

# Quota consolidation in Norwegian coastal fisheries

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## 1. Introduction

There is considerable evidence that market-based management improves the performance of fisheries and other natural resources, both in terms of economic efficiency and ecological outcomes. Despite this, the number of fisheries worldwide with market-based management are relatively few and there is often considerable political opposition to these management schemes. This study investigates the conflict between economic efficiency and social objectives is also present in Norwegian fisheries management.

## 2. Method

In this study, we investigate the impact of the market-based quota scheme on consolidation in the Norwegian coastal cod fishery using two methods. First, we estimate the direct impact of the policy on vessel reduction. Second, we analyze descriptive measures of long-run consolidation trends in the Norwegian coastal cod fishery. The study employs a difference-in-differences (DiD) approach to examine the effects of the Structural Quota System (SQS) introduced to different vessel groups in the coastal cod fishery at two different times. In analyzing the effects of SQS implemented in 2004 and 2007, it utilizes different control and treatment groups. To explore the long-run effect of the scheme, we adopt a variety of measures of consolidation including Herfindahl-Hirschman index (HHI) and the Gini coefficient. The concentration of fishing quota may occur due to the reduction of the number of fishers (extensive-margin) and the shift of quotas to a small number of fishers (intensive-margin). To distinguish these two margins, we decomposed the HHI into the number and the distribution effects.

## 3. Results

Fig.1 shows the coefficients estimates for the SQS in 2004. The difference in the probabilities of exit is not statistically different before the SQS introduced in 2004, but the difference emerges after the introduction. The magnitude of the impacts are around a 6 percentage point increase in 2004 and more than 10 percentage points in 2005. The estimated impact is lower in 2006, but this

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is likely due to the SQS moratorium that was introduced toward the end of 2005. Regardless of this, the policy change had a significant short-run impact on the consolidation of the fleet. The result for the introduction in 2007 also shows a similar outcome.

The results from the long-term effect analysis exhibits that vessel-level quota consolidation is prominent in all length groups under the SQS after implementation. Based on the decomposition, a large portion of the HHI is explained by the number effect before the SQS introduction, but the total HHI and the number effect start diverging after the SQS introduction, suggesting that the distribution is hindered after the implementation of SQS.

#### 4. Conclusion

Our study identifies a direct effect on vessel exit of the structural quota policies introduced in the Norwegian cod fishery in 2004 and 2007. Also, our long-run analysis indicates that the consolidation is triggered by the introduction of the SQS. Good resource management must be based on strong knowledge of both the direct and indirect effects of policy, such as the changes in quota distribution following the SQS. Norway's quota system has been described as a system of gradual change or 'hesitant reforms', but many claim that economic efficiency gradually has been given priority over social equity, in the form of e.g. local employment and economic activity. This development could reflect changes in people's attitudes and be the result of political processes, but it could also be that the system has had some unintended consequences.

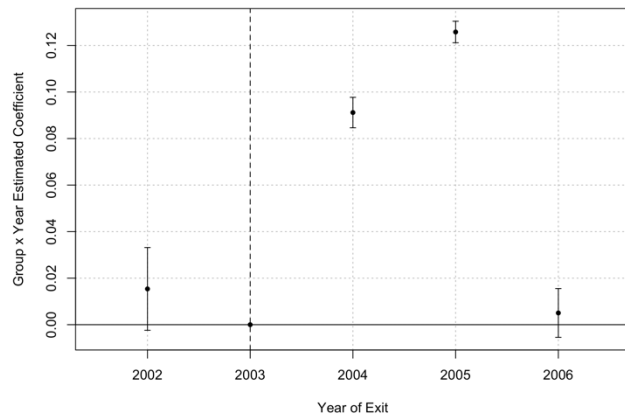


Fig.1 coefficient estimates of the event study model

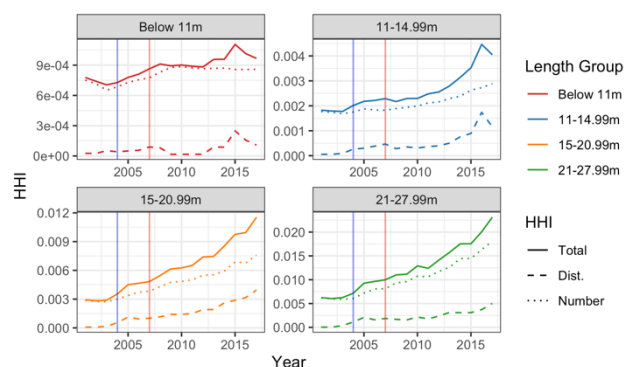


Fig.2 Vessel-level HHI for coastal cod license by length group