The Impact of Fiscal Policy
- The Case of Denmark 2009-2010

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2010
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1. Problem Statement

The first part of the study focuses on describing the discretionary expansionary fiscal policy conducted in Denmark in 2009 and 2010. This will be seen in relation to the current economic conditions in Denmark and the severity of the crisis, with respect to the output gap, the automatic stabilizers, and how the expansionary fiscal policy affects the general government budget balance. This will provide a brief and general description of what expansionary fiscal policy is and how it affects the Danish economy.

As the effects of expansionary fiscal policy hinges on the scale of the fiscal multiplier, the second part of the study will be a literature review of theories and empirical estimates of the fiscal multiplier. First, I will briefly describe the following theoretical frameworks: the traditional Keynesian theory of discretionary fiscal policy and following contributions, that is the contribution about investments from business cycle theory by Samuelson’s Oscillator model, the contribution about consumption by Friedman’s Permanent Income Hypothesis and Modigliani’s Life-Cycle Theory of consumption, and the new Keynesian theory of discretionary fiscal policy. The latter will be further elaborated through the current debate about the effect of the fiscal stimulus package in America. The scale of the multiplier is very difficult to estimate and for this reason it is useful to make a literature review of the various ways in which to estimate the multiplier and what the economists think is important to consider when estimating the effects of discretionary fiscal policy.

Further, I will present a small and very simple model for estimation of the fiscal multiplier. I will describe the data and the model specification for my regression analysis. The model is inspired by Samuelson’s Oscillator Theory and Friedman’s Permanent Income Hypothesis.

The Economic Council, among others, evaluates the effects of policy interventions in Denmark, by use of the SMEC model. For a further analysis of the framework of the traditional Keynesian models and new Keynesian model I wish make a comparison of the SMEC model and the Smets-Wouters model. At last, I will make an evaluation of the effects of discretionary fiscal policy, with respect to the scales of the multipliers.
1.1 The Delimitation

Even though fiscal and monetary policy is often used in combination. This thesis will only concern the effects of fiscal policy. The primary focus will be on the short-run effects from expansionary fiscal policy. A thorough description of interest rates is beyond the scope of this paper, due to the complexity of the interest rate systems.

1.2 Study Outline

In order to create an overview of the study, making it easier for the reader, I have decided to display the layout of the study of the effects of expansionary fiscal policy.

The first part of the study focus on describing the discretionary expansionary fiscal policy conducted in Denmark in 2009 and 2010. This will be seen in relation to the current economic conditions in Denmark and the severity of the crisis, with respect to the output gap, the automatic stabilizers, the fiscal position, and how the expansionary fiscal policy affects the general government budget balance. This will provide a brief and general description of what expansionary fiscal policy is and how it affects the Danish economy.

As the effects of expansionary fiscal policy hinges on the scale of the fiscal multiplier, the second part of the study will be a literature review of theories and empirical estimates of the fiscal multiplier. First, I will briefly describe two theoretical frameworks that are the traditional Keynesian theory of discretionary fiscal policy, the contribution about investments from business cycle theory by Samuelson’s Oscillator model, the contribution about consumption by the Permanent Income Hypothesis, and last the new Keynesian theory of discretionary fiscal policy. The latter will be further elaborated through the current debate about the effect of the fiscal stimulus package in America. The scale of the multiplier is very difficult to estimate and for this reason it is useful to make a literature review of the various ways in which to estimate the multiplier and what the economists think is important to consider when estimating the effects of discretionary fiscal policy.

Further, I will present a small and very simple model for estimation of the fiscal multiplier. I will describe the data and specify the model I wish to estimate. The model is inspired by Samuelson’s
Oscillator Theory and Friedman’s Permanent Income Hypothesis, with respect to the latter; the estimates are, however, not based microeconomic data. Furthermore, the underlying assumptions TS1’ through TS5’ are tested for, in which the model estimates are BLUE and the model is valid. Thus, enable an inference and interpretation of the model.

In Denmark the Economic Council among others evaluates the effects of policy interventions, by use of the SMEC model. For a further analysis of the framework of the traditional Keynesian models and new Keynesian model I wish make a comparison of the SMEC model and the Smets-Wouters model for the euro area. This will enable an evaluation of the effects of discretionary fiscal policy with respect to the size of the fiscal multipliers in each model.

2. Discretionary Fiscal Policy in Denmark

Keynes argued, in The General Theory of Employment, Interest, and Money in 1936, that in order to get out of recessions and have any chance for long-term economic growth, the government must take an active role in encouraging aggregate demand, by increasing government spending or decreasing taxes. Across the globe, and particularly in Denmark, governments have attempted to manage aggregate demand by cutting taxes and boosting government spending. Thus, fiscal policies have been conducted due to short-term macroeconomic stabilization objectives. In this part of the thesis, I will document the fiscal policy measures introduced in Denmark, in response to the recession. The fiscal policy measures will be seen in relation to the severity of the economic recession, the fiscal position, and the strength of the automatic stabilizers. Furthermore, this should create an overview of the costs and benefits relating to fiscal action and potentially consider issues related to the timing of the fiscal stimulus.

2.1 The Fiscal Stimulus Package

Denmark is one of the countries with the largest fiscal expansions. According to the Budget Outlook, August 2009 the fiscal stimulus amounts to 1,9 pct of GDP in 2009 and 1,3 pct of GDP in August 2009.

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1 Source: Nationalbanken, Kvartalsoversigt, 3. Kvartal 2009
The fiscal stimulus package is a combination of increasing government purchases, government investments and decreasing taxes. Furthermore, the composition of the fiscal stimulus package is visualized in Figure 1 measured as the percentage change in the fiscal balance. The fiscal stimuli are somewhat equally distributed between increasing government spending and decreasing taxes. Although, with a slight propensity to increase government spending over decreasing taxes. The design of the fiscal stimulus package, which in respect to instrument and timing, has some important implications. There is a greater implementation lag with respect to government spending and investments, as it may take a while before investment projects are carried out, whereas a decrease in taxes will, in principle, have an immediate effect. However, the effects from the increase in government spending has a direct demand effect in the economy, and thereby aggregate production, whereas taxes only have an indirect effect on demand, disturbed by the consumers propensity to save. This is potentially the reason for the decision to use a combination of the different fiscal policy instruments. Furthermore, the increasing government spending is related to an advancement of already planned investments. Furthermore, the argument for a combination of increasing government spending as decreasing taxes is that it has a broader impact on economic activity, because it is not only within sectors that relates to the government investments that is affected.

Source: The Ministry of Finance, Budget Outlook, August 2009.

Note: Measured from direct revenue effects.
2.2 The Economic Conditions

The severity of the recession describes the incentive for discretionary fiscal policy. In the current recession the production gap and employment gap describes that the production potential are not utilized fully. When there is idle resources within the economy there is an incentive to conduct expansionary fiscal policy and marshalling idle labor and resources into production. Thus, there is a positive relationship between the output gap and incentive to introduce expansionary fiscal policy. The production and employment gap is visualized in Figure 2.

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Figure 1 The composition of the Change in the Fiscal Balance from 2008-2010

Note: The fiscal composition is measured as the percentage change in the fiscal balance from 2008 to 2010.
Source: Budget Outlook, August 2009, The Ministry of Finance and my own calculations.
In Figure 2 the output gap and employment gap is visualized. The gaps are a measure of the difference between the actual output of the economy and the output it could achieve when it is most efficient. As it can be seen from the figure, there is a negative output- and employment gap, which explains that the economy is not operating at full capacity.

2.3 The Automatic Stabilizers

The automatic stabilizer is a measure of to what extent the public revenues and expenses are affected by cyclical fluctuations. There is a weak negative effect between the amount of the fiscal stimulus and the size of the automatic stabilizers, thus the size of the fiscal stimulus varies inversely with the automatic stabilizers. The automatic stabilizers of the OECD countries are visualized in Figure 3. Denmark is an exception to the negative relationship between the automatic stabilizers and the conducted expansionary fiscal policy, because the stabilizers in Denmark are sizably large, but the fiscal stimulus conducted is still comparatively sizeable. The effect or strength of the automatic stabilizers depends among other things on the size of the public sector, the tax system and the replacement rate for transfers. Denmark has a large public sector and is an integral part of the Danish welfare model, and transfers are core elements in the social insurance provided by the welfare state, and in its universal structure most welfare state expenses are financed through general taxation. During the current recession the effect of the automatic stabilizers in Denmark means that
expenditures for transfers will increase and the revenues from taxes will decrease due to the decline in production and the increasing unemployment. There is so to say an automatic fiscal expansion, which will reduce the slowdown in economic activity and employment, and reduce the need for an actual discretionary fiscal expansion. Nevertheless, Denmark still conducts expansionary fiscal policy\(^5\).

![Figure 3 The automatic stabilizers of the OECD countries](image)

**Figure 3.5. Size of discretionary fiscal packages varies inversely with the automatic stabilisers**

1. Total ex ante cost of discretionary fiscal packages over the period 2008-10.
2. Coefficient summarising the automatic change in the fiscal balance due to a 1 percentage point change in the output gap.

Source: Grouard and André (2005) and Table 3.1.

**Source**: OECD, Economic Outlook, Interim Report, 3 Chapter 3, 2009

### 2.4 The Prospects of the Structural Fiscal Balance

The initial fiscal balance or fiscal position explains the scope for conducting fiscal expansions. The expansionary fiscal policy together with the effects from the automatic stabilizers worsens the fiscal balance. Even though, there was a strong fiscal position, that is relatively large surplus on the public balance in Denmark in 2008, there will be a deficit on the public balance and thus a weakening of the fiscal position in 2009 and 2010. This reflects, that it is politically difficult to implement a fiscal contraction during a boom, which is equivalent to a fiscal expansion during a recession. Thus, the

propensity to conduct asymmetrical fiscal policy leads to an increasing public deficit in a
downturn\textsuperscript{6}.

In Denmark a larger share of the deterioration in the public balance is cyclical, which should been
seen in relation to the powerful automatic stabilizers. The discretionary fiscal policy and the effect
from the automatic stabilizers causes the public balance to decline from a surplus of 3.4 pct of GDP
in 2008 to a deficit of 5.6 pct of GDP in 2010. The deterioration of the public balance is 9 pct of
GDP equivalent to approximately DKK 160 bn., where approximately one-third this deterioration is
due to the expansionary fiscal policy. This means that public balance is very sensitive to cyclical
changes and trends in the financial markets. Thus, a worsening like this has not been seen since
WWII. This significant worsening of the public balance leads to hasty increase in the public debt.
The public debt in Denmark will increase from 33 pct of GDP to 42 pct of GDP\textsuperscript{7}.

Large public deficits and an increasing debt burden can increase the uncertainty about the economic
future, which will lead to a propensity to save within the private sector. Furthermore, an increasing
public debt is followed by an increase in the interest rate, which in turn will counteract the fiscal
stimulus.

3. Literature Review

Recently, there has been an increasing focus on discretionary fiscal policy and the worldwide fiscal
policy actions may suggest that there is a consensus about the effects of fiscal stimulus\textsuperscript{8}. However,
economist are in fact deeply divided by how well, or indeed whether, such stimulus works. There
are wild variations, in both theoretical and empirical literature, of the estimates of the multipliers
that captures the effectiveness of the fiscal policy. The variation in estimates of multipliers is
explained by the fact that they are very difficult to estimate as they are dependent on multiple
economic factors and difficult to isolate.

In the theoretical and empirical literature used for this thesis the variation in the estimates are
explained by different assumptions about the impact of higher government borrowing on interest
rates and private spending. The assumptions have their foundation in the macroeconomic theory,

\textsuperscript{6} Danmarks Nationalbank, kvartalsoversigt, 3. Kvartal 2009
\textsuperscript{7} Danmarks Nationalbank, Kvartalsoversigt, 3. Kvartal 2009
\textsuperscript{8} Source: (Cwik and Wieland, 2009)
and for some microeconomic theory, and are applied in the macroeconomic models for fiscal policy evaluation.

In the following, I will present the traditional Keynesian theory of discretionary fiscal policy. In 1939 Samuelson elaborated on the traditional multiplier theory by introducing the multiplier-accelerator model. As the traditional Keynesian multiplier did not, according to business cycle theory, fully explain the multiplier effect due to its simplistic nature. For this reason, the multiplier-accelerator model will be the contribution to the thesis with respect to investment theory. Furthermore, the contribution of what determines consumption will be presented by the theories of Friedman and Modigliani, who both insisted on the importance of expectations in determining current consumption. At last, attention must be paid to the new Keynesian DSGE models, in which traditional Keynesian theory, expectations, and real business cycle theories are incorporated. At last I will present current the debate about the effects of discretionary fiscal policy, which will center on the debate about the effects of the American fiscal stimulus package. The literature review is meant to create a foundation of knowledge about both the old- and new Keynesian theory and importantly a basic understanding of consumption and investment theory.

3.1 Traditional Keynesian Theory of Fiscal Policy

The traditional Keynesian multiplier captures how effectively increasing government spending or decreasing taxes stimulate output. Thus, a multiplier of one means that an increase in government spending of DKK 1bn will increase national income by DKK 1bn.

In The General Theory of Employment, Interest and Money it is described with respect to the marginal propensity to consume and the multiplier, that “Our normal psychological law that, when the real income of the community increases or decreases, its consumption will increase or decrease but not so fast, can, therefore, be translated – not, indeed with absolute accuracy but subject to qualifications which are obvious and can easily be stated in a formally complete fashion – into the propositions that \( \Delta C_w \) and \( \Delta Y_w \) have the same sign, but \( \Delta Y_w < \Delta C_w \), where \( C_w \) is the consumption in terms of wage units. This is mere a repetition of the proposition already established on page 29 above. Let us define, then, \( \frac{dC_w}{dY_w} \) as the marginal propensity to consume. This quantity is of considerable importance, because it tells us how the next increment of output will have to be
divided between consumption and investment. For $\Delta Y_w = \Delta C_w + \Delta I_w$, where $\Delta C_w$ and $\Delta I_w$ are the increments of consumption and investment; so that we can write $\Delta Y_w = k\Delta I_w$, where $1 - \frac{1}{k}$ is equal to the marginal propensity to consume. Let us call $k$ the investment multiplier. It tells us that, when there is an increment of aggregate investment, income will increase by an amount which is $k$ times the increment of investment.”

The evaluating the effects of fiscal policy in the traditional Keynesian theoretical framework, the prices and wages are sticky and current consumption depends on current income. That is, consumer spending is not dependent on expected future income. In this theoretical framework, an expansionary fiscal policy can stimulate the economy with multiple effects. And the effect of the fiscal expansion depends on the degree of openness and the exchange rate regime of the economy (Shafik Hebous, 2009).

In a closed economy, for a given money supply, an increase in autonomous spending, for example government spending will stimulate the economic activities and has a more than one for one effect on equilibrium output. As the demand for money depends on income, the increase in output raises the interest rate, which crowds out private investment. The sensitivity of private investment to income and the interest rate determines the degree of crowding out. Furthermore, the final effect of the expansion is an increase in output, total investment and consumption. If the fiscal expansion is a tax cut as opposed to an increase in government spending, the tax cut will boost private consumption which will lead to an increase in aggregate demand and thereby output. In this situation, there will be an effect of crowding out in private investment. The effects of a tax cut are equivalent to an increase in government spending. However, the multiplier derived from a tax cut is smaller than the multiplier derived from an increase in government spending. The reason for this is, that part of the increase in disposable income will be saved and not directly spent (Shafik Hebous, 2009).

If the country is open to trade, and has a flexible exchange rate regime, a fiscal expansion will put upward pressure on the interest rate. Given that there is perfect mobility of capital and the interest rate is fixed at the world level, then capital flows into the economy, which will increase the demand for the domestic currency. Thus, the nominal exchange rate will appreciate. With sticky prices, this nominal appreciation will cause a real exchange rate appreciation. And as a consequence, this will worsen the trade balance as net exports decline. Furthermore, this negative effect on the trade
balance counteracts the effects of expansionary fiscal policy. In this relationship, discretionary fiscal policy is ineffective in a small open economy with a flexible exchange rate regime (Shafik Hebous, 2009).

In a small economy with a fixed exchange rate regime a fiscal expansion will put upward pressure on the exchange rate and interest rate as well. However, money supply increases to accommodate the fixed exchange rate parity. The final effect is an increase in output and fiscal policy in this setting is effective in stimulating output. Domestic fiscal policy can affect foreign economies in an integrated world, such as a currency union. As the increase in domestic output and thereby aggregate demand will leak abroad to trading partners as imports increase, and thereby increase the output of the trading partners. Meanwhile, the initial upward pressure on the domestic interest rate will attract foreign capital from other members of currency union. And thereby will there be an upward pressure on the interest rates of the member economies. As a consequence the entire union’s interest rate may rise. This will in turn have a contracting effect on output. Furthermore, as the exchange rate of the union is floating with the rest of the world, a fiscal expansion conducted in a large economy in the currency union would cause an appreciation to the exchange rate with the rest of the world. Thus, the effects of the expansionary fiscal policy will be smaller because of the worsening of the trade balance (Shafik Hebous, 2009)

3.2 The Accelerator-Multiplier Model

In 1939, Samuelson wrote in relation to what Keynes had stressed about the multiplier: “... there would seem to be some ground for the fear that this extremely simplified mechanism is in danger of hardening into a dogma, hindering progress and obscuring important subsidiary relations in the process.” Thus, he developed in corporation with Hansen a way to explain the relationship between the multiplier and accelerating investments. The theory belongs to the class of Keynesian business cycle theory. This is a model in which a combination of the accelerator and multiplier effect can describe and explain cyclical fluctuations. A change in aggregate demand management will in this model cause an increase or decline in production and economic output depending on the type fiscal policy. The change in production and economic output will then, in consistency will the accelerator theory, determine a level of investment. If this is different from the previous level of investment, will there, directly and indirectly through the multiplier, occur a further change in income and
production, which again will lead to a new level of investment and so fourth. As the quote above explains, the theory is an extension to the multiplier theory presented by Keynes (1936) and the theory is often referred to as the Samuelson Oscillator Model. The theory relies on a multiplier mechanism based on a simple Keynesian consumption function with a lag. Where

\[ Y_t = g_t + C_t + I_t \]  
(1.0)

\[ C_t = \alpha Y_{t-1} \]  
(1.1)

\[ I_t = \beta [C_t - C_{t-1}] = \alpha \beta Y_{t-1} - \alpha \beta Y_{t-2} \]  
(1.2)

According to Keynesian economics, fluctuations in aggregate demand cause the economy to come to short run equilibrium at levels that are different from the full employment rate of output. These fluctuations express themselves as the observed business cycles. Keynesian models do not necessarily imply periodic business cycles. However, simple Keynesian models involving the interaction of the Keynesian multiplier and accelerator give rise to cyclical responses to initial shocks. This model is supposed to account for business cycles thanks to the multiplier and the accelerator. The amplitude of the variations in economic output depends on the level of the investment, for investment determines the level of aggregate output, by the multiplier, and is determined by aggregate demand, by the accelerator. (Samuelson, 1939\(^9\))

3.3 The Life Cycle-Theory of Consumption and the Permanent Income Hypothesis

In the 1950s two theories of consumption was developed independently by Friedman who called it the permanent income theory and by Modigliani who called it life-cycle theory of consumption. Friedman’s theory emphasized that that consumers look beyond current income and Modigliani’s theory emphasized that consumers’ natural planning horizon is there is their entire lifetime. In this theoretical framework it is assumed that consumers are rational, forward-looking agents. The behavior of aggregate consumption is important for evaluating the impact of a policy intervention. Furthermore, consumption is by far the largest component of GDP and careful considerations to how consumption fluctuates (Blanchard, 2006). Further, the contribution of the consumption theory

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presented here stresses that the dependence of consumption on expectations has two main implications for the relation between consumption and income:

Consumption is like to respond less than one for one to fluctuations in current income. When deciding how much to consume, a consumer looks at more than his current income. If he concludes that the decrease in his income is permanent, he is likely to decrease consumption one for one with the decrease in income. But if he concludes that the decrease in his current income is transitory, he will adjust his consumption by less. In a recession, consumption adjusts less than one for one to decreases in income. This is because consumers know that recessions typically do not last for more than a few quarters, and that the economy will eventually return to the natural level of output. The same is true in expansions. Faced with an unusually rapid increase in income, consumers are unlikely to increase consumption by as much as income. They are likely to assume that the boom is transitory, and that things will return to normal. And last, consumption level may shift even if current income does not change; this is explained by consumer optimism and consumer pessimism. (Blanchard, 2006\textsuperscript{10})

The findings of Friedman arose as he examined budget studies or microeconomic case studies, which showed that the average propensity to consume was roughly the same for widely, separated data, despite substantial differences in average real income. This finding dramatically underlined an inadequacy of a consumption function relating consumption solely to current income. Friedman argues that it would be more sensible for people to use current income, but also at the same time to form expectations about future levels of income and the relative amounts of risk. Thus, an individual consumes a constant fraction of \( k \) of his expected income \( Q^* \), where the consumption function is given by

\[
C = kQ^* \tag{2.0}
\]

And those individual arrive at a guess about the size of their permanent income. Friedman proposed that individual estimates of permanent income for this year \( Q^* \) be revised from last year’s estimate \( Q^{*}_{1} \) by some fraction \( j \) of the amount by which actual income \( Q \) differs from \( Q^{*}_{1} \)

\[
Q^* = Q^{*}_{1} + j(Q - Q^{*}_{1}) \tag{2.1}
\]

\textsuperscript{10} On the findings of Modigliani and Friedman, 1950s
and by substituting (1) into (2) the following relationship between an individual’s current consumption \( C \), this period’s actual income \( Q \), and last year’s estimate of permanent income \( Q_{t-1}^p \):

\[
C = kQ_t^p + kj(Q - Q_{t-1}^p)^{11}
\]  

(2.2)

Friedman argues, that people tend to spend more out of permanent income than out of transitory income. By transitory income he means income that is earned in excess of, or perceived as an unexpected windfall. Thus, income unequal to what people expected or not expects to get again. In Friedman’s analysis, he treats people as forming their level of expected future income based on their past incomes. This is known as adaptive expectations. Thus, adaptive expectation is looking forward in time using past expectations. In this case, a distributed lag of past income is used. (Blanchard, 2006).

Thereby, the function will be given as

\[
E(Y_{t+1}) = \beta_0 Y_t + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} \ldots
\]

(2.3)

In sum, ending to consumption is missing. However, it is understood that Keynes took for granted that the consumption only depends on current income, and is explained as such in the traditional Keynesian framework, he wrote in 1936 “…There are, in general, eight main motives or objects of subjective character which lead individuals to refrain from spending out of their incomes:

(i) To build up a reserve against unforeseen contingencies;

(ii) To provide for an anticipated future relation between the income and the needs of the individual or his family different from what exists in the present, as, for example, in relation to old age, family education, or the maintenance of dependents;

(iii) To enjoy interest and appreciation, i.e. because a larger real consumption at a later date is preferred to a smaller immediate consumption;

(iv) To enjoy gradually increasing expenditure, since it gratifies a common instinct to look forward to a gradually improving standard of life rather than the contrary, even though the capacity for enjoyment may be diminishing;

(v) To enjoy a sense of independence and the power to do things, though without a clear idea or definite intention of specific action;

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(vi) To secure a masse de manœuvre to carry out speculative or business projects;
(vii) To bequeath a fortune;
(viii) To satisfy pure miserliness, i.e. unreasonable but insistent inhibitions against acts of expenditure as such.

These eight motives might be called the motives of Precaution, Foresight, Calculation, Improvement, Independence, Enterprise, Pride and Avarice; the and we could also draw up a corresponding list of motives to consumption such as Enjoyment, Shortsightedness, Generosity, Miscalculation, Ostentation and Extravagance”.

From this, it can be seen that the permanent income theory and the life-cycle theory of consumption very much had its foundation in the findings in Keynes’ The General Theory of Employment, Interest and Money from 1936 but the use of budget data as opposed to aggregate data supported the permanent income hypothesis or gave further contributions to consumption theory.

3.4 The New Keynesian Theory

At last, attention must be paid to the new Keynesian DSGE models, in which traditional Keynesian theory, expectations, and real business cycle theories are incorporated. New Keynesian economics strives to provide micro foundations for Keynesian economics. Thus, the term micro foundation refers to the microeconomic analysis of the behavior of individual agents such as households or firms that underpins a macroeconomic theory. The two main assumptions define the New Keynesian approach to macroeconomics. First, the behavior of the individual agents has forward-looking, rational expectations, which is implemented in their optimizing spending and savings decision-making. Furthermore, there is assumed to a market failure, with respect to sticky prices and wages that is they do not adjust instantaneously to changes in the economic conditions (Shafik Hebous, 2009). The theory of New Keynesianism will further be explored in relation to the debate about the effects of fiscal policy.

\[12\] Note: Som of it seems fairly familiar and other seems to be of a different conceptual framework, which makes it difficult to understand, i.e. "Pride and Avarice"
3.5 The Current Debate on the Effects of Fiscal Policy: The Case of America

Why do economist disagree so much on whether fiscal stimulus works?

The “The job impact of the American recovery and reinvestment plan”, by Christina Romer, Chair of the President’s Council of Economic Advisers, and Jared Bernstein, Chief Economist of the Office of the Vice-President, contains a preliminary analysis of the job effects of a prototypical fiscal stimulus package. They simulate the effects of a prototypical package on GDP. The estimates of the multipliers used in this analysis are based on an average of two quantitative macroeconomic models. Thus, they use multipliers that are similar to those implied by the Federal Reserve’s FRB/US model and a private forecasting firm, Macroeconomic Advisers. More precisely, for the output effects of the recovery package, they are averaging the multipliers for increases in government spending and tax cuts from the Macroeconomic Advisers and the FRB/US model. They state that these two sets of multipliers are similar and broadly in line with other estimates. This, model is a traditional Keynesian model, in the sense that the model has not forward-looking expectations by individuals and firms. Thus, current consumption depends on current income. Furthermore, they consider multipliers in the case where the Federal Funds Rate remains constant, instead of the usual case where the Federal Reserve raises the funds rate in response to fiscal expansion, because they think that, the funds rate is likely to be at or near its lower bound of zero for the foreseeable future. However, new Keynesian economists disagree heavily with the validity of the estimates of the fiscal multiplier presented in this paper and the assumptions behind it.

Their particular multipliers for an increase in government purchases of 1 pct of GDP and a decrease in taxes of 1 pct of GDP are shown in Table 1.

An alternative assumption stressed in the paper “New Keynesian versus Old Keynesian Government Spending Multiplier” is that New Keynesian models are better for policy evaluations, because they capture how people’s expectations and microeconomic behavior change over time due to policy interventions and because they empirically estimated and fits the data. It is stressed in this paper, that in order to assess the effects of government actions on the economy, it is important to take into account how households and firms adjust their spending decisions as their expectations of future government policy changes. More precisely, the Smets-Wouters model is used for a similar experiment, which is estimating the impact on GDP of a permanent increase in government purchases of 1 percent of GDP in this paper and the estimates are shown in Table 1.
According to their estimates, from the new Keynesian model, the impact of this fiscal stimulus package is very small with GDP and employment effects only one-sixth as large as the Romer-Bernstein estimates. They stress that this is due to the timing of the government expenditures and the forward-looking perspective of households. That is the delayed government spending and the negative wealth effect on private consumption caused by anticipated higher future taxes combine to reduce the positive effect of the fiscal stimulus. Furthermore, there is a strong crowding out of investments. They conclude, that the declines in private consumption and investments are greater than the increases in government spending as consumption and investments are crowded out.

Furthermore, the authors of this paper think that it is highly questionable to assume that the interest rate will remain zero. They think it is better to assume that monetary policy is more responsive. Otherwise the increase in government spending combined with the zero bound interest rate will eventually lead to inflation, which is an assumption that is prohibited in new Keynesian models. In sum, their findings raise serious doubt about the robustness of the models and the approach currently used for practical policy evaluation by Romer and Bernstein.

For now, there has been focus on two papers view of to what extend the fiscal stimuli works. Furthermore, economists disagree too whether or not fiscal policy should be used at all. The paper “The Lack of Rationale for a Revival of Discretionary Fiscal Policy” was published in response to the increased attention of discretionary fiscal policy. The focus of this paper is decreasing taxes, whereas the two papers above was primarily concerned with the impact on GDP from increasing government spending. In reality, however, the fiscal stimulus packages are a mixture of increasing government spending and decreasing taxes. Thus, in this paper gives the reason, for the fact that tax rebates are an ineffective fiscal policy tools.

In this paper it is stressed, that it seems best to let fiscal policy have its main countercyclical impact through the automatic stabilizers, as discretionary fiscal policy does not contribute economic stability.

With respect to decreasing taxes as fiscal stimuli, it is stated that, supported by empirical evidence and regression techniques, that temporary tax rebates does not stimulate consumption demand, and thereby aggregate demand, or the economy. This result is consistent with the permanent income theory or life-cycle theory of consumption in which temporary increases in income are predicted to lead to proportionately smaller increases in consumption than permanent increases in income. The
life-cycle theory of spending is based on the idea that people make intelligent choices about what they want to spend at each age, limited only by the resources available over their lives (Angus Deaton, 2005). It is concluded, that recent evidence on the impact of the rebate payments on aggregate consumption does not provide a rationale for conducting countercyclical discretionary fiscal policy.

Furthermore, it is stated that, increasing government purchases will certainly raise GDP in the short run more than temporary rebates will, it is still not clear that this will be any more effective in stimulating sustained economic recovery. He stresses that multiyear changes in government spending phased in at realistic rates have a maximum multiplier less than one because of offsetting reductions in the other components of GDP. It is concluded, that there is little reliable evidence that government spending is way to end a recession or accelerate a recovery that rationalizes conducting discretionary countercyclical fiscal policy.

He proposes, instead of focusing on discretionary countercyclical fiscal policy, to focus on the automatic stabilizers as well as on more lasting long-run reforms that benefit the economy in order to keep the debt to GDP ratio in line. He stresses, that the automatic stabilizers are very powerful and the deficit will increase significantly on this account.

At last, the assumption that discretionary fiscal policy is a zero sum game is further explored in the paper Voodoo Multipliers (Barro 2009). He thinks that a much more plausible starting point is a multiplier of zero. In this case, the real GDP is given, and an increase in government spending is followed by an equal fall in the total of other parts of GDP – consumption, investment, and net exports. A policy intervention must therefore be treated as a cost-benefit analysis, where the benefits from the initial increase in government purchases must justify the costs. Thus, he thinks that the, by i.e. Romer and Bernstein, supposed macroeconomic benefits from discretionary fiscal policy remains unexplained in reality. He thinks that a good experiment is to estimate the impact from an expansion in government expenditures during WWII where he estimates the effect from the increase in government spending to have a multiplying effect on American GDP of 0,8. However, he thinks that this war-multiplier effect is an overstatement of what the peacetime multiplier would be. There are three reasons behind his argument. First, the increasing government defense expenditures temporarily almost do not affect the consumer behavior, whereas peacetime expansions decrease consumer spending through the negative income effect. Second, there is a direct effect on total employment during wars (recruiting the defense and the women in the labor
force). And thirdly, the economy was already in the path to recovery, so the increase in government defense expenditures cannot explain the all of the increase in GDP during WWII. Overall, he concludes, that it is important that the fiscal stimulus package must justify its following costs.

In summarizing what I have learned so far is that the scale of the multiplier is bound to vary according to the economic conditions. For an economy operating at full capacity, the fiscal multiplier should be zero. Since there are no spare resources, any increase in government demand would just replace spending elsewhere, increase the price level and leak abroad through increasing imports. However, in a recession, when there is an output gap and the resources are not fully utilized, a fiscal stimulus could increase overall demand. And if the initial increase in demand triggers successive increases in production, an accelerated reaction, leading to an increase in income, leading to an increase in demand, the multiplier could very well be above one. Furthermore, the size of the multiplier is bound to vary according to the type of fiscal action. In the empirical literature there is evidence that the impact from increasing government spending is higher than the impact from giving tax rebates in the short run. Most importantly, the scale of the multiplier hinges on how people react to higher government borrowing. If the economy should recover from the fiscal stimulus, it would be because of the increasing demand crowds in investments. The other possibility is that if the interest rate increases in response to the increasing government debt then some private investments that potentially could have occurred gets crowded out. At last, consumption theory suggests, that if the consumers anticipate higher future taxes, as the government attempts to reduce the budget deficit and conducts a fiscal consolidation, they would have a propensity to save rather than consume today.

The conclusion to the debate on the effectiveness of the American stimulus package will be that the different assumptions about the impact of higher government borrowing on interest rates and private spending explain the wild variations in the estimates of the stimulus package in the above mentioned models. That is the Romer-Bernstein model is estimated with a federal funds rate that is pegged to zero seems highly questionable and that the federal funds rate will eventually raise in response to higher government borrowing. Furthermore, the impact of higher government borrowing will too have an effect on private spending, as the forward-looking households and firms anticipate higher taxes in the future, which will lower their disposable income in the future and create an incentive to save as opposed to spend their current income supported by the life-cycle theory of consumption or the permanent income hypothesis.
4. Quantitative Analysis

Within the following subsection I will present a small and very simple model for estimation of the fiscal multiplier. I will describe the data and the model I wish to estimate by use of OLS. The model is inspired by Samuelson’s Oscillator Theory and Friedman’s Permanent Income Hypothesis, with respect to the latter; the estimates are, however, not based microeconomic data. Furthermore, the underlying assumptions in which the model estimates are unbiased and consistent are tested for and the model is valid. At last, an estimate of the impact of a one percent increase in government spending is found, the estimate is however not significant, but similar to the OECDs estimations of the Danish multiplier.

4.1 Data

The annual data from 1990-2007 is collected from Danmarks Statistik and consists of 9 variables, the data set relates to the pre-crisis scenario. Thus, this is a time series data set, since it consists of observations of several variables over time. The choice of these variables is determined by, and broken down by, the national accounts principles. That is the composition of GDP; the national accounts identity for an open economy is given by

\[ Y = C + I + G + X - M \]

The gross domestic product, private consumption, investments, government spending including government investments, exports, imports, and inventory investments all these variables are measured in 2000 index fixed prices, whereas taxes and transfers are measured in 2000 index fixed prices by use of the GDP deflator. From Danmarks Statistik it was possible to subtract the following data;

Further, government spending is equal to government consumption and government investment. At last the variables, the 10-year state bond interest rate and the 3-month money market interest rate are measured in percentages. I acknowledge that the sample size very small with only 18 observations. Nevertheless, from an evaluation of that this time period describes a certain paradigm I have chosen these observations, where the 1980s also called the poor eighties and the current recession is excluded from the data.
There seems to be an issue with respect to covariance; since this natural experiment has very high correlation between the explanatory variables, which can be seen from the table below.

<table>
<thead>
<tr>
<th>Table 1 Correlation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Y ) &amp; ( Y_{t-1} ) &amp; ( Y_{t-2} ) &amp; ( G ) &amp; ( X ) &amp; ( i ) &amp; ( r )</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>( Y ) &amp; 1 &amp;</td>
</tr>
<tr>
<td>( Y_{t-1} ) &amp; 0.994112 &amp; 1 &amp;</td>
</tr>
<tr>
<td>( Y_{t-2} ) &amp; 0.936114 &amp; 0.993574 &amp; 1 &amp;</td>
</tr>
<tr>
<td>( G ) &amp; 0.994748 &amp; 0.994291 &amp; 0.99114 &amp; 1 &amp;</td>
</tr>
<tr>
<td>( X ) &amp; 0.979634 &amp; 0.981424 &amp; 0.98201 &amp; 0.982239 &amp; 1 &amp;</td>
</tr>
<tr>
<td>( i ) &amp; -0.84288 &amp; -0.81963 &amp; -0.81561 &amp; -0.83779 &amp; -0.74537 &amp; 1</td>
</tr>
<tr>
<td>( r ) &amp; -0.93303 &amp; -0.93445 &amp; -0.93302 &amp; -0.9392 &amp; -0.8876 &amp; 0.868325 &amp; 1</td>
</tr>
</tbody>
</table>

Source: Appendix 1 Data 1990-2007

4.2 Model Specification

When testing an economic theory, formal economic modeling is the starting point for empirical analysis and with set off in the previous literature I will construct a model for interpretation (Wooldridge, 2009). I seek to find the impact on economic activity of a one percent increase in government spending. I consider the national accounts identity, with various investments functions, with this said (Cf. appendix 1), the best model is obtained when the investments is a function of both last years production level and last years change in the production level and the 3-month money market interest rate. Furthermore, I consider two different interest rates, which are the 3-month money market interest rate and the 10-year state bond interest rate, where the best model is obtained by using the 3-month money market interest rate. The national accounts identity is given by.

\[
Y = C + I + G + X - M \quad (3.0)
\]

For now, I consider the identity in the form where consumption, \( C \), is given by disposable income, that is the income that remains once consumers have received transfers from the government and paid their taxes.

\[
C_t = c_0 + c_1 (1 - t) Y_t, \quad \text{for } 0 < c_1 < 1 \quad (3.1)
\]
Where the investments, \( I \), are planned one year ahead and given by the previous year’s national income level, last year’s change in national income level, and is dependent on the 3-month money market interest rate. The investment function is inspired by the multiplier-accelerator model, Samuelson’s Oscillator theory, in which investments in year \( t \) depends on the national income level in the previous year and most importantly on the change in the level national income level of the previous year. However, in this model the investment is a function of national income, where it was a function of consumption is the Samuelson’s model.

\[
I_t = k_0 + k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i), \quad \text{where } k_0, k_1, k_2, k_3 \text{ are constants} \quad (3.2)
\]

Where imports, \( M \), is for simplicity only a function of production. Imports are the part of domestic demand that falls on foreign goods. Higher domestic income, \( Y \), leads to higher domestic demand for goods, both domestic and foreign.

\[
M = m \cdot Y, \quad \text{where } m \text{ is a constant.} \quad (3.3)
\]

Where government spending, \( G \), and exports, \( X \), are exogenous. Government spending is naturally exogenous for the reason that the task here is to evaluate the implications of an alternative spending decision. Furthermore, the government spending is chosen by the government and will therefore not be treated within the model. And export, \( X \), is exogenous for simplicity.

\[
G = \bar{G} \quad \text{and} \quad X = \bar{X}
\]

And in reduced form the equation will then become

\[
Y_t = c_1(1-t)Y_t + k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X - m \cdot Y_t \quad (3.4)
\]

And by rearranging in order to isolate the multiplier gives

\[
Y_t - c_1(1-t)Y_t - m \cdot Y_t = k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X
\]

\[
Y_t\left[1 - c_1(1-t) + m\right] \times k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X
\]

\[
Y_t\left[\frac{1}{1-c_1(1-t)+m}\right] \times k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X
\]
Where the multiplier is
\[
\frac{1}{1 - c_i(1 - t) + m} = \delta
\]  
(3.5)

Then
\[
Y_t = \delta k_1(Y_{t-1}) + \delta k_2(Y_{t-1} - Y_{t-2}) + \delta k_3(i) + \delta G + \delta X
\]
\[
Y_t = \delta(k_1 + k_2)(Y_{t-1}) - \delta k_2(Y_{t-2}) + \delta k_3(i) + \delta G + \delta X
\]

The above is the specification of the first economic model to be considered and after having specified the economic model, it is turn it into the econometric model or the second order autoregressive model including additional explanatory variables given below
\[
Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 i + \beta_4 G + \beta_5 X + u_t
\]
(3.6)
where \( \beta_0 \) is a constant and
\[
\beta_1 = \delta(k_1 + k_2)(Y_{t-1})
\]
\[
\beta_2 = -\delta k_2(Y_{t-2})
\]
\[
\beta_3 = \delta k_3(i)
\]
\[
\beta_4 = \delta G
\]
\[
\beta_5 = \delta X
\]
thus, where
\[
Y_t = \text{production}
\]
\[
Y_{t-1} = \text{production in year } t-1
\]
\[
Y_{t-2} = \text{production in year } t-2
\]
\[
i = \text{3-month money market interest rate}
\]
\[
G = \text{government spending}
\]
\[
X = \text{exports}
\]
The term, $u_t$, contains the unobserved factors that relates to the national income level. The constants $\beta_0, \beta_1, \ldots, \beta_5$ are the parameters of the model that describes the directions and the strengths of the relationship between the production level and the factors used to determine production (Wooldridge, 2009). Furthermore, i.e. the coefficient for $\beta_4$ is the estimate of the impact of an increase in government spending of 1 unit (percentage or).

In theory it is expected that the $\beta_1$ parameter will have a positive effect on production, as an increase in the production level in the previous year will have a positive effect on the production level in the subsequent year. The $\beta_2$ parameter will, however, is to be interpreted with a negative coefficient, due to a counterintuitive relationship; nevertheless, the change in the production level in the previous year has a positive effect on production. The $\beta_3$ parameter will have a negative effect on production, as an increase in the interest rate leads to a decrease in production, increasing interest rates leads to lower investment and lower demand. Furthermore, the $\beta_4$ parameter will have a positive effect on output, as the increase in demand will increase production. At last, the $\beta_5$ parameter will have a positive effect on production, as this represents the foreign demand for domestic goods and an increase of such will have an increasing effect on domestic production.

In the second model I consider, I have specified the consumption function different from the traditional Keynesian framework, where consumption solely depends on current income. Even tough I have not based the findings on microeconomic case study data, like Friedman did. I have specified the consumption function similar to the investment function. In this model, I set the consumption as being a function of the consumption level in the previous year and the change in the consumption level in the previous year. This could potentially frame the consumption function as being more dependent on the permanent income theory of consumption.

Furthermore, the fact that the function for investments was my initial focus, as opposed consumption, was founded in the volatility of the investments versus consumption.

There is an important difference between consumption decisions and investment decisions, that is the theory of consumption, i.e. by Friedman, implies that when faced with an increase in income that consumers perceive as permanent, they respond to changes with, at most, an equivalent increase in consumption. The permanent nature of the increase in income implies that they can afford increase consumption now and in the future by the same amount as the increase in income. Increasing consumption more than one for one would require cuts in consumption later, and there is
no reason for consumers to want to plan consumption this way. The behavior of firms faced with an increase in sales they believe to be permanent is somewhat different. If the present value of the expected profit increases, this would potentially lead to an increase in investment. In contrast to consumption, however, this does not imply that the increase in investment should at most to be equal to the increases in sales. The increase in investment spending may exceed the increase in sales. In sum, these differences suggest that investment should be more volatile than consumption. During recessions, for example, there are typically decreases in both investment and consumption. Nevertheless, the level of investment is much smaller than the level of investment (acc. Figure 1, which plots the composition of GDP), changes in investment from one year to the next end up being of the same overall magnitude as changes in consumption (Blanchard, 2006).

The rates of changes in investment and consumption are showed in figure 1, which plots the yearly percentage change in the Danish consumption and investment from 1990 to 2007. The figure shows that consumption and investment fluctuates somewhat together. Furthermore, the figure shows that investment is much more volatile than consumption. Thus, both components contribute roughly equally to fluctuations in output over time. And for this reason the changes the second model shows the impact of consumption on aggregate production.

![Figure 4 The Rates Change of Investments and Consumption 1990-2007](image)

Note: C is private consumption and I is private investment.
Source: Statistikbanken, NAT02, 2010
Further, I will add on a new consumption function. Once again I consider the national accounts identity, given by (3.0)

However, where consumption, $C$, is not just a function of disposable income, but also a function of the production level in the previous year, the change in last year’s production level, and the 3-month money market interest rate. Thus, the behavioral equation is given by,

$$C_t = c_0 + c_1(1-t)Y_t + c_2(Y_{t-1}) + c_3(Y_{t-1} - Y_{t-2}) + c_4(i)$$ \hspace{1cm} (3.7)

Investments remain the same as in the previous model, where the investments, $I$, are planned one year ahead and given by the previous year’s production level, last year’s change in production level, and is dependent on the 3-month money market interest rate. The investment function is based on the multiplier-accelerator model, in which investments in year $t$ depends on the production level in the previous year and most importantly on the change in the level production level of the previous year. Given by,

$$I_t = k_0 + k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i)$$ \hspace{1cm} (3.8)

Where government spending, $G$, and exports, $X$, are exogenous. Government spending is naturally exogenous for the reason that the task here is to evaluate the implications of an alternative spending decision. Furthermore, the government spending is chosen by the government and will therefore not be treated within the model. Given by,

$$G = \bar{G} \text{ and } X = \bar{X}$$

Where imports, $M$, is for simplicity only a function of production. Imports are the part of domestic demand that falls on foreign goods. Higher domestic income, $Y$, leads to higher domestic demand for goods, both domestic and foreign. Given by,

$$M = m \cdot Y_t$$ \hspace{1cm} (3.9)

And in reduced form the new model or equation will then become

$$Y_t = c_1(1-t)Y_t + c_2(Y_{t-1}) + c_3(Y_{t-1} - Y_{t-2}) + c_4(i) + k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X - m \cdot Y_t$$

$$Y_t[1 - c_1(1-t) + m] = c_2(Y_{t-1}) + c_3(Y_{t-1} - Y_{t-2}) + c_4(i) + k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X$$
\[ Y_t = \frac{1}{1 - c_1(1 - t) + m} \times (c_2(Y_{t-1}) + c_3(Y_{t-1} - Y_{t-2}) + c_4(i) + k_1(Y_{t-1}) + k_2(Y_{t-1} - Y_{t-2}) + k_3(i) + G + X) \]

where the multiplier given by, \( \delta \) equals (3.5)

\[ Y_t = \delta c_1(Y_{t-1}) + \delta c_3(Y_{t-1} - Y_{t-2}) + \delta c_4(i) + \delta k_1(Y_{t-1}) + \delta k_2(Y_{t-1} - Y_{t-2}) + \delta k_3(i) + \delta G + \delta X \]

\[ Y_t = \delta c_2(Y_{t-1}) + \delta c_3(Y_{t-1} - Y_{t-2}) + \delta c_4(i) + \delta k_1(Y_{t-1}) + \delta k_2(Y_{t-1} - Y_{t-2}) + \delta k_3(i) + \delta G + \delta X \]

\[ Y_t = \delta c_2(Y_{t-1}) + \delta c_3(Y_{t-1} - Y_{t-2}) + \delta c_4(i) + \delta k_1(Y_{t-1}) + \delta k_2(Y_{t-1} - Y_{t-2}) + \delta k_3(i) + \delta G + \delta X \]

\[ Y_t = \delta(c_2 + c_3 + k_1 + k_2)(Y_{t-1}) - \delta(c_4 + k_3)(Y_{t-2}) + \delta(c_4 + k_3)(i) + \delta G + \delta X \] (4.0)

In sum, this gives the same second order autoregressive model as previously and I refer to model specification (3.6) and the results in Table 1 of the AR2 model with the 3-month money market interest rate. Based on this, it is potentially no longer possible to falsify an elaborated version of neither the Samuelson’s Oscillator model of a multiplier-accelerator nor the modified version of Friedman’s Permanent Income Hypothesis within the same model.

Furthermore, I considered two variations of the first model, one that where investments where a function of the 3-month money market interest rate, \( r \), and one as function of the 10-year state bond interest rate, \( i \). I found that the 3-month money market interest rate was the best dependent variable.

In figure 1 the fluctuations from 1990 to 2007 of the two interest rates have been visualized. The intuition behind the fact that the models response with difference to whether it is \( r \) or \( i \), is because the actors within the model respond differently to the 3-month money market interest rate and 10-year state bond interest. This has just been stated in order to describe the model building process, where the interest rates are too complex for me to say anything about. It seems as if the model fluctuates more with the short money market interest rate, than the long state bond interest rate.
Figure 5 Interest Rates 1990-2007

Source: Danmarks Statistik, Statistikbanken, 2010 DNRENTA
4.3 The Results

The Estimated Impact of a 1 unit in DKK Bn. in 2000 index fixed prices in Government Spending on GDP from a change in 1 unit in DKK Bn. 2000 index fixed prices in the government budget balance.

Figure 6 visualizes the output from the “AR2 model” with respect to the predicted and actual values.

![Figure 6: Actual and fitted output](image)

### Table 3: Estimation Output

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>454055.5</td>
<td>170451.9</td>
<td>2.64420</td>
<td>0.0026</td>
</tr>
<tr>
<td>Y_t-1</td>
<td>0.737015</td>
<td>0.227009</td>
<td>3.249868</td>
<td>0.0009</td>
</tr>
<tr>
<td>Y_t-2</td>
<td>-0.405316</td>
<td>0.194010</td>
<td>-2.089160</td>
<td>0.0387</td>
</tr>
<tr>
<td>GOVERNMENT</td>
<td>0.558320</td>
<td>0.079336</td>
<td>7.006899</td>
<td>0.0001</td>
</tr>
<tr>
<td>EXPORTS</td>
<td>0.303626</td>
<td>0.1632575</td>
<td>1.859689</td>
<td>0.0696</td>
</tr>
<tr>
<td>INTEREST1</td>
<td>6927.909</td>
<td>2564.145</td>
<td>-2.686312</td>
<td>0.0086</td>
</tr>
</tbody>
</table>

R-squared: 0.995560
Adjusted R-squared: 0.994627
S.E. of regression: 1550.66
Akaike info criterion: 21.95908
Schwarz criterion: 22.05875
Hannan-Quinn critter: 21.84189
Durbin-Watson stat: 2.108770

Note: The “AR2 model”
4.4 The Assumptions

In order for the econometric model to be valid and to perform inference about the time series regression, the following six assumptions must be true.

The stochastic process \( \{ (x_{it}, x_{i2}, \ldots, x_{ia}, y_i) : t = 1, 2, \ldots, n \} \) follows the linear model

\[
y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_a x_{ia} + u_i
\]

where \( \{ u_i : t = 1, 2, \ldots, n \} \) is the sequence of errors of disturbances. Here, \( n \), is the number of observations or time periods (Wooldridge, 2009). By use of the Ramsey RESET test the hypothesis is tested in favor of the null hypothesis and not rejected. Thus, the stochastic process follows the linear process.

\textbf{Table 4 The Ramsey RESET test (}

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>0.134689</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>(0.7206)</td>
</tr>
</tbody>
</table>

The second assumption requires that there is no perfect collinearity. In the sample, and therefore in the underlying time series process, no independent variable is constant nor in a perfect linear combination with the others (Wooldridge, 2009). This assumption is also fulfilled, however, there is strong collinearity, but not perfect (Cf. table 1 for the correlation matrix).

The third assumption that is required is that the explanatory variables are contemporaneously exogenous, that is \( E(u_i | x_{i1}, \ldots, x_{ia}) = 0 \). This requirement is also fulfilled as the explanatory variables within the model, \( G, X, \) and \( i \), are exogenous.

The fourth assumption requires that the errors are contemporaneously homoscedastic, that is \( Var(u_i | x_i) = \sigma^2 \) where \( x_i \) is shorthand for \( (x_{i1}, x_{i2}, \ldots, x_{ia}) \) (Wooldridge, 2009). By use of the Breusch-Pagan-Godfrey test for heteroscedasticity the hypothesis is tested in favor of the null hypothesis and not rejected. Thus, the errors in the model are contemporaneously homoscedastic.

\textbf{Table 5 The Breusch-Pagan-Godfrey Test for Homoscedasticity}
The fifth assumption requires that there is no serial correlation within the model. For all \( t \neq s \),
\[
E(u_t, u_s|x_t, x_s) = 0 \quad \text{(Wooldridge, 2009)}.
\]
By use of the Breusch-Godfrey LM test for serial correlation the hypothesis is tested in favor of the null hypothesis. Thus, there is no serial correlation within the model.

*Table 6 The Breusch-Godfrey LM Test for Serial Correlation*

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>0.264037</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>(0.7731)</td>
</tr>
</tbody>
</table>

The sixth assumption requires that the errors, \( u_t \), are independent of \( X \) and are independently and identically distributed as Normal (0, \( \sigma^2 \)) (Wooldridge, 2009). By use of the Jarque-Bera test for normality the hypothesis is tested in favor of the null hypothesis and not rejected.

*Table 7 The Jarque-Bera Test for Normality*

<table>
<thead>
<tr>
<th>Jarque-Bera</th>
<th>1.350400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>(0.509055)</td>
</tr>
</tbody>
</table>

In sum, under the assumptions TS1’, TS2’, and TS3’ the OLS estimators are consistent. Under assumptions TS1’ through TS5’ the OLS estimators are asymptotically normally distributed. So the usual standard errors, t-statistics, F-statistics, and LM statistics are asymptotically valid. (Wooldridge, 2009).

4.5 Inference and Interpretation
The results obtained in model, the AR2 model with the 3-month money market interest rate is shown in Table 8.

**Table 8 The “AR2 model” with the 3-month money market interest rate**

<table>
<thead>
<tr>
<th>Type</th>
<th>Intercept</th>
<th>Y_{t-1}</th>
<th>Y_{t-2}</th>
<th>G</th>
<th>X</th>
<th>( \bar{i} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR2</td>
<td>Coefficient</td>
<td>454056.5</td>
<td>0.737933</td>
<td>-0.405316</td>
<td>0.565283</td>
<td>0.383626</td>
</tr>
<tr>
<td></td>
<td>p-critical</td>
<td>0.0257</td>
<td>0.007</td>
<td>0.0587</td>
<td>0.573</td>
<td>0.0361</td>
</tr>
</tbody>
</table>

Note: The results obtained in this regression analysis are consistent with the macroeconomic theory. Because the beta parameters of the econometric model describe the directions and strengths of the relationship between GDP and the factors used to determine GDP in the model, has a direction that is coherent with the theory. In macroeconomic theory there is a positive relationship between output and output in the previous year, the change in the production level in the previous year has a positive effect on production, but is to be interpreted with a negative coefficient, due to a counterintuitive relationship. However, it is in line with model 3.4. Furthermore, there is a positive relationship between output and government spending and exports. At last, there is a negative relationship between output and the interest rate. In sum this simple model fits the macroeconomic theory.

**Table 1 Confidence Intervals at a 5% significance level (2-tailed)**

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>S.E.</th>
<th>Lower limit</th>
<th>Upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Y_{t-1} )</td>
<td>0.737933</td>
<td>0.227059</td>
<td>0.247486</td>
<td>1.228380</td>
</tr>
<tr>
<td>( Y_{t-2} )</td>
<td>-0.405316</td>
<td>0.194009</td>
<td>-0.824375</td>
<td>0.013743</td>
</tr>
<tr>
<td>Government</td>
<td>0.565283</td>
<td>0.975636</td>
<td>-1.542091</td>
<td>2.672657</td>
</tr>
<tr>
<td>Spending, ( G )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports, ( X )</td>
<td>0.383626</td>
<td>0.162575</td>
<td>0.032464</td>
<td>0.734788</td>
</tr>
<tr>
<td>Interest rate, ( i )</td>
<td>-6927.998</td>
<td>2598.345000</td>
<td>-12540.423200</td>
<td>-1315.572800</td>
</tr>
</tbody>
</table>

Note: calculation based on t-stat with n-k+1 degrees of freedom and alfa = 0.05, where k is the number of estimated parameter including the intercept.

Source: Output from Eviews and Appendix G Table G.2 page 825 (Wooldridge, 2009)
The estimate of the fiscal multiplier, of an increase in government spending, is somewhat coherent with other empirical estimates. It is, however, insignificant, and the fiscal multiplier can, with a significance level of 5%, range from -1.54 to 2.67. The above confidence intervals are calculated based on partial assumptions. Eviews estimates the multivariate confidence intervals as shown in the Figure 1 of ellipses. The difference is mainly due to covariance between the explanatory variables.

\[ -1.54 \text{ to } 2.67 \]

Source: Eviews, data output
The simultaneously confidence interval ellipses range from approximately from –2 to 3, for the G coefficient in the, which is more than the partial confidence intervals, due to the covariance of the explanatory variables.

5. New Keynesian versus Old Keynesian Models

The main focus of this subsection will be to describe the macro econometric model the SMEC model and the estimated effects from discretionary fiscal policy within this model framework. The model will be compared to the framework of New Keynesian Dynamic Stochastic General Equilibrium model. This will enable an evaluation of the effects of the current discretionary fiscal policy introduced in Denmark in 2009 and 2010. Further, issues, relating to the current crisis, and given the models estimates will be explored to a brief extend.

5.1 The Effect of Discretionary Fiscal Policy According to SMEC

The SMEC model is a macro econometric model describing the Danish economy and is used by the economic council when conducting forecasts and policy analyses. The model is an annual model that contains approximately 600 equations and is based on national accounts data. Most of the estimations are based on data from 1966-2005. It contains eight production sectors and five types of import. Demand is divided into six types of private consumption, public consumption, three types of investments, and five types of exports. The demand and supply interactions are linked in a structural input-output system. Stocks and flows are modeled consistently in order to ensure that savings accumulates into financial wealth and investment into real capital. The model treats the interest rates, the exchange rate, the labor force, tax rates, public consumption, total factor productivity, foreign demand for exports, and import prices as exogenous (Grinderslev and Smith, 2007).

In the short run the model is Keynesian in the sense that production is determined by demand and that wages are taken as given. However, wages responds to changes in unemployment, and in the long run production is determined by supply-side factors such as the labor force, the capital stock
and technology. This means that SMEC features full crowding-out in response to shocks to the demand side (Grinderslev and Smith, 2007). This point is illustrated in the following example, where the effect from an increase in government spending is explained. The focus is to increase government spending by increasing the number of government employees. In the short run, the important effect is that the increase in government employment will increase government spending and thereby aggregate production. This will cause for an increase in employment in private sector. The declining unemployment causes the wages to increase and the result is a declining competitiveness, which reduces exports. Meanwhile, there is an increase in the households’ real income, which increases private consumption. In the long run, there is a decrease in net exports, which causes the unemployment rate to reduce to its natural level. In the long run, the total employment is unaffected by the change in fiscal policy, but the wage and price level has been increased permanently. This explains, that the structure of SMEC is consistent with the traditional Keynesian framework in the short run. (Grinderslev and Smith, 2007).

The effect of fiscal stimulus depends naturally on the type of the fiscal action. In general, the short run effect on employment and production from changes in government spending, that is government investments and consumption, have a greater impact on economic activity than changes in taxes and transfers. This is due to the fact that consumption and investment has a direct effect on economic activity, whereas changes in taxes and transfers affect the economic activity indirectly through the disposable income. Furthermore, in the long run the effects of all the fiscal policy actions are equal to zero, which is a reflection of the models fundamental feature of full crowding out of employment (Grinderslev and Smith, 2007).

In order to estimate the effects of discretionary fiscal policy, they measure the effect or estimate the fiscal multiplier from changes in various fiscal instruments. More precisely, they estimate the impact on GDP, GVA, employment, the fiscal balance, and the balance of payments and by how much these changes, from a given fiscal policy instrument by enough to make the direct yield of GDP equal to 0,1 pct. The direct yield thereby expresses the effect on the fiscal balance before the fiscal stimulus instrument is introduced. Table 9 shows the selection of multipliers, which illustrates the effect from changes in various fiscal policy instruments.
The effect from a fiscal expansion of 0.1 pct of GDP

<table>
<thead>
<tr>
<th>Expenses</th>
<th>GDP</th>
<th>GVA</th>
<th>Employment (1000)</th>
<th>Fiscal Balance (G-T)</th>
<th>Balance of Payments (X-M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Employment</td>
<td>0.135</td>
<td>0.137</td>
<td>5.4</td>
<td>-0.2</td>
<td>-0.6</td>
</tr>
<tr>
<td>Government Purchase</td>
<td>0.127</td>
<td>0.094</td>
<td>2.3</td>
<td>-0.7</td>
<td>-1</td>
</tr>
<tr>
<td>Government Investments</td>
<td>0.075</td>
<td>0.064</td>
<td>1.3</td>
<td>-0.1</td>
<td>-0.1</td>
</tr>
<tr>
<td>Government Wages</td>
<td>0.017</td>
<td>0.011</td>
<td>0.3</td>
<td>-0.9</td>
<td>-0.3</td>
</tr>
<tr>
<td>Transfers (taxable)</td>
<td>0.029</td>
<td>0.02</td>
<td>0.5</td>
<td>-1</td>
<td>-0.4</td>
</tr>
<tr>
<td>Transfers (non-taxable)</td>
<td>0.043</td>
<td>0.03</td>
<td>0.7</td>
<td>-1.4</td>
<td>-0.6</td>
</tr>
<tr>
<td>Revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income Tax</td>
<td>0.043</td>
<td>0.03</td>
<td>0.7</td>
<td>-1.4</td>
<td>-0.6</td>
</tr>
<tr>
<td>Property Value (Tax)</td>
<td>0.057</td>
<td>0.039</td>
<td>0.9</td>
<td>-1.3</td>
<td>-0.8</td>
</tr>
<tr>
<td>VAT</td>
<td>0.029</td>
<td>0.022</td>
<td>0.5</td>
<td>-1.3</td>
<td>-0.4</td>
</tr>
<tr>
<td>Excise Duties</td>
<td>0.041</td>
<td>0.028</td>
<td>0.5</td>
<td>-1.6</td>
<td>-0.5</td>
</tr>
<tr>
<td>Labor Market Contributions (LMC)</td>
<td>0.037</td>
<td>0.024</td>
<td>0.6</td>
<td>-1.4</td>
<td>-0.5</td>
</tr>
<tr>
<td>Corporate Tax</td>
<td>0.009</td>
<td>0.007</td>
<td>0.2</td>
<td>-1.8</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

Note: In all the cases is the fiscal stimulus 0.1 pct of GDP, which is equal to approximately DKK 1.9Bn in the year of the shock (2010). The table shows the effect from the first year. More precisely, the government employment is increased by 5000 employees, government purchase is increased by approximately DKK 1.5Bn in 2000 index fixed prices, government investments has been increased by just about DKK 1.6Bn in 2000 index fixed prices, income taxes has been reduced by just under 0.2 BAC, the effective property value tax rate has been reduced by approximately 6 BAC, the MOMS rate has been reduced by approximately 2.5 BAC, the corporate tax is reduced by just under 9 BAC, and Labor Market Contributions have been reduced by approximately 2 BAC. For the other items is the expenditure increased and thereby the revenue is reduced by approximately DKK 1.9Bn.


As the table shows, the greatest impact on GDP is exhibited by a change in government spending and more precisely government employment, while an equal increase in government purchase gives a smaller effect on economic activity. The effect from an increase in government investment is
smaller than the effect from government purchases, which is due to the fact that the amount of import that goes to investment is greater than in government purchase. The effect from changing transfers and government wages is significantly smaller. This is first and foremost due to the fact that government wages and transfers only affects the economic activity indirectly and that most transfers are taxable, which makes the initial effect on disposable income smaller than the immediate revenue effect. When the government wages has a smaller impact and multiplier it is because a part of government wages goes to pension funds, which in the SMEC model in the short run does not contribute to the consumption determining disposable income (Grinderslev and Smith, 2007).

In relation to the effects from a decrease in taxes should it be stated that the labor supply as well as wage setting in the SMEC model is assumed to be unaffected by a change in taxation. Another relationship, that is important to highlight, is that by evaluating a change in taxation the short run propensity to consume from an income is estimated to be approximately one-half. The estimated propensity to consume can be interpreted as a result both from income changes, which consumers expect to be temporary and income changes, which consumers expect to be permanent. From economic theory it would be expected that permanent changes has a greater impact on consumption and is therefore likely that the effect on private consumption and thereby economic activity from a permanent tax reduction in reality would have a greater impact than the estimates from the SMEC model shows. The effect can too be relevant for changes in transfers (Grinderslev and Smith, 2007).

The effect from the property value has a greater impact than the other taxes. This is due to the fact that changes in property value taxation have to effects on economic activity. The first is the effect on disposable income. The first effect is the effect on disposable income, which basically is equal to the effect from the other taxation types. The other is the effect from the cash price of houses, which increases as the as the property value taxation decreases. A higher cash price on real estate increases private consumption and private investments and thereby increases economic activity in relation to the tax reductions. On the other hand, the effect from corporate taxation is smaller than the effect from the other taxation types. This is because changes in corporate taxation in the short run in the SMEC model only partly have an effect on the consumption determining income. In the long run, however, the effect on disposable income from and changes in corporate taxation has similar effects on economic activity as the effects from other taxation types in the long run (Grinderslev and Smith, 2007).
The table shows that the resulting effects on the fiscal balance are smaller than the direct revenue, which in all experiments is DKK 1,9Bn. The resulting effect is typically smaller, the larger the effect there is in activity, which is due to the fact that a great impact on activity results in large taxation revenues and less expenses for i.e. subsistence. Reversely, is the resulting effect on the balance of payments equals approximately to the direct effect in the case where the effect on economic activity is small (i.e. from corporate taxation).

I realize that the model is highly complex, and that the following is somewhat too simplistic, but in order illustrate the behavioral relationships in the private consumption functions of the SMEC model these will be described, however, with the notion that it is more complex than presented below. Thus, an overview of the entire SMEC model is far beyond the scope of this paper. However, two of the six types of private consumption estimated in the SMEC model are described as follows:

- **Private consumption** is in the SMEC model described by the following variables, the short-term disposable income, minus the private consumption in the previous year, plus disposable income in the previous year, plus the total consumption determining wealth in the previous year divided by the consumer price index in the previous year, plus a dummy (non-interesting).

- **Car consumption** is explained by other consumption than cars, plus one-family housing divided by the consumer price index, the car consumption in the previous year – the long run disposable income in the previous year.

My point is simply to illustrate further how the SMEC model analysis the behavioral relations of private consumption.

5.2 The Effect of Discretionary Fiscal Policy According to New Keynesian DSGE Models

Analyzing fiscal policy in a standard New Keynesian Dynamic Stochastic General Equilibrium model gives the prediction that an increase in output followed by a decrease in consumption. This is due to the negative wealth effect of a fiscal expansion resulting from the embedded forward looking behavior of households in both types of models. Thus, in its simplest form, a New Keynesian
DSGE model lack of the Keynesian predictions of a positive effect on consumption. However, regarding the labor market reactions, the real wages in New Keynesian models increase after positive shock to government consumption. This is because of the resulting increase in the output raises the demand for labor, which in a New Keynesian model offsets the increase in labor supply due to the negative wealth effect (Shafik Hebous, 2009).

The New Keynesian Dynamic Stochastic General Equilibrium model, the Smets-Wouters model is a representative of current thinking in macroeconomics. It was recently published in the American Economic Review and is one of the best of the empirically estimated New Keynesian models. The term New Keynesian is used to indicate, that the model has forward looking or rational expectations by individuals and firms. The term is also used to contrast the models with “old” Keynesian models without forward rational expectations, such as the SMEC model. Thus, the model captures how households’ and firms’ expectations and microeconomic behavior change over time in response to policy interventions. For this fact, the model is viewed as better for policy evaluation. In assessing the effect on government actions on the economy, it is important to take into account how households and firms adjust their spending decision as their expectations of future government policy changes (Cogan et al, 2009).

The simulations are done, by using a new database of microeconomic models designed explicitly with the purpose of doing such policy evaluations and robustness studies. The forward-looking models require explicit assumptions about what households and firms expect. With respect to the study of the American fiscal stimulus package, mentioned previously, the Smets-Wouters model predicts that the increase in GDP after one year is smaller than the increase in government expenditures itself: that is, the multiplier is less than one. Thus, the model predicts that government stimulus quickly produces a permanent contraction in private investment and/ or consumption (Cogan et al.).
The Evaluation of the Effects of Discretionary Fiscal Policy

**Figure 1 Various Multiplier Models from other Institutions**

|---------------------|--------------------------|-----------------|---------------|---------------------|---------------|

Note: The Taylor (1993) G-7 model and the ECB’s area wide model. Government spending and real GDP.

In this figure you can see the estimated impact from a 1 pct increase in government spending on real GDP in the euro area. The estimates of Smets-Wouters model and the ECB Area Wide Model are plotted over time with respect to the fiscal stimulus. The Smets-Wouters are held in relation to the SMALL IMF Model, The EU quest Model, the Taylor model, and the ECB Area Wide Model. The latter is a model without forward-looking behavior of households and firms. And the difference in the estimations potentially illustrates the importance of the microeconomic foundation.

With regards to the model specification of the “AR2 model” there is estimates in the empirical literature that is very similar and some estimates is somewhat different. However, the results from the “AR2” model are somewhat lower than the multipliers from the estimation given in the figure below.
The results obtained in the “AR2 model” and the expected multipliers from the OECD Economic Outlook presents somewhat similar estimates.

Figure 1 shows differing responses to a large negative shock depending on the size and profile of the fiscal injection. As the public balance is worsened through 2010, there is a need for fiscal
consolidation subsequently. The fiscal expansion should therefore be of temporary character in order to avoid permanent damage in the public balance\textsuperscript{13} And debt.

<table>
<thead>
<tr>
<th>Figure 12 Fiscal Injection and Government Debt Consequences - 10 Year assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fiscal injection ( % of GDP )</strong></td>
</tr>
<tr>
<td><img src="chart1.png" alt="Fiscal Injection Chart" /></td>
</tr>
<tr>
<td><strong>Government debt ( % of GDP )</strong></td>
</tr>
<tr>
<td><img src="chart2.png" alt="Government Debt Chart" /></td>
</tr>
</tbody>
</table>

Source: OECD Economic Outlook, Interim Report, Chapter 3, 2009

The first figure shows what happens to debt after several years of discretionary fiscal expansions, the debt increases more than in the middle scenario of a temporary fiscal stimulus injection. And last, the scenario of symmetrical fiscal policy and thereby a lowering of the debt burden is introduced, by means of a fiscal consolidation during the booms.

\textsuperscript{13} Danmarks Nationalbank, Kvartalsoversigt, 3. Kvartal 2009
6. Conclusion

A relatively large fiscal stimulus package was injected into the Danish economy in 2009 and 2010 and the incentive for this expansionary fiscal policy was due to the increasing employment and output gap, due to the declining production and increasing unemployment. Thus, there was so to say a potential for marshalling idle resources into production. However, due to the structure of the Danish welfare model, the automatic stabilizers caused an expansionary fiscal policy in itself, which opens the issue of the worsening of the structural balance and the difficulty of conducting symmetrical fiscal policy.

In the literature review, I have established an overview of some of the theoretical contributions to the theory of discretionary fiscal policy, and the scale of multiplier. I began with the founding father of multiplier theory and some latter contributions to investment and consumption theory, by means of the Multiplier-Accelerator Model and the Permanent Income Hypothesis. Through the debate about the effects of the fiscal stimulus package in America, a great amount of emphasis was placed on the need for new Keynesian models for policy evaluations as they explain the people’s adaptive expectations in relation to policy interventions. I had established some of the explanations, for the reason that economists disagree so much on whether or not fiscal stimulus works.

Furthermore, the literature review, created a foundation of a simplistic way of thinking about a potential investment and consumption function in my model description, whilst juggling both a traditional Keynesian multiplier-accelerator theory and a behavioral consumption function, I have obtained multipliers, in a traditional Keynesian demand determined model, somewhat similar to those of the New Keynesian models.

In an evaluation I have distinguished the difference between Traditional Keynesian and New Keynesian model frameworks, hereby the Simulation Model of the Economic Council for the Danish and the Smets-Wouters model in general and for the European economy. However, these models are of complexity and there are for obvious reason many things left unsaid and I refrain from any distinct evaluation, as the simplistic model of mine has no explanation on these subjects.
7. References


Ethan Ilzetzki, Enrique Mendosa, Carlos A. Vegh, How big small are fiscal multipliers? Preliminary draft (September 14, 2009)

Christina Romer, Jared Bernstein, The job impact of the American recovery and reinvestment plan, Council of Economic Advisers (January 2009)


Robert Barro, Voodoo Multipliers, Economist’s Voice February 2009

Tobias Cwik, Volker Wieland, Keynesian government spending multipliers and spillovers in the euro area, July 2009


Paul A. Samuelson, Interactions Between the Multiplier Analysis and the Principle of Acceleration, 1939, From Readings in Business Cycle Theory, 1950


Economic Focus, Much ado about multipliers, The Economist September 26th 2009


Dorthe Grinderslev and John Smith, SMEC Description and Model Properties, 2006, Working Paper 2007:1

Jesper Linaa, Dorte Grinderslev og Peter Birch Sørensen, Finanspolitik og konjunkturer, Det Økonomiske Råd, Forårsrapport, 2007

Shafik Hebous The Effects of Discretionary Fiscal Policy on Macroeconomic Aggregates: A Reappraisal, September 2009


Danmark Statistik, Statistikbanken, 2010
