970s and early 1980s with the positive price shock after 1985, and point out that the cheaper oil prices tended to boost the real income in the OECD. Whether they indicate that oil price shocks have symmetric effects or not are not specified.

4.2. Inappropriate monetary policy

It has been very common to associate the origins of the Great Stagflation of the 1970s with the major oil price increases. Barsky and Kilian (2000) are two among many economists, as for example Friedman, Cagan, McKinnon, De Long, and Houthakker according to Barsky and Kilian (2000), who have disagreed with the traditional explanation. They have written an article where they argue that the oil prices were not the trigger cause for stagflation and they state that oil shocks can plausibly lower the GDP deflator to underline their point of view. The supply shocks theorists suggest in opposition that the inflation increases and refers to CPI measures instead. To illustrate the difference, the bulk of increase in the deflator inflation rate occurred only well after the oil price increases of 1973/74 and 1979/80, as is opposite to the CPI inflation rate. View graph 1 “Quarterly U.S. Inflation Rates for 1960.I-1998.II” on page 5. Barsky and Kilian’s second argument is that there have been several other periods with a cost-push shock, high oil prices, which did not lead to stagflation, for example in 1990-1991, 2000 and 2003 (Barsky and Kilian (2004)).

It is the monetary expansions and contractions which shift the AD curve and are the driving force of low GDP growth and high inflation in the inappropriate monetary policy theory. There are two reasons for purely monetary stagflation: First the existence of inherently sluggish or persistent inflation and second that the monetary authority follows a rule which prescribes a sharp contraction in response to increases in inflation (Barsky and Kilian (2000)). In the case of monetary expansion, with a sticky price model there will be a period

where the price level rises less rapidly than the money supply and the production will expand. In the next period the prices will therefore increase more rapidly than the money supply. The money supply will be contracted due to high inflation, which will have an immediate effect on the production.

Data from the U.S. in the period between 1960 and 1990 were collected to detect the effects of the federal funds rate. The empirical findings in the increase of the federal funds rate were that increased interest rate would in the short-run lead to decreased output and increased unemployment, but it would have little effect on the price level (Blanchard (1999)). Therefore the period of highest inflation will occur after the periods of maximal monetary growth and maximal output expansion, as the inflation has a longer reaction time to the increased interest rate due to sluggish prices and wages (Barsky and Kilian (2000)). Barsky and Kilian (2000) write that the sluggish inflation reflects that the agents are learning about changes in the monetary policy regime¹⁶. It takes time before all agents in the market realize that there has been a change in the monetary policy regime, and they therefore form their expectations based on current inflation. This underlines the importance of the credibility and communication between the public and the Fed to avoid a deep and lasting period of stagflation.

However, Barsky and Kilian (2000) do not deny that monetary fluctuations may explain variations in the oil prices and that it therefore will be natural to have incidents of high oil prices in periods of stagflation. Instead they suggest that the two explanations might be complementary. They find support for their belief that oil price shock might be constructed by monetary policy in the paper written by Bernanke et al (1997). They argue further that endogenous monetary policy is an important component of the aggregate impact of oil price shocks. Endogenous monetary policy is explained by the changes in the Fed's policy which are largely explained by macroeconomic conditions given the commitment to macroeconomic stabilization. In practice that would mean that if the oil price shock creates high inflation the Fed should react to it if their policy rule prescribes them to react to inflation.

¹⁶ A changed policy regime is defined as a permanent change in the money growth rate (Barsky and Kilian (2000))

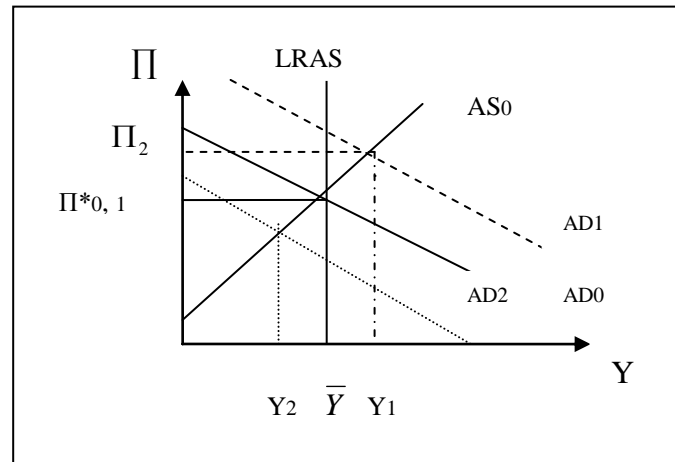
Figure 3: Inappropriate monetary policy

Figure 3 illustrates first a positive shift in the AD1 which leads to increased production above the natural level, Y_1 , but as the prices and wages are sticky the inflation will be unchanged in period 1, $\Pi^*_0 = \Pi_1$. In the next period the inflation will adjust to the positive demand shift level and increase above the target level, Π_2 . The AD2 will be shifted downwards as the monetary politicians will react to the inflation advance and raise the interest rate to deflate the economy. The production will react fast to the increase and drop below the natural level of output in period 2 to Y_2 , but the inflation will remain at the period 2 level. Therefore period 2 will be a period of stagflation as the inflation is above the natural level and the output gap is negative. In the case of inappropriate monetary policy as the main trigger for stagflation, the best way for the Fed to stabilize the economy is to stimulate it by keeping the interest rate low instead of targeting the inflation (Barsky and Kilian (2000)).

5.0. THE COST OF STAGFLATION

Under stagflation costs are unavoidable. The economy either has to suffer from high inflation or high unemployment. The Fed has only one tool, the FFO, and can therefore only target one of the variables. The Fed should be mostly concerned with the variable causing the highest cost in the long-run.

5.1. The costs of high inflation

High inflation is harmful for the economy because it can hinder economic growth. The producers have a hard time telling whether the price change is due to higher demand for their particular product or if it is the general price level in the economy that is changing¹⁷. The price level is decisive to set the level of production.

The consumers will suffer because high inflation can be volatile and that makes them uncertain about the future inflation level and real wages. This uncertainty will also make it difficult for the labour to make wage-contracts with the business. Furthermore there are aspects of the American tax system that are not indexed to inflation (The Federal Reserve Bank of San Francisco (2007)).

High inflation distorts economic decisions by arbitrarily increasing or decreasing after-tax rates of return to a variety of economic activities. Inflation also makes people spend their time ineffectively trying to hedge against inflation, at the alternative cost of not pursuing more productive activities (The Federal Reserve Bank of San Francisco (2007)).

The current account can also be harmed by high inflation, as it might lead to an unfavourable change in the trade balance if the exchange rate is kept constant and the purchase power parity does not hold. As home has no or little market power for traded-goods, higher domestic prices will lead to loss of competitiveness and the international demand for the domestic products will be zero or at least reduced. In worst case might this lead to higher unemployment in the export production sectors home, distortions in the labour market and/or wealth transfers between sectors.

However, inflation is not always a sign of an unhealthy economy; it can also reflect higher product quality (Sørensen and Whitta-Jacobsen (2005)).

5.2.1. The costs of high unemployment

Assume that individuals are risk averse and that they want to smooth consumption. In periods with low GDP growth and high unemployment, the unemployed will experience reduced utility due to decreased consumption. When they get employed again, the loss of utility will

¹⁷ The Lucas Island theory.

not be fully compensated by the gain of increased consumption, due to marginal decreasing utility of consumption. The monetarist is referring to this argument when they point out the importance of stabilizing the unemployment and reduce the size and the length of the recessions because people suffer more in the down turns than they gain in the booms (Sørensen and Witta-Jacobsen (2005)).

Especially people with lower education is a vulnerable group to be laid off in down turns and will therefore be the ones that suffer the most in recessions. They have less opportunity to save due to initial lower income and there are not satisfying unemployment insurances, due to the problems with moral hazard and adverse selection, to protect them from this kind of loss (Sørensen and Whitta-Jacobsen (2005)). The loss for the unemployed in the U.S. will be larger due to lower social care and unemployment benefits compared to countries with stronger welfare systems.

5.2.2. Hysteresis¹⁸

In addition to the immediate cost of being unemployed in the recessions, the unemployment will be more than just temporary for some individuals. The labour that is getting laid off in the recessions is not necessarily the first ones to get hired again in the booms. If persons have been unemployed for longer than a year, their working skills and habits will have depreciated. In addition the persons will stop applying for jobs due to negative responses and lack of self-esteem (Blanchard (1999)).

The natural unemployment rate is not independent from the actual unemployment rate. Therefore will a long period of high and persistent level of unemployment lead to an increase in the natural level of unemployment (Blanchard (1999)). This underlines the importance of including unemployment in the social loss function of the monetary policy.¹⁹

The hysteresis theory does not apply just as well in the U.S. as in Europe due to lower unemployment benefits. The government will only give support for the three first months in the case of unemployment and that would force people to find a job (Blanchard (1999)). The

¹⁸ Hysteresis describes any system whose equilibrium position depends on the history of the system (Blanchard (1999)).

¹⁹ When the monetary policy target both inflation and output, it is called a flexible inflation targeting. The inflation can fluctuate around the target in favour of stabilizing the production in the short and medium run, as long as the inflation is at target in the long-run.

unemployment benefit rate is a weekly payment and is based on the clients' wage paid during the base period (US Labor State New York (2008)).

5.3. The monetary policy trade-off

The main challenge for the monetary policy in a situation with stagflation is the trade-off between stabilizing the high unemployment or the high inflation. The Fed needs to make a choice of which goal to be targeted at which time. The hysteresis was developed after the stagflation period in the 1970s. Both the U.S. and European countries wanted to stabilize the inflation by contradictive policy. When the inflation started to decrease and the unemployment increased in the U.S., the monetary contraction was followed by a fiscal expansion, which led the output to expand and the unemployment to increase rapidly. The costs for the European countries were larger, as they continued to have strict fiscal and monetary policies, which led to a much higher and persistent level of unemployment (Blanchard (1999)).

PART B: EMPIRICS

6.0. THE STAGFLATION IN THE 1970S AND THE 1980S

Stagflation was an unknown incident until the 1970s/80s. What really happened?

6.1. The monetary policy and liquidity in the market

Barsky and Kilian (2000) claimed that the breakdown of the Bretton Woods system in 1972, which led to a rather dramatic expansion in the world money stock, was the initiation cause of the first stagflationary episode in 1973-1975. The second stagflationary episode in 1979-1982 was also preceded by monetary expansion.

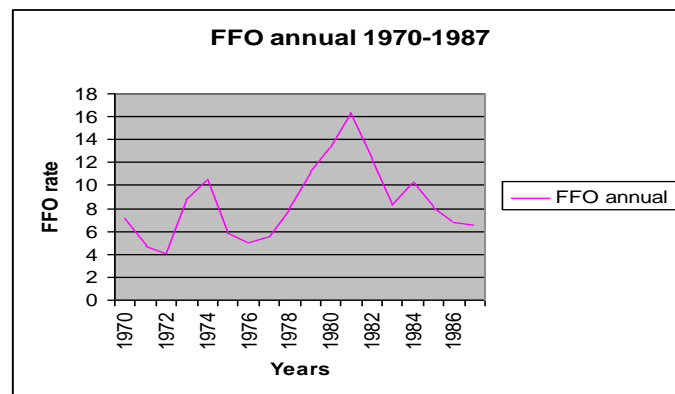
Prices of non-oil and non-agricultural commodities, such as industrial raw materials, started to increase in 1972. The prices were driven up by demand which was large due to the high global liquidity caused by the breakdown of Bretton Woods. This caused a period of high inflation before the first oil price shock occurred in 1973 (Barsky and Kilian (2000), Burda and Wyplosz (2001)). The commodities prices continued to rise in 1973/74, after the first oil price shock but not proportionally as much as the oil prices. The reason for the rising prices of both commodities and oil responded to macroeconomic forces driven by monetary condition, such as low interest rate which increased the liquidity. Also the expectations as described in the theory chapter contributed to drive the prices up.

The Fed in 1973 responded to the inflationary pressure with contraction policy. This caused the American economy to slide into a recession in 1974. When the recession was a fact, the Fed reversed its course to avoid an even deeper recession and a period of expansion lasted into the end of the 1970s. According to Hamilton (1998) as referred to in Barsky and Kilian (2000) the contraction in the monetary policy in 1973 was not large enough to prevent an increase in the price level at the end of the 1970s, even though the Ford administration introduced wage and price controls throughout 1973 and early 1974 which effectively suppressed the inflation rates and led to a delay in the inflation.

At the end of 1970s Paul Volcker was pointed out as the chairman of the Federal Reserve Board of Governors by President Carter. Volcker was now in charge and responsible for solving the inflation pressure. From 1978 to 1979 the average inflation had gone from 7.6 percent to 10.6 percent and based on this information Volcker thought it was time for the Fed to make a political change, known as “the Reform of October 1979” (Sumo (2006)). The Fed believed that the best way to achieve their mission, to pursue maximum sustainable growth, was to conduct the monetary policy in such a way that the prices were kept stable. The Fed succeeded in bringing down the inflation from 13.5 percent to less than 4 percent in just a few years, with the alternative cost of two recessions caused by extremely high interest rates (Sumo (2006)).

The main challenge was to drive down the inflation and to convince the public that the Fed was sincere about their inflation targeting. They were eager to build up credibility around the new policy regime. The lack of trust from the public was built on previous experiences with stop-go policy. Former politicians allowed inflation to increase in order to stimulate unemployment and output. But as the inflation reached concerning high levels, the interest rate was increased to deflate the economy. Unfortunately the high inflation was already baked into the future expectations and into the price decisions, therefore the inflation continued to increase. When the production and employment fell, the interest rate was again lowered to stimulate the economy. Goodfriend, Federal Reserve Bank of St. Louis (2005) said: *“The tolerance for rising inflation and the sensitivity to recession meant that stop-go cycles became more inflationary over time”*.

Volcker used Milton Friedman’s monetarist ideas as referred to in Sumo (2006) as encouragement to continue his strict inflation targeting, even though the unemployment and production fell. Friedman argued that inflation was mainly caused by excessive increases in money supply and therefore the cost of reducing inflation measured in lost production would be less severe. He claimed further that if the monetary policy gained credibility, the inflationary expectations would be adjusted and it would slack the trade-off between inflation and unemployment.

Graph 2: FFO annual 1970 to 1987

Source: FFO numbers collected from the Federal Reserve Bank (2008).

6.2. Increased raw material prices

Both the oil and the food prices rose in the 1970s and 1980s, which made most of the intermediate text books as Sørensen and Whitta-Jacobsen (2005), Burda and Wyplosz (2001) and Blanchard (1999) believe that stagflation was caused by a negative cost-push shock.

6.2.1. Oil Prices

The oil price shocks in the 1970s and 1980s have been blamed as the main trigger for stagflation in most macroeconomic text books as for example Blanchard (1999) and Sørensen and Whitta-Jacobsen (2005). The oil price was increased twice by OPEC²⁰, in 1973 and 1979. Due to the cartel qualities of OPEC, they had the market power to cut back the production of oil to increase the prices (Blanchard 1999). But according to the OPEC's homepage (2008) was the main reason for higher prices the Arabian Embargo in 1973 and the Iranian Revolution in 1979.

The demand for oil continued to be high due to heavy production as the interest rate was low in the U.S. and it was excess global liquidity. The oil prices remained high. Because of the unusually low growth in total factor productivity in the period between 1974 and 1985, coinciding with unusually high oil prices, the high oil prices were blamed for causing stagnation in the economy (Barsky and Kilian (2004)). Among the reasons that led the world economy to find its way out of the stagflation was the discovery of more oil reserves and in

²⁰OPEC: Organization of the oil Producing Export Countries.

addition that some of the oil producer partners increased their production. Together these factors led this to an immediate decrease in the oil prices in 1984.

6.2.2. High food prices

In the 1970s there had been a large failure of the crop that led to decreased supply of food and drove the food prices up. At the same time the Peruvian Fishery, which produced a lot of fertilizer, broke down. This affected the agricultural product delivering especially from South-America. In addition the most common fertilizer was produced by oil and the increased input factor prices in food production contributed to increase the food prices.

7.0. AMERICAN ECONOMY 2008

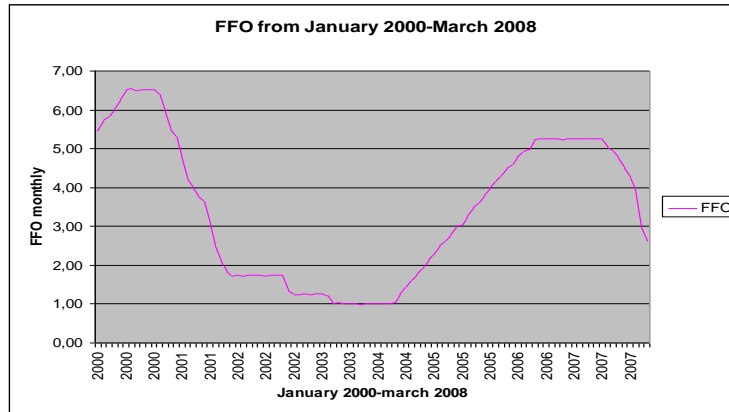
The American economy today is in an early phase of recession. At the same time the high oil and food prices are putting a pressure on the inflation. Can this combination lead to stagflation?

7.1. Monetary policy; actions and results

The American economy went into recession in late 2000, as the stock market bubble, based on the economic “dot-com” boom in the 1990s, burst. The attack on the Twin Towers contributed to further dampen the already existing economic slow down. Fiscal policy under the Bush administration made tax cuts for the upper-income Americans to stimulate the economy²¹. The tax cuts contributed to some increased economic activity but not as much as needed. The monetary policy had to take the superior responsibility for stimulating the economy and chairman of the Fed, Allan Greenspan²², kept the interest rate low until 2004. The FFO was at the lowest, 0.98 percent, in December 2003 before it started to increase again in June 2004 (Federal Reserve (2008)). The graph beneath illustrates the drop in the FFO rate from over 6 percent in 2000 to beneath 2 percent in 2001.

²¹ Stiglitz (2008b) disagrees. He does not believe Bush’s main intention by decreasing the tax for upper-income was to stimulate the economy.

²² Allan Greenspan took the place as chairman for the Fed after Paul Volcker in 1987, and he ended his career in 2006, when Ben Shalom Bernanke replaced him.

Graph 3: Monthly change in the FFO from January 2000 to March 2008

Source: FFO numbers collected from the Federal Reserve Bank (2008).

Normally would also the housing market stagnate as the rest of the economy went into recession in the beginning of 2000. But the low interest rate contributed to keep the housing prices growing (SSB (2008)). Since 2003 the high residential housing prices have been the driving force of American economy (Norges Bank (2003)).

Spring 2006 the housing bubble²³ burst and the main reason was a drop in the GDP growth below trend whereas FFO had reached its highest level at 5.56 percent. The economy managed to pick up in the second half of 2007, stimulated by high governmental spending²⁴, increased export supported by the weak dollar and businesses were running large profits (SSB (2007)). In the end of 2007 and beginning of 2008, the crisis in the housing market had infected the credit and the financial market too and the household demand decreased. According to the Monetary Policy Report 2008 did not the consumer spending decline until the second half of 2007 due to lagged effects of the increases in household wealth in 2005 and 2006 and solid gains in aggregate wages.

Stiglitz (2008b) wrote in the New York Times that the American economy is heading towards a period of recession where the economy will operate below its potential level and the unemployment will grow. Merrill Lynch (2008), Monetary Policy Report (2008) and a collection of estimates done by the Wall Street Journal (2008) all agreed that they believed the recession had started.

²³ The growth in the American Housing Market is presented in graph 5 in the appendix.

²⁴ The governmental spending was mainly military expenses in Iraq.

According to classic Keynes theory is the recession caused by a drop in the aggregate demand below trend. The aggregate demand is the total of private consumption, investment, governmental spending, export and import. Seventy percent of the American economy is driven by private consumption, and the decreased consumption is the main reason for the recession. Private consumption has decreased mainly due to lower disposable income for consumption as the supply of credit has been decreased, and the loan expenses have increased.

The low FFO has given the opportunity for banks to give loans to people with low security, the so-called sub prime loans. A sub prime loan is a loan that has not been fully secured, meaning that the borrowers did not have a full coverage at the time the loan was taken. The value of the loan was based on the belief that the price growth in the housing market would continue. The loan has a low interest rate in the beginning but can after a while increase drastically (SSB (2008)). As the value of mortgage objects have fallen since 2006 the banks have added a mark-up on the interest rate, as well as a high risk premium on debts which are high or loans with low security, to compensate for the risk they are taking (SSB (2008)).

I might have given the impression that all American are in possession of such sub prime loans, but the total volume of housing loans in the U.S. is only about 6 percent (Gjedrem (2007)). But it is the domino effect to the financial market which has triggered the recession. This paper also considers the U.S. as whole, but I believe some states, like for example Florida, Nevada, California, and Michigan, which has the highest number of loans per 1000 unit and the number of foreclosure per 1000²⁵ unit, will be more exposed to the credit crisis and the recession and thus also more vulnerable for the increased food and energy prices.

As the housing prices increased, the personal savings rate went in the opposite direction.²⁶ Lack of savings makes the consumers less able to smooth their consumption in times of recession. In addition the future income is uncertain as unemployment numbers from BLS for March 2008 increased to 5.1 compared to 4.8 a month before. The numbers were higher than expected and contributed to lower the future consumer expectations about income and growth. More negative expectations contributed to decrease consumption and investment. According to the Conference Board (2008) the consumer confidence has declined twelve

²⁵ Federal Reserve of New York (2008).

²⁶ View graph 6 "Personal Saving Rate" in the appendix .

points from February to March and is now down in 64.5. The expectation index also fell to 47.9 from 58.0 a month before. Decreased consumption will have a negative multiplier effect on GDP, which again will reduce the future income for the households.

Total private demand is the consumption and the investment added together (Sørensen and Whitta-Jacobsen (2005)) and it is the total private consumption which has led the American economy into recession. The number of unsold residential houses is the largest since 1991 and prices are still falling (SSB (2008)). But as the residential housing market hit the roof and peaked in 2006, two million people have become homeless because they have been forced to sell their homes. In addition several others are in danger of losing their homes. This has created a negative psychosocial spiral: The housing prices have kept falling due to lower demand and buyers are getting more selective about what they want to buy. Potential buyers speculate for the prices to drop further before purchasing. Several big banks have had great credit losses as a consequence of being too open-handed with their lending and are today in danger of being closed. In the summer of 2007 the liquidity in the market dried completely up. The crisis has been so extensive that the Fed together with JP Morgan Chase bought up a bank, Bear Stearns, in March 2008 to avoid an even larger crisis in the financial market. Tuesday 11th of March was the market supplied by \$200 billions dollars in order to increase the liquidity. In addition they have lowered both the FFO and the discount rate.

The private demand has been the driving force not only for the U.S. economy but also for the rest of the world. How large effect the recession will have on the U.S. trade partners and their demand for American goods is still uncertain and will mostly depend on the domestic economic situation. But it is obvious that the increased food and energy prices will affect also these economies. The expansive fiscal policy actions are taken to try to stabilize the economy. Countercyclical²⁷ fiscal policy and a stimulation package at the size of one percent of the GDP will try to reduce the negative multiplier effect on the consumption, by lowering the taxes and increasing disposable income.

The dollar has depreciated since 2007 but was especially weak in April 2008, below 0,627 EUR per US dollar, and the exchange rate was in 2006, before it started to depreciate, just

²⁷ Countercyclical fiscal policy: corrective device intended to keep the economy near its equilibrium level by increasing aggregate demand via public spending or tax policies as the GDP is below trend (Burda and Wyplosz 2001).

below 0.85 EUR per dollar. This has boosted the export sector and has together with low wage growth, contributed to improve the competitiveness and balanced the trade account. But isolated the weak dollar is not excludible positive as it will lead to increased inflation and reduced purchasing power parity for the households (SSB (2008)). As the high import prices for finish goods will directly cause higher prices, but as nominal wages are fixed in the short-run will this lead to lower real wages.

The export sector is not the only sector which has improved its profits. The agricultural sector has had an up-swing in 2007 and early 2008 due to higher food prices. The net farm income in 2007 compared to 2006 increased, the volume of banks with agriculture loan portfolios reported a decrease in the number of people having repayment problems and the expected higher non-real estate-loans for January, February and March is anticipated to be used for operating farm machinery and grain storage construction loans (Oppedahl, Federal Reserve Bank of Chicago (2008)).

The monetary policy is in a great dilemma. Bernanke has to consider the deflation in the housing market and the increased inflation pressure as a consequence of both weak dollar and higher food and energy prices before he decides how to set the FFO. The federal funds rate was in January 2008 totally lowered by 1.75 percent points and indicates that the fear of deflation in the housing market, the repayment problems and the low GDP growth is more of a concern than the inflation. But as SSB (2008) points out, the lowered FFO will have limited effects due to the special situation.

To summarize this section the economy is driven out of the long-run equilibrium due to the sub prime loans affections on the financial markets. In the private sector it has lead to negative expectations about the future and resulted in lower total consumption. But both the monetary policy and the fiscal policy are expected to have effects and according to the Monetary Policy Report (2008) is the GDP expected to decrease for the first half of 2008 but then pick up again in the second half.

7.2. Higher resource prices

Higher oil and food prices are putting a pressure on the CPI. What causes the high prices and how sustainable will they be?

7.2.1. Increased oil prices

The high oil and gasoline prices contribute to an increase in the production costs for the producers. The oil price has increased since 2003. It was driven up by the war in Iraq and by increased demand from two of the largest countries in the world, China and India. Due to economic growth these countries have an increased need for heating, gasoline, transport and energy for production. The oil prices also increased due to increased producing costs, fear for conflicts in oil producing countries and the decision about decreased supply from the OPEC. And since the oil is priced in dollar and the dollar has depreciated relative to a lot of other currencies, energy prices have increased relatively more in the U.S.

The annual West Texas Intermediate crude oil price increased to average \$72.32 dollar per barrel in 2007 compared to \$65 in 2006, and are projected to average \$101 per barrel in 2008 and \$92.50 per barrel in 2009 (SSB (2008), EIA (2008)). 15th of April 2008 the crude spot price for oil reached a new record level at \$113.77 per barrel and beat the old April 1980 record which was \$39.50 and equals today \$103.77 adjusted for inflation (New York Times (2008)). The main reason for the high prices in April 2008 is the news about a lower oil reserve than expected. According to SSB (2008) the cold weather on the north hemisphere contributed to increase demand for oil for heating. The demand for gasoline has also been large. Furthermore the oil supply has been reduced twice by OPEC, whose cuts in the production by 1.7 million barrel per day led the oil price to increase, but they increased the production again with 0.5 million barrels per day in November 2007, which contributed to not press the oil prices further upwards.

The International Energy Agency, as referred to in SSB (2008), expect the demand for oil to increase with 1.8 millions barrels per day from 2007 until 2008 and the main demand will come from Asia and the Middle-East for transporting purposes. The demand for oil in 2008 has been adjusted down compared to the earlier predictions due to reduced demand from the U.S. and Europe based on recession expectations. Also the production capacity of OPEC is expected to increase the next two years and will dampen the oil prices.

The oil prices seem to continue to be high at least throughout 2008 due to increased demand and reduced supply. As I in this paper will consider the short- and medium-run, I will assume that the oil prices will continue to be high at least in the short-run.

7.2.2. Increased food prices

The U.S. soybean futures in mid-January 2008 broke the long-standing 1973 record, according to the Grain Market Report (2008). The increase in the food prices is extraordinary since the food prices at the world market have fallen between 1974 and 2005 by three-quarters in real terms (The Economist (2007)). In 2007 the food prices started to increase for the first time since the 1970s, for example the cash soybean price increased with sixty-two percent compared to 2006 (Federal Reserve Bank of Chicago, AgLetter (2008)). The Economist's food index is higher today than at any time since it was created in 1845; even in real terms have prices jumped by 75% since 2005 (The Economist (2007)).

The increased human demand and food used for producing an alternative energy resource are the forces behind the new expression "agflation" (Rasco and Bernstein (2007)). Agflation is a combined word of "agriculture" and "inflation". The increased demand can not be met by enough supply and are therefore forcing the prices to increase and causes inflation. The prices for soybeans and corn are driven up as they are the main raw material for producing bio diesel and ethanol. Since these products are becoming more expensive, consumers will switch to demand more non-fuel related grain substitute such as wheat. But the relatively low supplies of corn and soybeans along with low wheat stocks have urged the future prices upwards (Federal Reserve Bank of Chicago, AgLetter (2008)). Further has higher population growth increased the use of grain to bread, tortillas and chapattis. Increased demand for meat is tied to economic growth. The global GDP is now in its fifth successive year of expansion at a rate of 4%-plus. It is especially the increased demand for meat from more wealthy and highly populated countries like China and India which has put pressure on the grain demand, as it takes six kilos of grain to produce one kilo of beef. Buntrock (2007) on the other hand argue that the change in diet has happened over time and been incremental and therefore cannot be a satisfying explanation for the upward movements in prices the last years.

Another reason for the increased prices is the less full world food stock. The reason for a lower food stock is that the U.S. and China decided to do a run-down, in order to keep the

food prices low on the cost of a cut in the stock. As the high oil prices would depress the use of oil-based fertilizers, which have been behind much of the increase in farm production during the past century, the supply will also be lower. In addition the production cost for food will increase due to a more expensive input factor.

Once the higher food prices are embedded in the market, the producers will have to react to them. Bunrock (2007) proclaimed that the demand for grain would probably stay high in the short-run. The prices would rely on the size of the supply, which depend on the harvest. A greater harvest than expected will lead the prices to fall back and then the supply will be lower again next season.

If the food prices continue to stay high in the medium-run, the farmers will have to produce more to suppress the prices or new land for cultivation is needed and the yields must go up. There is land available where cultivation can start almost immediately, as there has been a policy where farmers have been paid not to grow crop to keep the prices up. This can easily be reversed. But in spite of the good profit for farmers, the International Food Policy Research Institute (IFPRI) report that the response tends to be sticky: A 10% rise in prices yields a 1-2% increase in supply.

Based on these confliction currents, forecasters believe that the prices will remain high for as much as a decade. IFRI believes cereal prices will rise by 10-20% by 2015. And the United Nation's food and agriculture organization's forecast for 2016 -17 is slightly higher.

United States Department of Agriculture (2008) believes that the reason for the high food prices is due to weaker dollar, stronger demand, weather related production problems in some areas in the world and increased use of some commodities such as corn for bio energy use. But how much will these increased food prices harm the consumers? The consumers will not be seriously harmed by the increased food prices as at-home-food is less than ten percent of the private consumption expenses in the U.S. (Frazão, E., B. Meade and A. Regmi (2008)). Therefore the agflation will mostly hurt the poor, where the food expenses are the biggest part of the budget. Some countries where a large share of the population is poor have stopped the export of for example rice, which has lead to empty shelves in the American supermarkets.

The food prices will most likely remain high, at least in 2008, and lead to a sustainable negative supply shock.

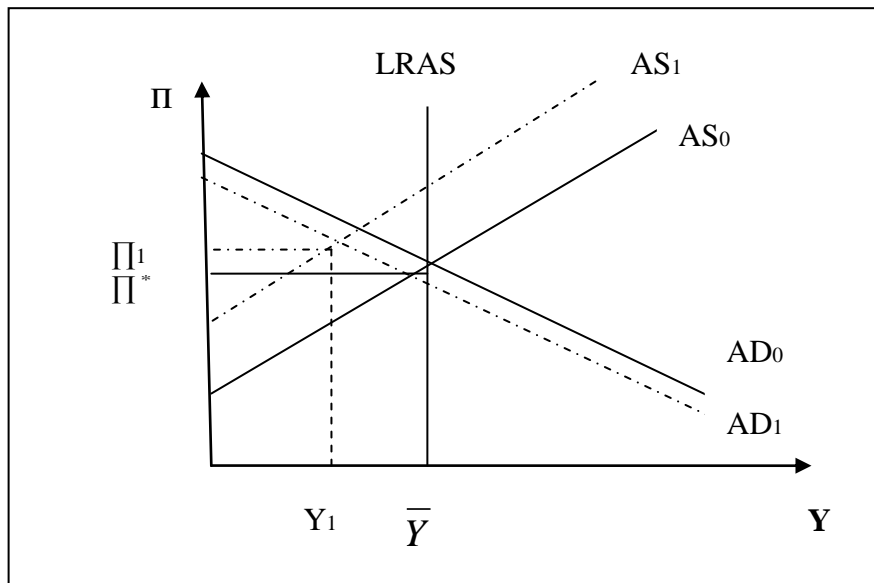
PART C: DISCUSSION

8.0. STARTING POINT FOR THE DISCUSSION

Theoretically the starting point for this discussion is an economy in a short-run equilibrium with a negative shift in both the AS and AD curves compared to the steady state levels, labelled with a zero. The new equilibrium has a negative output gap, both the shift in AS_1 and AD_1 curves contribute to reduce the production. The negative shift in the AS_1 results in higher inflation than the long-run equilibrium but is dampened in the short-run equilibrium by the negative AD_1 shift. Therefore the inflation level is only slightly increased compared to the long-run equilibrium level.

The output-gap in figure 4 is larger than what is reasonable to assume in the real economy today since the GDP has just begun to grow below trend level. The reason for the large impact on the output gap is due to the steepness of the AD curve, which is relatively flat as it reflects an open economy with flexible exchange rate and a monetary policy which is weighting the inflation stabilizing more than the output-gap; recall the size of the b and h.

As the size of the assumed recession is not yet certain, the shift in the AD_1 curve is relatively small compared to the shift in the AS_1 . The AS_1 curve is shifted further up in order to illustrate the record high oil and food prices.

Figure 4: The economy before the stabilization policy action

Chapter 9 will discuss how likely it is that the AS curve will move further up and cause a much higher level of inflation than is observed today in the American economy, given that the AD curve is unchanged. As a consequence of the AS shift the negative output gap will also increase, which will underline the cost of stagflation.

Further chapter 10 will discuss if the stabilization policy actions taken by both the Fed and the fiscal politicians will be enough to either move the AD curve back to its initial long-run level, given that the short-run AS is still shifted up, and lead the American economy into stagflation. Or if the AD will be shifted further out than the long-run equilibrium level and only lead to a situation with high inflation and no recession, given that the AS is still shifted up.

9.0. NEGATIVE SUPPLY SHOCK AND INFLATION

The food and oil prices, which have remained high since January and are projected to remain high at least to the beginning of 2009, are the fundament when I claim that the supply shock will not move back to the initial long-run equilibrium level again soon.

"I don't think you should react initially, say in the first few months, to these kinds of surprises," said William Gavin, vice president at the Federal Reserve Bank of St Louis, who has researched the effects of food inflation effect.

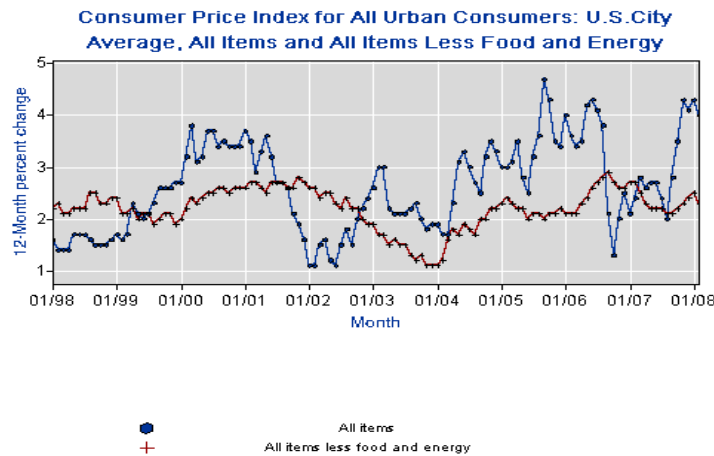
"But once they become embedded you have to react to them."

(Reuters (2007)).

The purpose of creating core inflation is to learn about the underlying inflation trend. The Fed does not react to inflation caused by high oil and food prices. The food prices are subtracted from the core inflation and ignored by the monetary policy as this kind of inflation is assumed to be short-lived and self-correcting. The Federal Reserve policy should only respond to inflation caused by too much growth in money supply and not to transitory shocks. As a result of the highly volatile food prices in the early 1970s and the increasing energy prices later on, techniques were developed to filter out the short-run real effects caused by disruptions in certain markets from the long-run monetary effects. Graph 4 illustrates that the CPI including all items is much more volatile compared to the core inflation (Gavin and Mandal, Federal Reserve Bank of St. Louis (2002)).

Graph 4 illustrates the diversified reaction to the oil price increase in 2001 and 2003 by the core inflation. In 2001 the core inflation continued to grow steadily in deviation from 2003 when it took the opposite direction of the inflation including oil and food. I believe that from 2001 on, the overall goods prices grew smoothly due to the economic growth as the economy was recovering from the recession in 2000.

When the oil prices increased in 2003 as a result of the American invasion of Iraq, the core inflation did not pick up but dropped due to cheap import from China (imported deflation), low real wage accepted by wage takers all over the world and low FFO which led to investment in the housing market (Stiglitz (2008a)).

Graph 4: Consumer price index, all items and all items less food and energy

Graph: Consumer Price Indexes, Bureau of Labour Statistics (2008).

As there is no obvious correlation between the CPI and the core CPI, is it not sufficient that only the inflation is high; the core inflation also needs to be above a certain level in order to claim stagflation. In both the two periods of stagflation, 1973 and 1979, the commodities prices were also high.

What is high inflation? The CPI for all items in January 2008 was 4.3 percent²⁸, which is the upper bound of what is defined as low inflation. For the inflation level to be sufficient to state stagflation, Barsky and Kilian (2000) have suggested it should be high compared to historical standards. But I do not believe that the inflation level today will reach the same levels as in 1980 with a record high inflation level 13.58 percent²⁹ due to the change in monetary policy.

Before the first period of stagflation in 1973, the average inflation level from 1963 to 1972 was at a 3.3 percent level.³⁰ In comparison the average CPI for all items in the period from 1998 to 2007 was 2.6 percent³¹. One explanation for this difference might be the change in monetary policy. The latter period, the action from the Fed has reflected an emphasis for inflation stabilization and I can therefore expect the average inflation level to be lower

²⁸ CPI not seasonally adjusted (Consumer Price Indexes, BLS 2008).

²⁹ Data collected from US Misery Index (2008).

³⁰ For calculation see table 2 in appendix.

³¹ For calculation see table 3 in appendix.

compared to the decade before first period of stagflation in 1973. My reference levels for inflation will therefore be from the period 1998 to 2007.

The first quarter of 2008, the consumer prices have increased an annual rate of 4.1 percent³², which is the largest first quarter average for the period I am considering (Consumer Price Indexes, BLS (2008)).

9.1. Will increased input factor prices raise the core inflation?

This section will discuss if energy and food prices as intermediate input factors will increase the core inflation and at the end briefly touch the question whether the food prices should be included in the core inflation or not as a good predictor for future inflation.

Burda and Wyplosz (2001) suggest that the supply shock variable, s_t , capture changes in non-labour costs as capital, land and intermediate input factors such as unfinished goods, materials and energy. These changes will be captured by the price mark-up variable in the supply shock term, s_t in equation (3)³³ for exogenous supply shocks³⁴. I assume all other variables are kept constant. Higher energy prices will lead to a negative shock and increased inflation through the relation to inflation from equation (5)³⁵.

Intermediate inputs prices are sales prices charged by another firm and will be reflected in the GDP deflator inflations measure and producer price index, PPI. In March PPI increased with 2.3 percent from February and the crude goods increased with 8 percent in the same period. Furthermore the intermediate energy goods index advanced 5.9 percent in March, following a 1.1 percent gain in the previous month. The main factors leading to this raise was diesel fuel, which rose 15.3 percent, prices for jet fuel, residual fuel, liquefied petroleum gas, electric power and home heating oil (Producer Price Index, BLS (2008)).

According to BLS (2008) the considerable increase in the input prices was not proportional to the increase in the consumer prices. The producers absorbed much of the increased input

³² Not seasonally adjusted.

³³ (3) $\Pi_t = E_{t-1}\Pi_t + \gamma (y_t - \bar{y}) + s_t$

³⁴ I will ignore the fact that a supply shock might be endogenous if the fiscal policy is changing the corporate taxes since this is a case which will not be discussed in this paper.

³⁵ (5) $s_t = \ln\left(\frac{m^p}{m^w}\right) + \ln\left(\frac{m^w}{m^w}\right) - \frac{\ln(B/\bar{B})}{1-a}$

factor expenses. The size of the change in the price mark-up depends on profit margins, if there is room for cuts without going bankrupt, and how sensitive the consumers are to the changes in prices. If the producers reduce their own profit and absorb the increased input factor prices, the mark-up variable will be unchanged, the AS curve will not shift and the inflation level will not raise further. But if the raise in the intermediate factor prices is permanent it will eventually end up in a higher price mark-up factor.

How a supply shock might evolve into the core inflation, $E_{t-1}\Pi_t$, depends on the length of the shock. If I assume that the shock will be persistent, it is more likely that it will evolve over in the expectations about the future inflation level. As mentioned in the introduction, food and energy are filtered out of the core inflation as these are products which easily will be affected by changes in demand and supply, as well as exogenous shocks such as unfavourable weather conditions or conflicts, and will not give a good prediction about the underlying inflation. But Gavin and Mandal, Federal Reserve Bank of St. Louis (2002) suggested including the food in the core inflation again as the food prices had stayed stable for about two decades and leaving them out would cause a loss of valuable information. They argued that the inflation in food prices appeared to be an unbiased forecast compared with PCEPI excluding food and energy. Further they tested the forecast errors³⁶ for prices of other components that comprise the PCEPI and food came out best with the smallest forecast error (0.99), while energy came out worst with the largest (10.52). If they are right the increase in the food prices today should be considered as a good predictor for the future inflation; the food prices would tell that the underlying inflation trend is increasing.

Gavin and Mandal, Federal Reserve Bank of St. Louis (2002) claim that the reason for the more stable food prices have been due to improved technology and changed eating habits. The improved technology has both contributed to improve the food delivery system and lead to reduced costs of air freight and refrigeration, which has lead to reduced volatility in the food prices. Furthermore the eating habits of Americans have changed. Consumers are demanding more prepared food from the grocery stores and tend to eat more at restaurants. Of all the food measured in CPI, 44.6 percent is food away from home. In the prices paid for these meals the raw materials are not the main expense but to pay the labour preparing and

³⁶ The root-mean-square error method was used to measure the forecast error (Gavin and Mandal (2002)).

serving the food. As wages paid for these services are more stable than the raw food materials, these prices will be less volatile.

If this is correct I would expect a smaller mark-up change in the restaurant and take-away food sector than for the home-food purchased at supermarkets due to the increased food prices lately. This pass-through of expenses in the supermarkets might reflect the increasing competition and the already low profit-margins which make it challenging to carry the extra costs.

But in reality, both the food-at-home and food-away-from-home are projected to increase by one percent, respectively from 4.0 percent to 5.0 percent and from 3.5 percent to 4.5 percent. According to the United States Department of Agriculture (2008) the retailers will continue to pass on the increased commodity and energy costs to consumers. This is in contradiction to what Gavin and Mandal, Federal Reserve Bank of St. Louis (2002) claimed. How much this affects the stability of the food prices is not certain, and I would therefore still follow the food prices closely as they might contain valuable information.

If the increased food and energy prices remain high or increase further, this will work as an increased price-mark up factor and raise the overall inflation level. In the theory presented in chapter 3, this pass-through to consumer prices was immediate but in reality it will be a lag as many of the products are traded in the forward market and the producers need information about the sustainability of the intermediate input factor price shock before they decide to change the mark-up.

9.2. Core inflation and wage formation

This section will be a discussion whether the increased food, energy and import prices will raise the wages.

Conversation with Harald Magnus Andreassen (2008):

I asked: “*Do you believe it will be stagflation in the American economy in close future?*”

He replied: “*No, because the inflation we see now will not evolve into the wages like it did in the 1970s.*”³⁷

³⁷ The author’s free translation.

The AS curve will shift if the expectations about prices for next period, P_t^e , changes, and not only by the supply shock variable, s , as discussed in the previous section. According to Burda and Wyplosz (2001), P_t^e is the variable which decides the core inflation and is the driving force behind the short-run AS curve after the initial shock. The core inflation contains both forward and backward-looking components. The forward-looking component is the wage takers' prediction about the future price in order to achieve the desired real wage level, and the backward-looking component is trying to correct the past expectations errors.

Given the nominal wage level and the increased food and energy prices, the real wages are reduced. The Monetary Report (2008) informs that the headline core inflation (measured in PCEPI) was only slightly below the 2006 level. Even though the wages and salaries rose briskly in nominal terms over the second half of 2007, the growth in the real disposable income³⁸ was lagging. The purchasing power of the nominal gain was eroded due to the energy-driven advance in the consumer price inflation in the same period. Especially the gasoline price increase in 2007, with an annual rate of 29.6 percent, the highest since a 30.1 percent rise in 1999, was felt directly by the end users ("U.S. Export and Import Price Indexes", BLS (2007)).

In 2007 the increases in the real wages were modest for most workers. Even though the aggregate labour productivity raised, was the increase of the average hourly earnings³⁹ adjusted for inflation only half a percent point total for 2007. For some workers the real wage actually declined, e.g. for the manufacturing and retail workers. All in all did the household balance sheet for 2007 remain in good shape, except for the weakening towards the end of the year (Monetary Policy Report February (2008)).

The continuously increasing energy prices in addition to increasing food prices contribute to drive the real wages down. If the real wage is going to reach its desirable level, the wage takers will demand higher nominal wages next period, not only for correcting the past error in the end of 2007 but also to take into account a possible future raise in energy and food prices. The nominal wages will be set according to the expectations about which long-run level which will eventually be reached. If the wage takers believe that all goods and services will continue to increase due to the weak dollar and more expensive imports and that the oil

³⁸ Disposable income is after-tax income adjusted for inflation (Monetary Policy Report February (2008)).

³⁹ Average hourly earning is a measure of wages for production or non-supervisory workers (Monetary Policy Report February (2008)).

and food prices will remain high and with a lag will evolve into the end consumer prices, the AS shift will be more sustainable compared to the shift caused by only a shock.

Will the expectations about the price change? The more expensive import, food and energy prices will drive the expectations up but the increased number of unemployed will drive the expectations down. If the high oil prices will affect the productivity of the labour negatively the expectations will also be pressed downwards. The persistence of the food and energy prices is decisive for whether the expectations about inflation will change or not. But since the food and energy shock has lasted at least the first quarter of 2008 and is projected to continue out the year the workers are likely to demand higher nominal wages.

The imported inflation through finished goods will directly affect the CPI, and will lead to increased daily expenses. In the Monetary Policy Report presented in February 2008, the increased inflation due to higher oil and food prices was not expressed as the prime concern for the board of governors in comparison to the deflation in the residential housing market, the sub prime loan crisis and turmoil in the financial markets.

But when the unexpectedly high U.S. import numbers were released 11th of April 2008, presenting an increase in the import prices from February to March with 2.8 percent⁴⁰, the concern grew. Both petroleum and non-petroleum imports contributed to the advance. The petroleum imports increased with 9.1 percent compared to February. On an annual basis the petroleum prices advanced with 60 percent from March 2007 to 2008, compared to 3.1 percent raise between 2006 and 2007 (U.S. Export and Import Price Indexes, BLS (2008)). The 3.6 percent advance in the price for non-petroleum prices was mainly caused by a jump in unfinished metal prices, natural gas, finished metals and chemicals. In particular, import prices from China increased in March, rising 0.7 percent compared to a 0.1 percent gain in the previous month. The increased fuel prices increased the imports from Mexico, Canada and the European Union (BLS (2008)). The advance in the import prices is not only due to the increased energy prices but is also influenced by the depreciation of the dollar.

These are increased costs which will directly affect the purchasing power, as the prices for the goods included in the CPI basket will increase as the nominal wages are fixed. Both the non-petroleum prices and the export prices had the largest one-month increase for the index

⁴⁰ Not seasonally adjusted.

since 1988⁴¹, with respective increases of 1.1 percent and 1.5 percent from February to March 2008 (U.S. Export and Import Price Indexes, BLS (2008)). Might this be an indicator of higher inflation in the future?

The expectations about future inflation raise is dampened by the unemployment numbers that were released by the BLS (2008) in April, which were higher than expected and rose from 4.9 in February to 5.1 in March 2008. It was a loss of 80 0000 on the non-farm payroll list and over the three last months the employment on the payroll list has declined by 232,000, mainly in the construction and manufacturing sector and in the employment services (Employment Situation Summary, BLS (2008)). If the loss of jobs is due to the early phase of recession, the expectations for future inflation will decline.

From theory and the Phillips curve, recall equation (2)⁴², the relation between inflation and unemployment is described as declining. If the unemployment exceeds the natural level of unemployment, the inflation will be reduced in the short-run, given that the expectations about future inflation is constant and the supply shock variable is on its mean value, zero.

Oil will not have as large impact on the productivity as in the 1970s as there has been developed new and energy-saving machines which are more productive with less energy, both as an answer to the environmental concern and to the last stagflation period. Another reason why the oil prices might not have just as large impact on the economy today is that the economy has shifted more away from industry and towards service. But on the other hand the oil and petroleum prices are correlated and therefore the higher oil prices will harm the economy and households through higher transportation expenses.

Higher wages and prices here will only harm the domestic consumers if the products are of non-traded goods or are now substitutes for the more expensive imported goods. However, the fact that 76.1 percent of those in employment work in the service sector will contribute to increase the prices domestically since services cannot easily be exported but on the contrary are highly geographically fixed.

⁴¹ The monthly price changes were published for the first time in 1988 (BLS 2008).

⁴² (2) $\Pi_t = E_{t-1}\Pi_t + \alpha(\bar{u} - u_t) + s_t$

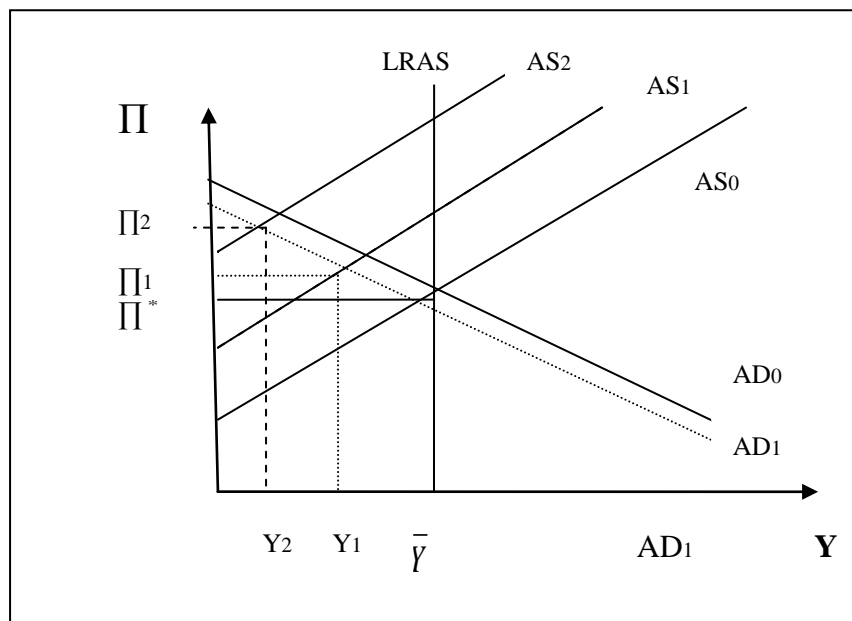
As mentioned above the real wage has not been the same for all sectors. The export sector has had a price advantage on the international market due to the weak dollar. The U.S. export has picked up since 2005; in real change the trade balance has been positive. In 2007 exports added almost 1 percentage point to the GDP. This is not only due to the favourable dollar but also to the still-solid growth of foreign economies (Monetary Policy Report (2008)). Not all sectors are just as vulnerable for having to lay labour off. In order for the export producers to meet the increased demand for their products from abroad they will increase their demand for labour. As the capital is both expensive due to high market rates and it is assumed to be constant in the short-run according to the theory presented, the marginal productivity of the labour will be decreasing and therefore more expensive. It is not likely that there is full substitution in the labour market, so the ones who are unemployed in the construction sector cannot step in and work in the export producing sector, which can lead to higher wages in this sector to attract labour. This can in turn lead to a skewed wealth effect in the economy which in this sector will contribute to drive up the prices if the product is sold at home as well. In addition the increased nominal wages in this sector will lead to higher real wages.

To summarize chapter 9, the increased food and energy prices, which are exogenous shocks and captured by the supply shock terms, will most likely only lead to a temporary shock and therefore the s will be zero again in 2009 and the AS will move back to its initial long-run equilibrium level. Because this inflation is not caused by monetary actions, the monetary policy will not react to it and it will sort itself out. How the inflation and production levels are then depend on whether or not the recession has passed and the AD is back in the long-run position.

But on the other hand there are two ways that a negative supply shock might evolve into higher core inflation. Firstly, the increased food, energy and import prices will lower the real personal disposable income and wage takers will demand higher nominal wages with a lag through the expectations about future prices. Secondly, more expensive input factors can drive the overall commodities prices up due to increased costs for the producers which are passed over to the costumers. In these two cases, when the core inflation drives the AS up, the inflation will be more persistent. If the shift of the AS was permanent, the long-run curve would shift to the left. In figure 5 this is illustrated by another supply shock in period 2 and the AS curve is shifted further upwards. This has led the economy into a deeper stagflation

where the inflation has escalated compared to the inflation target and the inflation level in period 1. The actual production is far from the trend level and the economy is in a deep recession.

Figure 5: AS shifts up due to changes in core inflation or increased food and energy prices



But if the Fed in addition goes out strongly and communicates that they will depress any raising inflation and they have credibility from the public, will this in addition to the increased unemployment contribute to lower the inflation expectations. Then the economy will not end in the same situation as it did in the 1960s/70s when the inflation was baked into the expectations.

In theory the AS will not continue to shift out after the correction for the past inflation expectations errors after the first interest rate increase. For an open economy will the effect of an increased interest rate most likely appreciate the dollar and the imported inflation will be reduced. In addition a stronger dollar will slow down the foreign demand for American goods as the currency has become more expensive and the high inflation will make domestic products relatively less price-competitive on the international market.

The inflation is believed to be modest according to projections referred to in the Monetary Policy Report for February (2008), where most participants believed the personal

consumption expenditure (PCE) inflation would be in the range between 2.1-2.4 percent and the core PCE 2.1.-2.2 percent, but these projections were adjusted up from October 2007.

10.0. STABILIZATION POLICY AND INFLATION

Stabilization policy can be divided into monetary and fiscal policy. I present both policies below, as well as how they might contribute to increase the inflation level by stimulating the economy today. Not all economists, in accordance with Adam Smith, believe in utilizing stabilization policies and are of the opinion that the market itself created this situation and that it should therefore find its own way out of it.

10.1. Monetary policy and inflation

In 1977 the goals for the monetary policy were prescribed in the Federal Reserve Act: “To promote ‘maximum’ sustainable output and employment, and promote ‘stable’ prices” (The Federal Reserve Bank of San Francisco (2008)). More specifically, according to The Federal Reserve Bank of San Francisco (2008), the Fed has responsibility for four broad categories: 1) to pursue maximum employment, stable prices and moderate long-term interest rates; 2) to supervise and regulate banking institutions to ensure the safety and soundness of the nation’s banking and financial system; 3) to maintain the stability of the financial system and contain systemic risk that may arise in financial markets; and 4) to provide financial services to depository institutions like the U.S. government and foreign official institutions.

The monetary policy instrument is the federal funds rate overnight (FFO), which is the rate that member banks lend to one another overnight and which indirectly regulates the supply of money. Because of the lags in the wages and prices, the monetary policy is effective in the short and the medium-run but neutral in the long-run as the prices then are fully flexible.

The intention behind the FFO lowering between January and March 2008 with 1.33 percent⁴³ was to stimulate the economy. I will discuss the effect of the FFO lowering through the transmission mechanism where the FFO will affect the economy through the direct currency channel, demand channel, expectations channel to inflation and real interest rate to aggregate demand. According to theory a lower FFO would increase the production and increase the inflation. But will the effects be the same on the American economy today?

⁴³ Current level on the FFO is 2.61 percent in March 2008 (The Federal Reserve 2008).

10.1.1. Expectation channel to inflation

The traditional instrument of monetary policy has been the FFO. Today is the communication between the Fed and the public believed to be the most effective tool to secure low and stable inflation guided through the expectations channel. As the Fed cannot set the real interest rate directly, since it cannot set the inflation expectations directly, monetary policy has the greatest effect through the expectations. In October 2007 the Federal Open Market Committee decided to expand the medium-term economic forecasts and to release this information to the public (Kohn (2008)). If this more open communication form will improve the relationship of trust between the Fed and the public, the expected and actual inflation will be near equal and the expectation-bias close to zero.

For the Fed to be able to concentrate on reaching its goals and staying credible, it is necessary to be independent from the government, since the government's wishes sometimes can conflict with the Fed's. Further would the change of governments and following changes of policy regimes tear down the credibility, as for example a socio-democratic government would decide that they wanted to have close to zero unemployment at the cost of high inflation, whereas the next and more conservative government would like to keep the inflation at target at any cost. The change of monetary policies might be confusing for the public and the probability that they will set their expectations in accordance with the Fed is smaller. Therefore the Fed is independent and in its best position to balance between the short-run and long-run objectives.

Without credibility, the Fed will lose its impact on the expectations formations as in the 1970s. The reasons were several incidents of go-stop monetary policy and lack of a nominal anchor. This policy was the driving force for the historical high levels of inflation. The Fed could not decide which goal to stabilize and therefore tried to stabilize both in some periods. Most likely the politicians have learned from previous mistakes and go-stop policy will not be practiced again.

Is the Fed clear in their communication and their overall tasks? Did they confuse the public and lose some credibility when they helped JP Morgan Chase bail out Bear Stearns? Victims of the sub prime loan mortgages and people who were forced to sell their homes have protested against the buy out. They claimed that if the Fed bought up the debt of a bank, then

the Fed should do the same for them too. Meyer, as referred to by Godoy (2008) claim that if the Fed did so they would run a large risk of moral hazard.

Was the Fed spreading outwards their responsibility area? Should they instead have bailed out the home owners? The Fed is assigned to maintain the stability of the financial system and contain systemic risks that may arise in financial markets. If the Fed did not bail out Bear Stearns, which was at risk of going bankrupt, the consequences of not supplying JPMorgan with credit would be more extensive. The reason is that Bear Stearns was more than just a bank it was “counterparty”, a middleman for transactions. Furthermore, private persons had their retirement funds and hedge funds placed there and smaller banks could trade their stocks and securities through them (Godoy (2008)). This underlines the importance for the Fed to be clear about what their real objectives are.

The best way of building credibility is to have earned it through previous experiences where they kept to the rules and did not under any circumstances deviate from them. When the credibility is high, the expectations themselves will move the economy towards the Fed’s target, only by a smaller decrease. Not too large and too sudden shifts in the FFO are preferred because by the time the FFO has effect on the economy the initial shock that was reacted on might have passed away or a new shock might have occurred and changed the economic picture. The predictions made now about what is best in the future runs a great risk of being mistaken. Therefore I question whether the size of the cut in January is an indicator of lack of credibility, because if they did have credibility such a large cut would be excessive.

As the history shows a growing concern for stabilizing the inflation in the American economy, the Fed does not follow any inflation target policy. The Fed defines “appropriate monetary policy” as:

“The future policy that, based on current information, is deemed most likely to foster outcomes for economic activity and inflation that best satisfy the participant’s interpretation of the Federal Reserve’s dual objectives of maximum employment and price stability.” (Monetary Policy Report 2008).

In the Monetary Policy Report (2008) it is also written that the further actions taken by the Fed will depend on the evolution of the economic growth and inflation. Based on this I will state that the Fed is following a discretionary policy. The Fed is trying to reduce the size of the negative demand shock by smoothing the effect over several periods, by ignoring the inflation threat and by lowering the FFO as this is the most urgent problem for the economy. According to the Monetary Policy Report 2008 the target rate for FFO has been lowered from 5.25 percent to 3.0 percent based on the circumstances in the financial market and facing the up-side risk of increased inflation.

The downside by utilizing a discretionary policy is that it might reduce the Fed's future ability to affect the inflation through expectations. The public might expect the Fed to help them out next time when it is needed by stimulating the economy and instead tolerate a higher level of inflation. Therefore, if the inflation is picking up soon and needs to be reacted on, how will the public form their expectations?

Does the size of the cut in January indicate that the economy is in larger trouble than the Fed would like to admit? If the cut rises suspicions about a more serious recession it might lead to modest inflation expectations in the future and contribute to dampen the inflation.

If the cut in the FFO makes the public believe that the Fed will stimulate the economy and avoid a large recession on the cost of higher inflation, the AD curve will shift out due to a change in the ε or v which are the private sector's expectations about the future, recall equations (7), (8) and (12), and they will increase both the investment and consumption. The size of the shift will depend on how bright the expectations about the future are.

On the other hand, if people do not trust the Fed and are afraid that the imported inflation will drive up the inflation in the future and the FFO with it, they will not expect the income to increase in the future and the investment and consumption will be affected negatively. If this is the case, the FFO will not have any stimulation effect on the economy and the AD will remain unchanged or even drop.

10.1.2. Demand channel to inflation

The expected reaction time is one to two years before FFO has an effect on the inflation through demand. As the FFO is lowered, the aggregate demand should increase. The business will produce more due to cheaper credit and will therefore need more labour, which will reduce the unemployment, increase the wages and end in higher prices (wage-price spiral). The income will increase, as there is a lag from the nominal wages is set and to the prices are changed. Thus the real wage will be increased, which will lead to increased consumption, which again will increase demand for products and labour and thus drive up the wages (multiplier effect).

The negative real interest rate today will affect the demand in the economy if and only if also the market interest rate is reduced. Rudebusch, Federal Reserve Bank of San Francisco (2008) writes that despite that the Fed has eased the monetary policy, the spread has widened between the FFO rate and the market rate. Because of the difficulties in the market for mortgage-backed securities, the typically conventional mortgage rates have increased from running 150 basis points above the ten-year treasury yield to now running 250 basis points above. Also the jumbo rates, which usually run about 175 basis points above, are today running about 150 basis points higher.

Not only has the credit become more expensive, but banks have also become more restricted about giving out new loans. I think that the situation with both more expensive and more restrictive credit will not increase the consumption and the investment, and I therefore believe that the AD will stay unchanged.

10.1.3. Direct exchange rate channel to inflation

It takes about one year to see the effects of the direct exchange rate channel to inflation. One reason might be that the exchange rate is constantly changing and therefore only the large changes might be responded to; another reason might be that some goods are traded in the forward market.

The interest rate difference between the U.S. and other foreign countries is one of the reasons why the American dollar has depreciated. The weak dollar has lead to more expensive imported products. Since finished imported goods are measured directly in the CPI, the inflation will increase.

Since 2003 China could export deflation. At that time the oil prices already started to increase, but due to high productivity the prices could be kept low. This situation has changed as China is today struggling with increasing domestic inflation, current level around seven percent, and China is therefore today exporter of inflation instead. According to the BLS' "U.S. Import and Export Price Indexes" the import prices from China from February to March 2008 increased by 0.7 percent. The index was up 0.9 percent since January. Prices on imports from China rose 4.0 percent between March 2007 and March 2008, the largest annual increase since 2003 when it was first recorded.

The change in Chinese exchange rate policy has made the U.S. more vulnerable for imported inflation from China. Earlier China had pegged their Yuan to the dollar to always be able to ship cheap products to the U.S. But as this pegging was slacked due to strong encouragement from the U.S., the dollar has also depreciated towards Yuan, which contributes to give an extra strong effect of the imported inflation. Furthermore import prices from Japan, Canada, Mexico and the European Union increased in March and the increases were led by higher fuel prices from all countries and regions except Japan.

How fast the effect from the exchange rate on the inflation is depends on competition in the sector and the profit-margins in the traded good sector. If the imported goods also are produced domestically the imported goods will now be less competitive in price. The demand for imported goods will be twisted away and towards domestic goods instead. If this leads to less import the effect on the imported inflation will be reduced.

Further are the profit margins of the importer if there is domestic competition deciding for how much of the increased prices of the imported goods price which will be evolved over in the end price for the consumer. If the profit margins are large and there is great domestic competition, the importer will reduce its price mark-up and cover the increased cost in the short-run. But if the dollar continues to be weak more of the costs will be rolled over to the customers. The reality is that profits for the business have been large. The Beige Book for April 2008 reports that even though the import expenses of input products have increased, the end price has not increased proportionally. Therefore have not the CPI yet increased as much as the input factors cost.

10.1.4. Exchange rate channel to aggregate demand

The expected effect of the exchange rate channel to aggregate demand is about one year and is the fastest of all channels. As the dollar depreciates the export will increase as the U.S. is getting a price advantage. This price advantage will only hold if the price level in the U.S. is unchanged; in other words that the purchase power parity does not hold.

But in the long-run the increased demand for domestically produced products will drive up the overall domestic inflation. Especially the export sector is feeling the increased demand for their goods. The Monetary Policy Report (2008) reported the smallest change in imports since 1999 and contributed to a net export of 11 percent on an annual rate. Also foreign tourism is picking up as it is getting relatively cheaper to travel and shop in the U.S.

10.1.5. Real interest rate channel to aggregate demand

The real interest rate channel also takes one year before it has effect on the aggregate demand. Reduced real interest rate will increase demand through the substitution effect, the effect of changes in relative prices. In the case of a lower interest rate, the price for capital and consumption will be relatively cheap due to cheaper credit or less alternatively cost of having the money in the bank. The alternative gain by investing in other assets is more profitable compared to saving in the bank.

If the market interest rates also follow the FFO, this effect will lead to increased demand. But if the market rates continue to stay high, the AD will not move out but remain at the same level. Those who are not in debt and want to make investments will choose to do so in solid goods such as gold, oil and metals; since the financial markets are so unstable these are the best alternatives. The total effect of the lowered FFO through the transmission mechanism depends on the lags in the market interest rate and how the market receives the news about the lowering of the FFO and chooses to form its expectations about the future.

The increased export due to weak dollar is clearly positive as it will demand labour and contribute to keeping the GDP growth up. I do not believe that the lowered FFO alone will be enough to move the AD above the old equilibrium level, maybe only enough to move it just below the old level. The AD will have more an off-setting effect on the negative expectations in the market. Since the AD curve is relatively flat, the shift in the AD will contribute positively to reduce the output gap but will not affect the inflation just as much.

However, since the U.S. is an open economy, the inflation that we see today will stem from imported inflation and higher energy and food prices, not mainly be caused by the domestic monetary policy.

10.2. Fiscal Policy

According to the Keynes supporters, the fiscal policy has a faster and more direct effect compared to the monetary policy (Blanchard (1999)). Expansive fiscal policy by increasing demand has been an active tool to avoid or speed up the economy when it runs towards a recession.

The fiscal policy intervenes in the economy in two ways: through the taxation law and through governmental spending. It is either the president or the congress that can instigate a change in the tax law. The taxation law contributes to decide how much the households have as disposable income and therefore indirectly influence the private demand. Except from when the corporate taxes is changed and will lead to a supply shock.

President George W. Bush has distributed a “stimulate package” at the size of one percent of the GDP, which equals 150 billions dollars split between 130 millions tax payers, to avoid a deep recession. The intention is to avoid a reduction in the private consumption, which is the driving force in the American economy and will stimulate the GDP through increased demand. About 117 million low and middle-income households, 20 million senior citizens living of social security and 250,000 disabled veterans are the receivers (CNN (2008)). It is a one time payment which is based on the income level for 2007. To be qualified for receiving the full rebate the single tax payers must have had an adjusted gross income below \$75,000 and will receive a tax rebate of \$600 and joint filler must have below \$150,000 and will receive a rebate up to \$1,200. In addition will parents receive \$300 per child under the age of seventeen. Between 28th of April and 11th of July all should have received their checks.

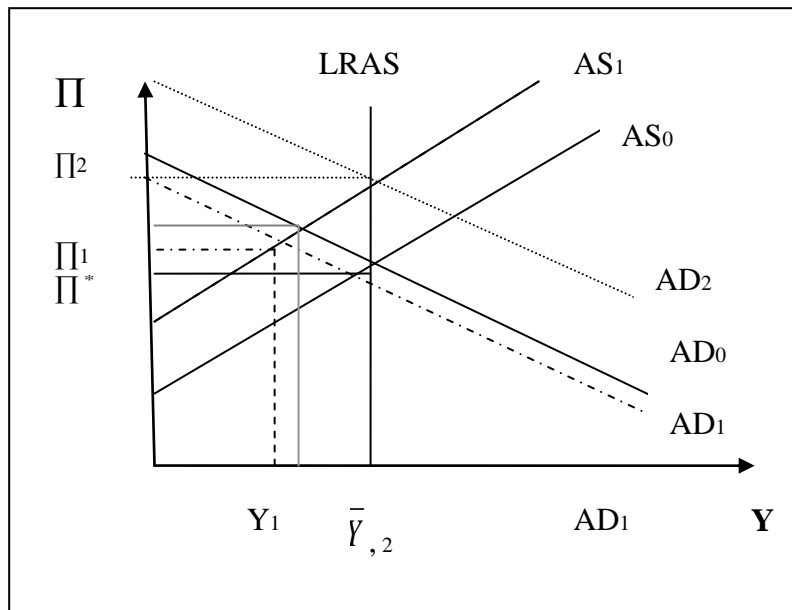
The critics are that all the extra income will not be spend on consumption but on repaying loans. The high level of private consumption since 2003 has for many households been loan-financed consumption and not due to higher incomes. The share of the increased disposable income will be used to finance debt or saved to smooth consumption in the future due to dark expectations about the future.

Stiglitz (2008b) argues that increasing the benefits for the unemployed will be the best way of stimulating the economy, as they will spend it right away. Theoretically, according to the Ricardian Equivalence, a cut in current taxes which is not accompanied by a cut in present or future public spending will not have effects on the private consumption. Because the consumers are perfectly foresighted and know that if the taxes are reduced now and not the governmental expenses, the future taxes will increase (Sørensen and Whitta-Jacobsen (2005)). If consumers act according to the Ricardian equivalence, the AD curve will not shift, or at least not enough to move back to the original equilibrium level.

Stiglitz (2008b) argues that the fiscal policy should rather be used to increase governmental spending instead of tax cuts. By increasing governmental demand through e.g. building new roads, improving the infrastructure and expanding the education sector, new jobs will be created, people will be able to keep their current jobs, demand for domestic resources and services will increase and it would be more likely to avoid a deep recession (Stiglitz (2008b)). Or if the Bush administration instead had eased the producers' taxes, it would lead to a positive supply shock and the producers would increase their production and therefore demand more labour.

A down side by using fiscal policy is the increased deficit on the already large American current account deficit, as the U.S. has to loan-finance in order to cover the stimulation package. If the fiscal policy really will manage to achieve the desired effect to shift the AD out enough to get the production back on trend is ambiguous. The tax cut is only a one-time payment; thus it is dependent on increased consumption in order to succeed in stimulating the economy now. If the tax receivers will not spend the money but save them or repay debt, the output and unemployment will not change.

For the stabilization policy to contribute to increase inflation enough to state stagflation, given the negative supply shock, the AD curve will have to move back to the long-run, AD_0 position in figure 6 illustrates. Then the duration of the stagflation period will depend on the persistence of the supply shock.

Figure 6: Stabilization Policy leads to positive shifts the AD curve

In order to move the economy out of the recession, the AD curve will need a large outward shift above the old long-run level as illustrated in figure 6 by the shift in period 2, the dotted line. In this new equilibrium the output gap will be zero but the inflation will be even higher compared to if the AD only shifted back to the original level. The danger in such a situation is that the stabilization policy will fear the extremely high level of inflation and increase FFO to deflate the economy. As the production's reaction time to this increase is faster than the inflation, the result will be a negative output gap at the same time as the inflation is lagging at a high level and the economy will experience a period of stagflation.

The economic situation of America is a state of emergency that needs to focus on stabilizing the production and the unemployment in the short-run and fight the inflation in the long-run to avoid long-run losses in terms of high long-term unemployment. If there were taken no stabilization actions at all the AD curve would perhaps have shifted further downwards and created a deeper recession.

But on the other hand such actions will increase the inflation and if the inflation is high enough and the monetary politicians do not react, it will harm the credibility of the Fed and it will be more challenging in the future to fight inflation through the expectations channel.

11.0. CONCLUSION: Living the 1970s all over again?

I believe it is the combination of the two theories of stagflation that might lead the American economy into stagflation. It started in 2000 when the interest rate was lowered to speed up the recovering period of the recession. The FFO was kept low until it reached the bottom in 2001 at the level of 0.98, when it slowly started to pick up again but continuing to stay below two percent until 2004. As the economy grew, the inflation increased. From 2004 to 2005 the annual CPI not seasonally adjusted rate increased to 3.4 percent, which was the highest CPI level in the period between 1998 and 2007. The low interest rate and new loan structures led to easy access to cheap credit and fuelled the housing market in the same period.

Because of the increased inflation, the interest rate was increased to suppress the inflation and improve the current account balance. In 2007 FFO peaked at 5.26 percent. The housing market stopped the remarkable growth in 2006 and led to turmoil in the financial market in the end of 2007 start of 2008 which had lent money based on the expectations about sustainable high or increasing housing prices. The Fed lowered the FFO again to stimulate the financial market and help the households in debt. In addition the fiscal politicians provided a stimulation package whose purpose was to contribute to speed up the economic contraction. Time will show whether these stabilization actions will be enough to boost the economy and avoid a long and deep recession.

But at the same time the economy is challenged with an upside risk, driving the inflation further up. The economic growth since the early twenty first century has been world wide and large countries as China and India started to increase their demand for energy for production, heating and transporting. The energy prices were driven up by lower oil supply from OPEC, lower storages than expected, higher production costs and the depreciation of the dollar. The concern for the environment grew and the government subsidized the development and the fabricating of ethanol as bio fuel which lead to an increased demand for corn. Also countries where larger parts of the population had become wealthier led to increased demand for food and meat, which again led to increased demand for corn and wheat to feed animals and as basis products for meals. The supply could not meet this increased demand and it led to a negative supply shock for food. It is discussed by economists, as for example Bernanke et al (1997) whether such a kind of supply shock is

endogenous or exogenous, as it is the high liquidity which has led to the increased demand initially.

To sum this up do I believe that the early recession experienced today is due to previous monetary policy actions and the inflation is due to a negative supply shock. I have already made the assumption that the economy is in an early phase of recession. How likely it is that the inflation will continue to increase and lead to stagflation depends on the AS curve and the persistence of the supply shock. If the changes in the food and oil prices are only temporary, the AS curve will shift back to LRAS and given the recession the inflation will not be higher than in the long-run level.

But on the other hand if the supply shock will lead the expectations about the inflation to change, the AS curve will continue to stay in a negative shift or move even further up and lead to higher and more sustainable inflation as the core inflation is increased. The wage development is pulled in two opposite directions: upwards due to increased living expenses and downwards due to higher unemployment. If the wages should increase, it is more likely that we will experience a period of stagflation, as the negative shift will be more persistent.

The definition of stagflation is vague. Officially it only states that it is a combination of high inflation and low GDP and is illustrated with the only large incident in the 1970s and 1980s. However, as the policy regime has changed and it is more focus on stabilizing the inflation now than then, it is not reasonable to expect that the inflation will reach the same level of inflation as experienced then. Hopefully the Fed has gained some wisdom from previous mistakes in 1970s and 1980s and will therefore not utilize go-stop monetary policy, as it reduced the credibility of the Fed and drove the inflation up instead.

Due to the lags in the wages and the prices, it is still too early to predict remarkable increase in the inflation yet and therefore too early to state any stagflation. It is also too early to state a recession, as the American economy might manage to recover due to the stabilization policies and increased export. GDP numbers for the first quarter of 2008, released the 30th of April, showed that the economy was still growing by 0.6 percent (Gross Domestic Products: First quarter 2008, BEA (2008)).

I believe that the largest possibility for a period or several periods of stagflation is if the inflation increases further and the Fed has to increase the interest rate to target inflation. That will reduce the economic growth and lead to a negative output gap. At the same time the inflation expectations will continue to increase due to persistently high food and energy prices. Whether or not the Fed will succeed in deflating the economy quickly and avoiding a period of stagflation depends on the creditability the private sector has to the Fed.

Is the American economy heading towards stagflation? I do not know. The economy is a living animal lead by psychology and changes daily due to the expectations. All I can do is to wait and see.⁴⁴

⁴⁴ If you are interested in stagflation in general, I would suggest as a hint that you keep track of the Icelandic economy in the close future.

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Table 2: Annual CPI from 1963-1972

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Table 3: Annual CPI for all items from 1998-2007

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Graph 2: FFO annual 1970 to 1987

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Graph 4: Consumer price indexes

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Graph 5: The American Housing Market, growth represented in percent

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Graph 6: Personal saving rate

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APPENDIX

Explanations of symbols:

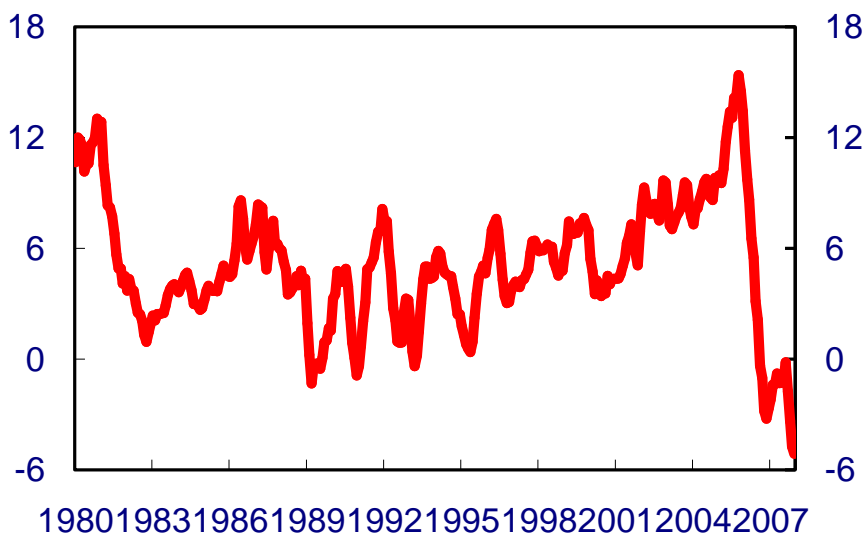
- \bar{u} : The long-run level of unemployment
- π^* : Inflation target level
- π : Inflation level
- $(1+\mu)$: mark-up factor
- \bar{y} : Production capacity
- \bar{r} : Real interest rate on the long-run level
- B : Technology factor
- b : Weighting of keeping the out put on target
- C : Consumption
- $D = C + I$: Total private demand
- G : Governmental spending
- h : Weighting of keeping inflation on the target
- I : Investment
- i : Nominal interest rate
- M : Money
- P : Price
- P_t^e : The expectations for the price is set before the actual price is set
- r : Real interest rate
- T : Tax
- u : Actual unemployment level
- Y : GDP and output
- y : Production, output, GDP
- ε : “State of confidence”, expectations about future growth of income and demand

Acronym list:

- AD : Aggregate demand
- AS : Aggregate supply
- BEA: Bureau of Economic Analysis
- BLS: Bureau of Labor Statistics
- CPI : Consumer Price Index
- EIA: Energy Information Administration, Official Energy Statistics from the US Government
- FFO: Federal Funds rate Overnight
- GDP deflator: Gross Domestic Production deflator
- GDP: Gross Domestic Products, the total value of all final goods and services produced within that economy during a specified period.
- IEA: International Energy Agency
- LRAS: Long-run Aggregate Supply
- OECD: Oil Export Countries Development
- OPEC: The Organization of the Petroleum Exporting Countries
- PCE: Personal Consumer Expenditure
- PCEPI: Personal Consumption Expenditures Price Index
- PPI : Producer Prices Index
- SRAS: Short-run aggregate supply
- SSB: Statistisk Sentral Byrå
- The Fed: The Federal System, The Central Bank of the United States
- The U.S.: The United States

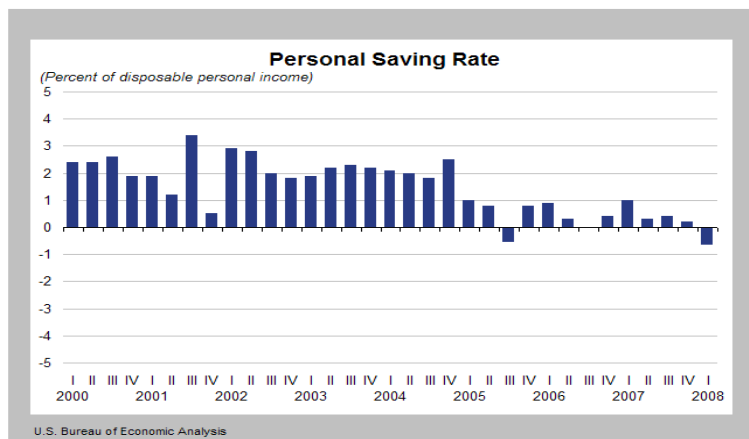
Tables and graphs:

Graph 5: The American Housing Market, growth represented in percent



Graph: Norges Bank (2008)

Graph 6: Personal Saving Rate



Graph: U.S. Bureau of Economic Analysis (2008)

Table 1: The US Misery Index- from 1948-2007














































1961	7.76		Kennedy
1962	6.77		
1963	6.88		Johnson
1964	6.44		
1965	6.10		
1966	6.80		
1967	6.62		
1968	7.83		
1969	8.95		Nixon
1970	10.82		
1971	10.25		
1972	8.87		
1973	11.02		
1974	16.67		Ford
1975	17.68		
1976	13.45		
1977	13.55		Carter
1978	13.69		
1979	17.07		
1980	20.76		
1981	17.97		Reagan
1982	15.87		
1983	12.82		
1984	11.81		
1985	10.74		
1986	8.91		
1987	9.84		
1988	9.57		
1989	10.09		Bush, G.H.W.
1990	11.01		
1991	11.10		
1992	10.52		
1993	9.87		Clinton
1994	8.71		
1995	8.40		
1996	8.34		
1997	7.28		
1998	6.05		
1999	6.41		
2000	7.35		
2001	7.59		Bush, G.W.
2002	7.37		
2003	8.26		
2004	8.21		
2005	8.48		



Table: The United States Misery Index 2008

The blue part of the bar represents the Unemployment Rate and the red part represents the Inflation Rate.

Table 2: Annual CPI from 1963-1972

Year	CPI annual seasonal adjusted
1963	1,2
1964	1,3
1965	1,6
1966	3,0
1967	2,8
1968	4,3
1969	5,5
1970	5,8
1971	4,3
1972	3,3
10 years	Sum: 33,04
	Annual Average: 3,30

Source: US Misery Index based on numbers from BLS.

Table 3: Annual CPI for all items from 1998-2007

Year	CPI annual (not seasonally adjusted)
1998	1,6
1999	2,2
2000	3,4
2001	2,8
2002	1,6
2003	2,3
2004	2,7
2005	3,4
2006	3,2
2007	2,8
10 years	Sum: 26
	Annual average: 2,6

Source: Annual CPI numbers for all items collected from BLS 2008