# Introduction

Looking at the development of the generosity of unemployment benefits in Denmark over time, as a result of political regulations deteriorating the income insurance program data from ADAM’s databank shows a falling compensation rate in the period of 1990-2018. One of the most recent regulations is the political decision to suppress the regulation of unemployment benefits in the period of 2016-2023. We use a stock-flow-consistent (SFC) approach to set up a counter-factual analysis looking at the effects of this decision. We build upon the SFC-model build by (Mikael, Hamid, Sebastian) as we integrate the Danish income insurance program, as well as important macroeconomic channels for the program. Using these channels, we obtain an estimate of the macro elasticity of income insurance on unemployment making it possible to validate the decision to suppress the regulation of unemployment benefits.

# Evaluating changes in the Danish income insurance program

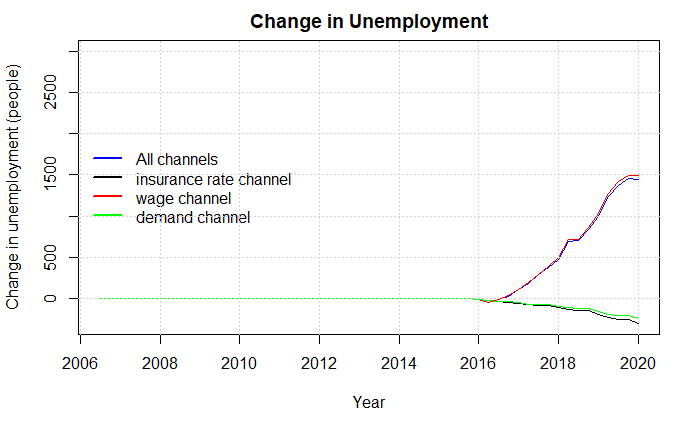
In 2015 a commission was set down by the Danish Ministry of employment (IS-commission) with the goal of analyzing changes to the income insurance program in Denmark. The work of the IS-commission led to the income insurance model, today used by the government to analyze political regulations towards the Danish IS-program. the dynamics of this 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. 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 these results, 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; Fagbevægelsens Hovedorganisation, 2021; Jensen, 2021)

The popular micro founded models makes it hard to analyze these macroeconomic effects, as the models are usually build using aggregated micro effects as the total macroeconomic effect. Also, these models imply a large focus on the supply side of the economy, thereby tending to ignore the effects of the demand site. Post-Keynesian theory seems to overcome these short comings making it more suitable for this type of analysis, by not building on the narrow micro founded effects. For this reason, we use the framework of a PKSFC- model building on standard accounting principles and explaining the data through 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. This demand channel suggests that changes in level of income insurance affect the level of aggregated demand through a higher consumption, thereby increasing GDP leaving a higher demand for workers. We find this channel alone to decrease unemployment by 250 people[[1]](#footnote-1).

The second channel goes through the insurance rate[[2]](#footnote-2), as the income insurance program is not mandatory in Denmark, it is argued by (Aastrup, 2018; Fagbevægelsens Hovedorganisation, 2021; Jensen, 2021) that one should expect a lower compensation rate to also lower the insurance rate. We find a significant positive long-run relationship between the insurance rate and compensation rate, which we add into the model when introducing the insurance rate channel. We find that this channel independently decreases unemployment by 50 people.

Lastly, (Andersen et al., 2015) argue that changes in the level of income insurance will affect the wage negotiations, expecting that a higher level of income insurance would increase the targeted wages demanded of the worker unions, who wants to maintain a high incentive to work. Such a channel is also included by (Byrialsen & Raza, 2018) including the compensation rate in their wage equation. They argue that incorporating the compensation rate 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). First, we assume that worker unions want the wages to follow inflation so that workers keep their purchasing power over time. Second, they set a threshold for the minimum wage gap measuring the difference between the wages and maximum level of income insurance relative to the wages, 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). In the case where 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. We find the wage-channel alone to increase unemployment by 1750 people compared to the baseline only including the demand channel.

In the graph below, we see the effects of each channel independently, also including a scenario where all the channels are interacting together. We find thee total effect of all channels to increase unemployment by approximately 1500 people. We estimate the elasticity of these macroeconomic effects to be in the range of 0.35-0.4[[4]](#footnote-4).



# 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, and there are aggregate inefficiencies, then income insurance should be set lower than the level dictated by the Baily-Chetty formula. 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 market externalities. So, if finding significant market externalities as we show for the Danish economy, we can use those together with the micro effects of the income insurance model to get an idea of the relationship between then 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 0.35-0.4, whereas we now 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 suppressing of the rate regulation rate in the period of 2021-2023[[6]](#footnote-6). In the response it is estimated that the removing of the suppressing 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). They further split the effect up to the one estimated from the exit-rate (1600 people) and the one for the approach-rate (1300 people). As mentioned by Jensen (2021) the effect of the controversial estimate for the approach effect is approximately 45% of the total effect. (Hummelgaard, 2021)

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 estimates of the income insurance model. This implies that the macro elasticity in Denmark is in the range of 0.86-0.91, thereby finding results comparable to the findings of Fredriksson & Söderström (2020) with a macro elasticity twice as large as the micro elasticity.

At the start of the regulation in 2016, the government themselves were faced with the elasticity found above of 0.66, when using the IS-model. 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 the same conclusion when evaluating the political decision to suppress the state regulation percentage, as the government would using an elasticity of 0.66. The Baily-Chetty function evaluates the benefit level by using three important parameters. (1.) The elasticity of unemployment[[8]](#footnote-8) with respect to benefits (), where we will use the estimates just presented. (2.) 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, and (3.) 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. Using these the Baily-Chetty function estimates the marginal gains of income insurance on the left side, versus the marginal costs on the right side:

against

Using the estimates of the income insurance model, we get the estimate of the marginal gains to be 0.52 which is lower than the estimate for the marginal costs being 0.69. Thereby validating the political decision to suppress the rate regulation.

Using the macro elasticity found in the paper, as well as adjusting the micro elasticity to match what is found by newer literature towards 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 the economically optimal solution in lowering the compensation rate over time by suppressing the rate regulation percentage.

But 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 to be split regarding categorizing the demand regime for Denmark, but the results based on our model seems to be very robust therefore we are not concerned about this assumption.   
It gets more critical for the next assumption, as the conclusion rely on the ability of worker unions to raise wages when the gap between wages and income insurance gets small, the theoretical as well as empirical evidence for this seems to be strong, whereas we set the minimum gap that the worker unions will allow according to the elasticity of the level of income insurance on wages found by Fredriksson & Söderström (2020). When using our own data for Denmark to estimate a relationship between the level of income insurance and wages, including the average level of IS in the wage equation of our model, we find no significant long run relationship. 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. Using 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 a increase in the compensation rate, thereby making the decision to suppress the rate regulation rate non optimal looking at the economic welfare.

# Conclusion

In this paper we present an alternative of using the purely micro-founded models, like the income insurance model built to analyze regulations as the suppressing of the state regulation percentage. 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 IS-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 1500 people, leaving us with an elasticity of these macroeconomic effects in the range of 0.35-0.4. 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. Estimating the micro elasticity for Denmark we use calculations carried out by the ministry using the IS-model to calculate the effects of removing the suppressing of the state regulation percentage from 2020-2023, based on this we estimate the micro elasticity to be 0.66. But as newer literature presented by DØRS indicate, the approach effect is overstated in this model, accounting for this we find the more realistic estimate of the micro elasticity to be 0.51.   
Based on these results we estimate the macro elasticity of income insurance on unemployment to be in the range of 0.86-0.91 in the case of Denmark. We use these results together with the estimated micro elasticity of 0.66 found using the estimates of the IS-model, to see if we reach different conclusions when evaluating the political regulation using the Baily-Chetty function. In both cases we find that the political decision to suppress the state regulation rate increases economic welfare, thereby not changing the conclusion when taking into consideration the macroeconomic effects of this regulation. This conclusion heavily relies on two assumptions. First, that Denmark is categorized as profit-led where the results found in our model seems to be very robust indicating that we fulfill this assumption. Second, we assume the worker unions in Denmark to be capable of affecting the wages when the gap between the level of income insurance and wages is getting small. Even though there is much empirical evidence for this, our own data suggests there are not significant relationship between the level of IS and wages. When not fulfilling this assumption and leaving the wage-channel out, we estimate the total macro elasticity to be 0.47 instead of 0.89, thereby resulting in the opposite conclusion, leaving the political decision to suppress the rate regulation percentage to lower the economic welfare.

1. As the demand channel is built into the baseline model, this channel will also affect the results of the two additional channels. [↑](#footnote-ref-1)
2. The share of workers being part of the income insurance program. [↑](#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)