# Including macroeconomic effects when analyzing regulations towards the Danish income insurance program

# Introduction

The economic effects of unemployment benefits are poorly understood, as stated by Karabarbounis and Chodorow-Reich (2016). On the one hand, it is argued that by making unemployment more generous job search efforts would be lowered and have a negative impact on the economic activity. On the other hand, it is argued, that higher benefits would provide a significant economic stimulus by increasing incomes and spending.

Given this uncertainty related to the effects of changes in the level of unemployment benefits it might come as a surprise, that the political regulations imposed in Denmark the last decades has resulted in a significant fall in the compensation rate over the period of 1990-2018, as pointed out by DORS 2016, Byrialsen & Raza 2018. One of the best examples of this kind of political regulations is the tax reform from 2012. Combined with a reduction in the taxes on income, a suppression of the regulation of unemployment benefits in the period of 2016-2023 is expected to increase the level of employment with more than 10.000 people, due to increased economic incentive to participate actively in the labour market. In order to discuss the validity of this expected increase in the level of employment as a result of the suppression of regulation of unemployment benefits, we build a macroeconomic model for the Danish economy, following the tradition of the stock-flow-consistent (SFC) approach in order to perform a counter-factual analysis. The model used in this analysis is an extended version of the model presented in Byrialsen et al. (2022), where the Danish income insurance program as well as the relevant macroeconomic channels for the program is integrated into the model. Using these channels, we obtain an estimate of the macro elasticity of income insurance on unemployment making it possible to evaluate the validity of the decision to suppress the regulation of unemployment benefits.

# Evaluating changes in the Danish income insurance program

In 2015 a commission was set down by the Danish Ministry of employment (the IS-commission) with the aim of analyzing changes to the income insurance program (IS-program) in Denmark. The work of the IS-commission led to the income insurance model (IS-model), today used by the government to analyze the effects of political regulations affecting the Danish IS-program. The model was built using aggregated micro effects estimating the change in the exit- and approach-rate as a result of changes in the level of income insurance. Only looking at unemployment, this model favored the lower level of income insurance as a result of suppressing the regulation of the unemployment benefits. In a response to this, worker unions and unemployment insurance companies claimed that the estimates of the micro effects were not correctly estimated and most importantly that the important macroeconomic effects, of changes to the level of income insurance, were missing in the model. (Aastrup, 2018; Jensen, 2021; Risgaard, 2021)

Micro-founded models like the IS-model make it hard to analyze these macroeconomic effects, just like these models imply a large focus on the supply side of the economy, thereby tending to ignore the principle of effective demand. Post-Keynesian theory seems to be more suitable for this type of macro-analysis, by being built on a macrofoundation. We use the accounting framework provided in the SFC- model approach adding behavioral equations inspired by post-Keynesian theory. To obtain the macro elasticity of the level of income insurance on unemployment we introduce three macroeconomic channels not considered by the income insurance model. The first channel goes through the demand created when raising the income insurance as discussed by Karabarbounis and Chodorow-Reich (2016). This demand channel suggests that changes in the level of income insurance affect the level of aggregated demand through a change in disposable income and thereby consumption, which leads to changes in economic activity and the demand for workers. The second channel goes through the insurance rate[[1]](#footnote-1), as the income insurance program is not mandatory in Denmark, one should expect a lower compensation rate to also lower the insurance rate (Aastrup, 2018; Jensen, 2021; Risgaard, 2021). Lastly, we find that incorporating the level of income insurance is in line with standard models of wage setting, which plays an important role in the determination of the targeted wage (Mcdonald & Solow, 1981; Shapiro & Stiglitz, 1984).

In order to analyze the effect of the suppression of regulation of unemployment benefits, we perform a counter-factual analysis, where the regulation was never introduced, which means that the old regulation applies during the whole period.

In the first scenario, the effect of not introducing the new regulations leads to a to reduction in the level of unemployment by 250 people[[2]](#footnote-2) as seen by the green line in figure 1. This result is mainly explained by the demand channel, where higher unemployment benefits stimulates the economic activity, mainly through higher consumptions.

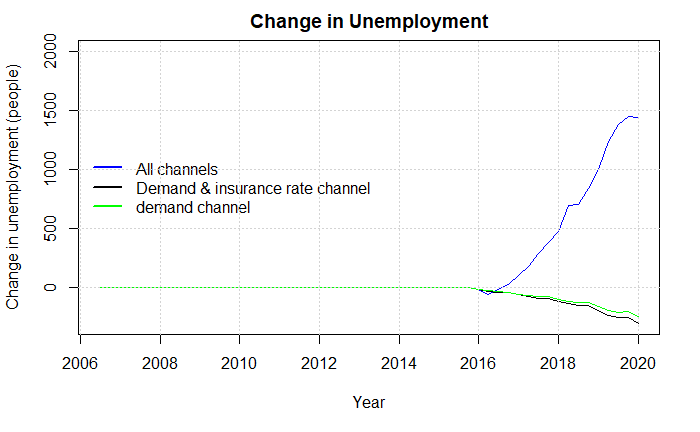
Since we find a significant positive relationship between the insurance rate and compensation rate, we want to introduce this link in the second scenario, to see how this affect the results achieved in scenario 1. Introducing this relationship and removing the suppression of the regulation of unemployment benefits, leads to a further reduction in the level of unemployment by 50 people compared to scenario 1, as seen by the black line in figure 1. The reason for the further reduction in the level of unemployment is due to the increase in the number of people in the insurance program and therefore a higher average income level of unemployment benefits.

In the third scenario we allow the level of unemployment benefits to affect the wages. We assume that the worker unions got two agendas when entering the wage negotiations, first, they want wages to follow inflation so that workers keep their purchasing power over time, second, they set a threshold for the minimum wage gap between wages and the level of income insurance, to maintain a certain incentive to stay employed. In the model the minimum wage gap is set to 42% of the wage[[3]](#footnote-3), if inflation is not able to close the minimum wage-gap alone (thereby leaving the gap to be below 42% of the wage), the labor unions would set the target wage so that the wage gap is exactly 42% of the wage.

Integrating the wage-channel, with the first two channels, creating a link between unemployment benefits and wages clearly lead to the opposite results compared to the one achieved in scenario 1 and 2. In this scenario, the omission of the suppression of the regulation of unemployment benefits result in an increase in the level of unemployment by 1450 people compared to the baseline, as seen by the blue line in figure 1. This is driven by the assumption, that the increase in the level of unemployment benefits leads to a higher increase in the wages. An increase in wages has a dual effect in the model. On the one hand it affects the economy positively due to higher household income and thereby higher consumption. On the other hand, the increase in wages affect the economy negatively in mainly two aspects: firstly, an increase in wages leads to a change in the income distribution, where the wage share increases (and the profit share thereby is reduced with the same magnitude), which reduces the level of investment. Secondly, higher wages lead to higher domestic prices, which reduces the competitiveness of the Danish firms and thereby the level of net export.

The final conclusion of including the three channels when removing the suppression of the regulation of unemployment benefits, is an increase in the level of unemployment by 1450 people, leaving the elasticity of the macroeconomic effects to be in the range of 0.25-0.3[[4]](#footnote-4).

Figure : The change in unemployment when removing the suppressing of the state regulation percentage



# Estimating the macro elasticity of Denmark

When discussing a political decision like suppressing the rate regulation percentage, it is crucial to know the relationship between the macro elasticity and micro elasticity for the Danish economy. To the best of our knowledge, no previous study has compared these for the Danish economy. For the general case Fredriksson & Söderström (2020) concludes that when not knowing the macro elasticity relative to the micro elasticity of income insurance it is not possible to make the right political decisions. If the macro elasticity equals the micro elasticity, then the Baily-Chetty formula applies directly (Baily, 1978; Chetty, 2006). If the macro elasticity is greater than the micro elasticity income insurance should be set lower than the level dictated by the Baily-Chetty formula due to aggregated inefficiencies in the economy. Likewise, income insurance should be set higher than dictated by the Baily-Chetty formula if the macro elasticity is lower than the micro elasticity. A key question is thus whether the macro elasticity is greater/lower or equal to the micro elasticity. (Fredriksson & Söderström, 2020).

To obtain an estimate of the macro elasticity for Denmark, we use the same idea as Lalive et al. (2015) taking the sum of the micro effect and macro effects. So, if finding significant macro effects as we show for the Danish economy, we can use those together with the micro effects of the IS-model to get an idea of the relationship between the macro and micro elasticity[[5]](#footnote-5). In the section above we found the elasticity of the macroeconomic effects to be in the range of 0.25-0.3, whereas we only need an estimate of the micro elasticity.

Estimating the micro elasticity for Denmark we use calculations carried out by the ministry of employment using the income insurance model. In 2020 the ministry received a question for calculating the effects of removing the suppression of the regulation of unemployment benefits in the period of 2021-2023[[6]](#footnote-6). In the response it is estimated that this will result in an increase of 2.25% in the level of income insurance. In total this increase will lower employment by 2900 people[[7]](#footnote-7). This is further split up showing the effect associated with the exit-rate (1600 people) and the approach-rate (1300 people) independently (Hummelgaard, 2021). As mentioned by Jensen (2021) it is controversial that the effect on the approach-rate is contributing with 45% of the total effect found.

As a large majority of the literature has questioned the estimate of the approach effect we use the argumentation from DØRS (2022) of lowering the effect on the approach rate to half the size, when estimating the micro elasticity. Therefore, we will be using an increasement of 2250 people in unemployment instead of by 2900 as estimated by the income insurance model. Doing this, we estimate the micro elasticity to be 0.51, compared to an elasticity of 0.66 using the full effect on the approach-rate as done by the IS-model. This implies that the macro elasticity in Denmark is in the range of 0.76-0.81, thereby finding results comparable to the once presented by Fredriksson & Söderström (2020) with a macro elasticity significantly larger than the micro elasticity.

At the start of the regulation period in 2016, the government faced the elasticity found above of 0.66. Using our own results, we instead estimate the elasticity to be in the range of 0.86-0.91 taking into account the lower approach effect, as well as macroeconomic effects. We can now use these estimates in the framework of the Baily-Chetty function to see if we reach different conclusion when evaluating the political decision to suppress the state regulation percentage. The Baily-Chetty function evaluates the benefit level by using three important parameters. First, the elasticity of unemployment[[8]](#footnote-8) with respect to benefits (), where we will use the estimates just presented. Second, the drop in consumption as a function of benefits   
( ), here we do as DØRS (2014) using the compensation rate as a proxy for the change in income when going from employment to unemployment. Third a coefficient of relative risk aversion (), as we do not obtain an estimate of the risk aversion we use an estimate of 1, also used by DØRS (2014) when applying the Baily-Chetty function for Denmark. Below we see the set-up of the Baily-Chetty function estimating the marginal gains of income insurance on the left side, versus the marginal costs on the right side:

against

Applying the estimates of the income insurance model, we estimate the marginal gains to be 0.52 which is lower than the marginal costs found to be 0.69. Thereby validating the political decision to suppress the regulation of unemployment benefits.

Using the macro elasticity found in this paper, as well as adjusting the micro elasticity to match what is found by newer literature regarding the effects of the approach rate, we find the marginal gains to be 0.57 which is lower than the estimated value of the marginal costs being 0.96. Therefore, the government seems to be choosing right in lowering the compensation rate over time by suppressing the regulation of unemployment benefits.

Interestingly, we find this conclusion to rely heavily on two assumptions. First, that our findings of Denmark being categorized as profit-led holds, meaning that increases in the wage affects the Danish economy negatively. We find the literature in general to be split regarding categorizing the demand regime for Denmark, but the results based on our model seems to be very robust.   
The next assumption is more critical, as the results rely on the ability of worker unions to raise wages when the gap between wages and income insurance gets small. Both theoretical as well as empirical evidence seems to support this assumption, whereas we set the minimum gap that the worker unions will allow according to the elasticity of income insurance on wages found by Fredriksson & Söderström (2020). If we instead use our own data for Denmark to estimate a relationship between the level of income insurance and wages, including the average level of income insurance in the wage equation of our model, we find no significant relationship in the long run. Using this as an argumentation to exclude the wage-channel, we instead estimate the elasticity of the macroeconomic effects to be -0.04, leaving the total macro elasticity to be 0.47. Applying this estimate in the Baily-Chetty function we reach the opposite conclusion where the marginal gains from increasing the level of income insurance exceeds the marginal costs, favoring an increase in the compensation rate, thereby making the decision to suppress the regulation of unemployment benefits the wrong choice.

# Conclusion

In this paper we present an alternative of using the purely micro-founded models. We do this utilizing the quarterly Stock-Flow-Consistent model for the Danish economy built by Byrialsen et al. (2022) by incorporating the Danish income insurance program within the model, as well as introducing three macroeconomic channels in which the income insurance program affects the economy. When performing a counterfactual analysis in removing the suppressing of the state regulation percentage, we find that the three macroeconomic channel together increase unemployment by 1450 people, leaving us with an elasticity of these macroeconomic effects in the range of 0.25-0.3. We use our estimated macro elastic together with the estimated micro elasticity from the income insurance model used by the government to evaluate the decision to suppress the state regulation rate using the Baily-Chetty function. We do find support for the political decision to suppress the regulation of unemployment benefits.   
However, we find this conclusion to heavily rely on two assumptions, where especially the assumption that worker unions in Denmark are capable of affecting the wages when the gap between the level of income insurance and wages gets small. We do not find empirical evidence for a significant relationship between the level of income insurance and wages, which suggests a macro elasticity of 0.47 instead of 0.89. This change in elasticity actually results in the opposite conclusion, questioning the political decision to suppress the regulation of unemployment benefits.

1. The share of workers being part of the income insurance program. [↑](#footnote-ref-1)
2. As the demand channel is built into the baseline model, this channel will also affect the results of the two additional channels. [↑](#footnote-ref-2)
3. Which is giving us an elasticity of income insurance on wages close to the one found by (Fredriksson & Söderström, 2020) of 0.2-0.3. [↑](#footnote-ref-3)
4. As we use a dynamic model, we obtain an estimate of the elasticity for each quarter, as the shock is still active at the end date of 2020Q1 we use the 4 latest values to estimate the elasticity. [↑](#footnote-ref-4)
5. One possible critic of this method is that the effects from the income insurance model and the model built in this paper will not interact. We don’t see this affecting the overall results, as it will have no effect on the most dominant channel being the wage channel. [↑](#footnote-ref-5)
6. Evaluated in 2025, so that the full effects have been carried through. [↑](#footnote-ref-6)
7. As the participation rate is fixed the fall in employment will directly result in an increase in unemployment of the same amount. [↑](#footnote-ref-7)
8. As they look at a micro foundation they use the unemployment duration of one person, we will use the amount of unemployed in the economy. [↑](#footnote-ref-8)