Quantifying the Welfare Gain from Switching to Tax Regulation for Fisheries

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Abstract: Theoretical papers on choice of regulatory instruments for fisheries find that taxes may be preferred to transferable quotas (ITQs) when the regulator is uncertain about either the biological growth function (pure biological uncertainty) or the extent of non-compliance with regulations (pure compliance uncertainty). In this paper we estimate profit functions, penalty functions and growth functions as well as the underlying biological uncertainty and compliance uncertainty for the Danish cod fishery in Kattegat and simulate the aggregated welfare gain (or loss) from switching to tax regulation. We find that taxes are preferred over ITQs but the welfare gain of a regulatory shift is very small (less than 3%) and this result is robust to large changes (+/- 50%) in all parameter values. When varying the parameter values the gains of taxes are less than 5% in most cases and in no case the gain exceed 13%. We, also, develop a simple, operational indicator based on typically accessible information with which regulators can approximate the welfare gain from switching to tax regulation for any given fishery. By calculating this indicator using existent literature covering a wide span of fisheries we concluded that for most fisheries worldwide a small welfare gain arise when switching to taxes. Thus, the theoretical results on taxes and ITQs under biological and compliance uncertainty should not generally guide practical policy recommendations for fisheries.