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The growth and decline of fisheries communities: Explaining relative population growth at municipality level

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ABSTRACT

In several countries, maintaining the population of fisheries dependent communities are of major importance in the fisheries governance system. However, most studies investigating the relationship between fisheries and communities have a qualitative focus on the impact of fisheries policies on the communities. We have access to data on population and key employment indicators of every Norwegian municipality in addition to fisheries catch, landings and employment. These data allow us to study the effect of fisheries on population growth in fisheries dependent municipalities relative to all other municipalities. The data are analyzed using a multi-level approach integrating micro- and macrodata. The results indicate that general trends have a stronger influence on population growth than fisheries activities, implying that measures for increased fisheries landings are poor tools to support population growth.

1. Introduction

Coastal communities are often found to be in decline, with a reduction in population over time [1–4]. Moreover, regulatory measures that are intended to maintain fish stocks and fishing as an economically efficient sector, often reduce the number of fishers and thereby work to reduce the population in coastal communities [4–7]. This has generated several policy measures to support fisheries dependent communities and maintaining their population. Management tools meant to help fisheries-dependent communities include subsidies of fishing vessels and processing plants [8]; allocation of individual processing quotas [9]; allocation of quota to inefficient vessel groups (as is often the case when quotas are granted on non-economic basis) [10,11], community development quotas [12]; and imposing obligations to land fish in specific communities [13,14]. The use of such measures builds on the assumption that population growth is influenced by fishing and related activities, and thus by measures to influence the patterns of fishing and landing of fish.

In this paper, we test how fisheries activities *do* influence population growth, using data on population growth, general economic activity and fisheries activities for all Norwegian municipalities.

Fisheries management generally has broader objectives than preserving fish stocks through proper resource management. The Food and Agriculture Organization of the United nations (FAO) includes broader economic and social considerations in the ecosystem approach to fisheries (EAF), such as the fisheries industry's contribution to employment and livelihood. In many countries, there are differently expressed but similar development goals or social objectives associated with fisheries policy. In the US, the Magnuson-Stevens Fishery Conservation and Management Act includes a requirement to minimize economic impact and sustain fisheries participation in these communities [15]. The Magnuson-Stevenson Act also requires federal fisheries management to consider the impact on fishing communities when implementing new fishing regulations [16]. In the EU, one of the goals for the Common Fisheries Policy (CFP) is to "foster a dynamic fishing industry and ensure a fair standard of living for fishing communities".[1] Even so, the CFP is

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[1] https://ec.europa.eu/fisheries/cfp_en.

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often criticized for taking too little account of regional development and social and cultural impacts of the policy [17–19]. In the EU, the concept of fisheries dependency in costal societies carries political importance because areas falling under the definition will benefit from EU funds [20].[2]

In Norway, the mission statements in the two central laws regulating the fisheries both aims at benefiting the coastal population. The Marine Resources Act (Act of June 6, 2008 no. 37), aims to "ensure employment and maintain settlement in coastal communities". The Participant Act (Act of March 26, 1999 no.15) aims to "facilitate the harvesting of marine resources to continue to benefit the coastal population", amongst other things by making sure the fishing fleet is owned by active fishers. This legislative focus is also reflected in political discussions, where allocation of fishing rights, homeport and port of call for fishing vessels, and location of the fish processing industry, is often directly linked to the development of vulnerable coastal communities [21]. However, this focus contrasts with the more general trends of economic growth that led to transition from primary to secondary and tertiary employment, as in all other developed economies [22]. An important effect of this transition was population decline in rural areas, prompting political reactions in the 1970s and regional policies aimed at maintaining a distributed settlement pattern [23,24]. White papers from the government on fisheries policy signals an ambiguous attitude to modernization, on one hand the sector must evolve to keep pace with the surrounding society, but on the other hand the sector should be a basis for a distributed settlement and employment along the entire coastline [25–29].

This duality is seen also in the changing instruments used for social development and efficiency in the Norwegian fisheries management system even before TACs were introduced to protect fish stocks [14]. In the 1960s and 1970s subsidies were widely used to sustain fisher wages and a high number of vessels. However, the subsidies peaked in 1982, and in the following decade most subsidies were revoked. Moreover, as TACs were introduced for all important fish stocks, first decommission schemes and then individual fishing quotas with an increasing degree of transferability was introduced to promote economic efficiency [30–32]. This has led to a strong reduction in the number of fishing vessels [33]; fishers [34]; and fish processing plants [1,35]. Furthermore, these changes have led to a massive redistribution of landings between municipalities [35]; providing us with a quasi-experiment on the effect of fish landings on population. Hence, Norwegian coastal communities provide a good case for investigating the impact of fisheries and fish processing on net population growth in fisheries dependent communities.

In the period analyzed in this paper, 2003–2013, the Norwegian fishing industry is characterized by well-managed fish stocks and political initiatives to increase economic efficiency [32,36]. At the same time the Norwegian minister for fisheries proclaimed in 2006 that the explicit goal for the fisheries policy of the Norwegian government was to "maintain the lights in every house" along the coast, i.e. keeping a dispersed population settlement [37].

The conflicting objectives of increased productivity and regional development leads to a series of fisheries policy dilemmas [32,38–40]; including the case that social goals might be reached at the expense of economic efficiency [11]. It has been argued that when an industry with declining employment is given social responsibilities, such as to uphold population in coastal communities, this leads to a public perception of permanent crisis [41]. While laws and political aspirations expressed in white papers to the Norwegian parliament [26–29,42] signal the desire to promote employment and settlement in coastal communities, the productivity increase means that the industry's ability to meet such ambitions is severely limited. However, the productivity increase is important and often necessary to maintain the industry without increasing subsidies, as it allows the fishing sector to pay competitive wages [34].[3]

The importance of fishing resources to communities are often studied qualitatively, and reported in a narrative format [43,44]; often with an anthropological starting point [15,45]. Others have introduced a range of metrics [46,47] to be able to quantitatively asses the importance of fishing and to lay the foundation for studies of fisheries and community dynamics. For this paper a unique data set combining fisheries specific information and general information about all Norwegian municipalities is used to investigate the existence and degree of influence of fisheries on net, relative population growth[4] for the period 2003–2013, with a focus on fisheries dependent municipalities. The data will be analyzed using a multi-level approach integrating micro- and macro-data, which is now state of the art in many subfields of political and economic sciences [48]. The general population model will be augmented with a set of variables to explicitly allow for the effect of fisheries on population growth. These variables include fish landings and employment as fishers and in fish processing, as well as dummies singling out particularly fishery dependent communities using the categorization by Lindkvist [49].

Two things are novel in this paper, 1) we measure this link between economic activity, fisheries in our case, and population, and 2) we do it for a specific purpose: to investigate the widespread assumption that fisheries policy affects the development of population at municipality level. This is complementing the significant literature of case-based analysis in selected communities.

The paper is organized as follows. In section 2 a presentation of the development in fisheries and coastal communities in Norway is given. In sections 3 and 4 the data set and empirical model are presented, before results are reported and discussed in section 5.

2. Contextual background: fisheries management and population in the Norwegian context

Much of the fisheries in Norway are conducted in the Northern part of the country, from coastal, peripheral communities with low population density, and where fisheries are highly important in the communities. The fisheries industry in Norway is in transition with one exception: fully utilized fish stocks means relatively stable landings. Annual landed value in the period from 2003 to 2013 is on average about 14 billion NOK in total (Fig. 1), with whitefish as the largest category at about 8 billion NOK. However, there is significant variation around these means, as prices fluctuate. In particular, the value of landings increased quite steeply in two parts of this period. From 2003 to 2005 as prices for cod, herring and mackerel increased, and from 2009 to 2011, when the quota for cod was steeply increasing. Even with the marked decline from 2011 to 2013, the value in 2013 is about 10% higher than in 2003, the poorest year within this window.

Even though landings values are relatively stable, the number of fishing vessels has been reduced by 40% during the same period (Fig. 2). Quotas for a large part of the fleet, coastal vessels between 11 and 28 m, was made partly transferable from 2004, creating a process of quota consolidation as well as scrapping and renewal. The number of fishers was not as strongly reduced (but was still reduced by 30%), as many vessels with higher quotas employ more fishers, some of them running

[2] This has led to a discussion with respect to whether there are trade-offs in various sustainability dimensions, and particularly whether management systems that restricts access to the fisheries has negative impact on social sustainability. Asche et al. [71] show that on average this is not the case, but there are still compelling individual examples indicating that outcomes may depend on system design.

[3] Indeed, there is a number of productivity enhancing innovations through the seafood supply chain [74].

[4] In this paper we measure population growth as relative growth, percentage change from year to year, and as net growth (migration + births - deaths).

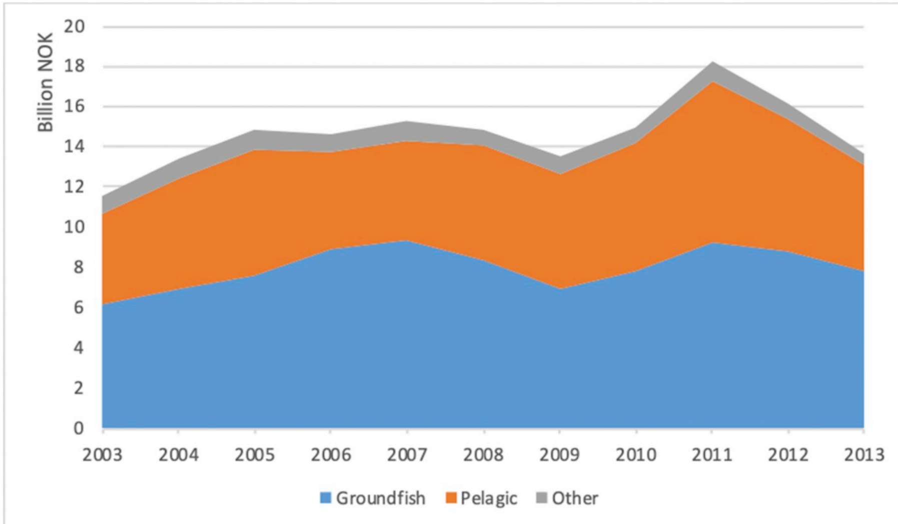

Fig. 1. Value of landings in Norway, fixed prices (2013 = 100). Source: Nofima/Directorate of Fisheries/SSB.

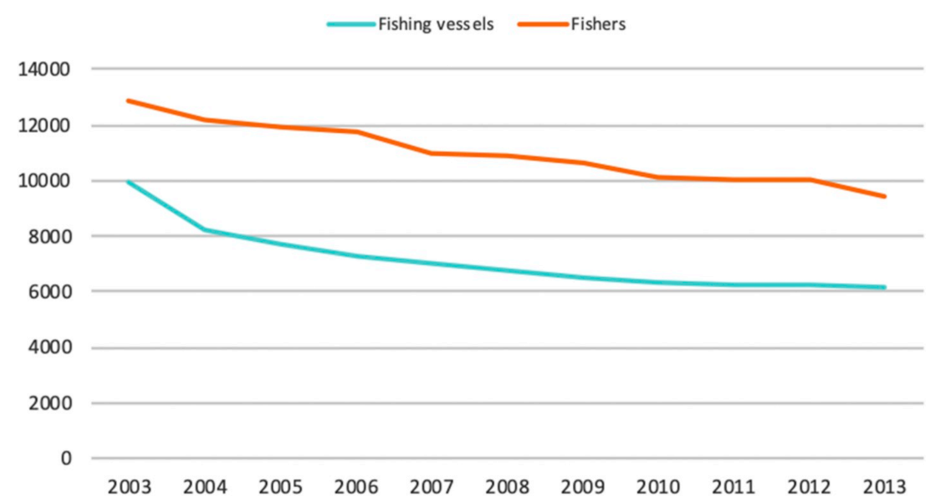

Fig. 2. Fishing vessels registered and number of fishers. Sources: Fishing vessels: The Directorate of Fisheries. Fisheries: Statistics Norway[6].

two shifts (with the added benefit of more time off and more regular work time for the fishers remaining).[5] While the number of fishers was reduced by 30%, employment in the fish processing industry was reduced by 18% from 2003 to 2013.

The reduction in the number of fishermen is a result of opposing trends; while young people are increasingly attracted to fisheries as crew members, as pay is very good [34]; the increased productivity from restructuring schemes and the increasing value of fishing rights leads to reduced entry to fleet ownership from younger fishers.

While employment in processing showed increase around 2010/2011 (Fig. 3), there is a marked reduction and a substantial change in the composition and location of the processing industry. Landings and processing of fish is concentrated to fewer and larger facilities, meaning also that some municipalities increase their activity, while some reduce or even lose activity altogether [1,35]. As shown in Table 1, while the number of processing plants was reduced by 40 %, an estimated 20 municipalities lost all their processing activity in the period between 2003 and 2013.

That fisheries activity is concentrated in fewer fisheries municipalities, means that some of the remaining fishing municipalities may grow. On the other hand, fisheries activity also is shifted from smaller, dependent fisheries municipalities to larger municipalities or regional centers, with a more diversified economy, i.e. cities like Tromsø, Bodø and Harstad [38]. As shown by Ref. [50]; the larger municipalities in Northern Norway has been the drivers of demographic development for the last decades. The growth is mainly fueled by natural increase (i.e. birth minus deaths) and net migration from Eastern Europe. Either way, such rapid structural changes present a good opportunity to investigate the existence and degree of influence of fisheries activities on population development.

3. Data

While European studies often find it hard to get sufficient data when studying fisheries dependent communities [51]; very detailed data are now becoming available in Norway. To conduct this study, data from three data sources will be combined. Data containing information about

[5] This is not dissimilar to the experience in several Alaska fisheries, where it seemed that a large part of the over-capacity was in terms of floating steel, but where a system with catch shares leads to a longer season [75]; with fewer but steadier jobs [47,72].

[6] The Directorate of Fisheries maintains a register showing who have fishing as main occupation as well as secondary occupation.

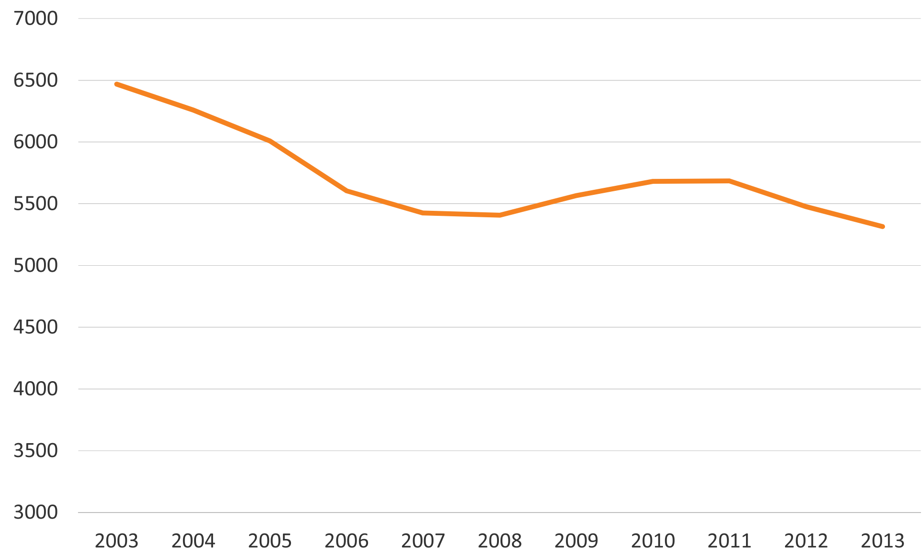

Fig. 3. Employees in the Norwegian fish-processing industry. Source: Statistics Norway.

Table 1
Number of processing plants in Norway and number of municipalities with fish-processing industry. Source: Nofima.

		2003	2005	2010	2015
Number of processing plants	Groundfish	432	418	311	288
	Pelagic	42	39	38	24
Municipalities with fish-processing industry		145[a]	140	128	122

[a] This number is from 2000, the actual number for 2003 is thus somewhere between 145 and 140.

each landing event for every vessel in the Norwegian fleet, including in which municipality[7] the fish was landed, are extracted from the Norwegian Directorate of Fisheries trip-data register.[8] Annual employment statistics at the municipality level is available from Statistics Norway (SSB), based on yearly 4th quarter registrations. The work force is segregated on industry divisions and public sector. Thirdly, data on municipality development is available from Gator,[9] a database of more than 1200 variables to describe local development (population, age, employment rate, income etc.). For more details on the variables see Appendix.

To cover the period after the introduction of structural measures in the coastal fishing fleet, we use data for the period 2003 to 2013.

Fisheries dependence can be measured in multiple ways. Fishery employment as share of general employment is used to identify fisheries dependent communities in EU's coastal areas [52]. A combination of output-, economic- and employment data disaggregated to regions [53] is used to characterize different kinds of fisheries dependence, while 11 qualitative measures to describe the economic and demographic status of fishing communities is also proposed [47]. Lindkvist [49] uses a combination of employment and production (aggregated catches and landings) to determine different categories of fisheries dependent municipalities in Norway.

In this analysis two measures of fishing dependency will be used, Lindkvist's discrete dependency measure of large fishery dependent communities and continuous measures like Natale et al.'s [52] share of employment in fisheries.

4. Methods

Population development is very often associated with social and economic development (K. V. [54,55]; and there are many studies of the positive and negative social consequences of population changes in fishery dependent communities [56,57]. As shown [77]; population size has been shown to be important to the long-term viability of communities. Also, for methodological purposes, population size is necessary for constructing relative measures that can be used in a comparative perspective.

Integration of micro- and macrodata is now seen as state of the art in many subfields of political and economic sciences [48] and has been increasingly popular the last decades [58]. There are good theoretical and statistical arguments for using multilevel models accounting for macro-as well as micro-level information [59,60]. Using a multilevel setup, a diverse range of topics has been studied: policy diffusion [61]; attitudes toward immigration [62]; ethnic and social tolerance [63]; rightwing voting [64]; social and political trust [65]; M. [66]; satisfaction with democracy [67]; political participation [68]; the political economy of gender vote gap [69]; support for European integration [70] and the effect of regional development policies [50].

Most of these studies employ pooled individual-level survey data with matched country-level information to estimate micro and macro effects. This is the same technique applied in this paper, but rather than having countries as level 2 units, we use municipalities as level 2 and year at level 1. One of the critiques against multilevel modeling is that researchers analyzing countries often have too few observations at level 2 [48]. The research strategies in this paper, where there are enough observations at level 2, attend to this critique.

The data for this study is structured as a panel data set. The multilevel time-series analysis employs a latent growth curve model as the Norwegian population in general has increased over the time period studied. Each municipality i is measured in every year t. The dependent variable, *net relative population growth*, is explained through a set of increasingly complex models. The most basic model contains only a constant term and a trend. This implies that individual growth curves

[7] Municipality is the lowest administrative level in Norway, and the lowest level for which relevant data are to be found. A municipality is in most cases a single community, but in a few of the larger municipalities there are more than one fisheries community.

[8] The register includes catches delivered by Norwegian vessels, both in Norway and abroad, and catches delivered in Norway by foreign vessels. The data is submitted via the fish sales organizations (PO's) to the Directorate of Fisheries.

[9] http://site.uit.no/rokkangruppen/2016/10/17/presentation-gator-and-the-high-north/.

are estimated for each municipality in relation to the overall growth curve. This model is given as:

Level 1: γ $\mathrm{poprate}_{ti} = \pi 0_i + \pi 1\mathrm{itrend}_{ti} + e_{ti}$
Level 2: $\pi 0_i = \beta 00 + u0_i$
$\pi 1\mathrm{itrend}_{ti} = \beta 10 + u_{ti}$

This base model is then expanded by first introducing fisheries specific variables (landings, fisheries dependency, percentage fishermen), and then variables containing general information about the economic status in the municipality (public sector employment, general employment), and finally allowing the constant and trend terms to be influenced by municipality size as measured by the number of inhabitants.

The models are estimated with a Maximum Likelihood approach. To examine which model has the best quality, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) is used. AIC and BIC cannot be interpreted in absolute terms, but the smaller the number the better the model fit the data and better predict the actual score on the dependent variable. Both these criteria are reported together with the log likelihood function.

5. Empirical results

In total, five models are estimated, and the results are reported with increased model complexity, in Table 2. As indicated by the log-likelihood function and the two information criterions, the model fit improves with additional variables, with the most complex model providing the best fit to the data.

Model 1 contains only a constant term and a trend. The negative constant term indicates a negative population growth rate, but with a positive trend term this is reversed after four years. In model 2, fisheries landings as well as a dummy variable for Lindkvist's fisheries dependent municipalities are added. Both variables are statistically significant, but with opposite signs. Increased landings increase net population growth while high fisheries dependency is associated with low growth. This suggests that while increased landings may lead to additional activity in a community, the landings are not directed to the most fisheries dependent communities.

In model 3, the percentage of the labor force in the municipality working as fishermen is added. This provides a continuous measure of fisheries dependency, and this appears to be a better fit to the data than the Lindkvist dummy. The new variable is statistically significant with a negative sign, while the dummy becomes insignificant. However, the main conclusion from model 2 holds in that increased landings increase net population growth while fishery dependence reduces it. We also tested this model with the percentage of the labor force in fish-processing instead of fishers with similar results. Both variables could not be included, as they are highly correlated and would create a multi-co-linearity problem.

In model 4, the percentage of the labor force working in the public sector as well as the general employment level (the inverse is the unemployment level) is added together with three dummies that classify the municipalities in four size quartiles (the smallest municipalities are the base category). All the new variables are statistically significant, but the landings variable now becomes insignificant. The share employed in the public sector has a negative effect on net population growth. This is not too surprising as struggling communities where private companies fail or reduce employment, has an increasing share of the labor force in the public sector. More generally, municipalities located in the capital region or larger city-regions have a lower share of the workforce in the public sector than other municipalities, while municipalities located in sparsely populated regions have the highest share of the workforce employed in the public sector [76]. This particularly applies to fisheries dependent municipalities in Northern Norway due to a favorable government funding compared to municipalities in general, as the county of Finnmark and the northern part of Troms has lower tax levels and higher central support.

The general employment variable is statistically significant with a positive sign. This is a measure of the general economic temperature in the municipality, and it is not surprising that municipalities with low unemployment, generally caused by successful companies hiring, have higher population growth, as growth in employment most often will have to come from people moving in. The dummies on municipality size are statistically significant and increasing with size, indicating that population growth is higher the larger the municipality, and accordingly that urbanization trends are reinforcing.

In model 5, where the trend is nuanced by allowing it to vary by the size of the municipality, the basic growth rates differs even more, showing a larger net population growth in larger municipalities. However, the negative trend parameters indicate that the population growth rates are converging. The results with respect to fisheries dependence do not change in that landings are still not statistically significant, and a high share of fishers have negative impact on growth. Hence, a high share of fishers in a community does not appear to be positive for growth, but rather the opposite. A high share of fishermen, and a high share of public employment, implies that there is less alternative private activity to create other private employment. This is an indication that one needs to pay attention to factors beyond the fishing industry to

Table 2
Growth curve models: Effects of fisheries on relative population growth.

	Model:				
	(1)	(2)	(3)	(4)	(5)
Trend	0.096*** (0.006)	0.096*** (0.006)	0.090*** (0.006)	0.086*** (0.006)	0.118*** (0.011)
Total weight of yearly landings		0.037*** (0.014)	0.036*** (0.014)	0.004 (0.012)	0.001 (0.012)
Large, fisheries dependent		−0.673*** (0.146)	−0.089 (0.173)	−0.054 (0.153)	
Percentage employed as fishermen			−0.069*** (0.011)	−0.051*** (0.010)	−0.050*** (0.008)
Percentage employed in public sector				−0.015*** (0.004)	−0.015*** (0.004)
Percentage general employment				0.018*** (0.004)	0.018*** (0.004)
Population quartile 2				0.190** (0.091)	0.332*** (0.114)
Population quartile 3				0.706*** (0.098)	0.854*** (0.120)
Population quartile 4				1.149*** (0.103)	1.448*** (0.127)
Trend*Population quartile 2					−0.031** (0.016)
Trend*Population quartile 3					−0.033** (0.016)
Trend*Population quartile 4					−0.063*** (0.016)
Constant	−0.191*** (0.055)	−0.142** (0.056)	−0.069 (0.054)	−0.743*** (0.287)	−0.927*** (0.292)
Observations	4655	4655	4655	4655	4655
Log Likelihood	−7274.4	−7263.0	−7244.6	−7140.1	−7132.2
Akaike Inf. Crit	14,560.9	14,542.1	14,507.3	14,308.2	14,296.5
Bayesian Inf. Crit	14,599.5	14,593.7	14,565.3	14,398.4	14,399.6

Note: *p < 0.1; ***p < 0.05; *****p < 0.01.

create sustainable communities [71]. Important factors may include more steady jobs also in the fish-processing industry [72]; as well as the social standing of the fishers in their community and the functioning of the community at large, including public sector employment [46,47].

6. Concluding remarks

In this paper, the effect of fisheries activity on population growth is investigated, while controlling for general trends, using data for all Norwegian municipalities. In models where only fisheries specific variables are included, landings contribute positively to population growth. Also, the more fisheries dependent municipalities experience lower relative population growth. These findings would suggest that regional preferences in the management system such as community quotas and landing obligations could explain population growth in coastal communities. However, when including measures of more general economic activity and general population trends, the significance of the landings variable disappears. Hence, the significance of the landings variable appears to be due to an omitted variable problem, as the landings variable captures also other economic activity not explicitly controlled for. This means that while one might see a positive effect on population from fisheries activity for some municipalities, this positive effect is overshadowed by general trends, as change in population is most strongly determined by municipality size. Aquaculture and related services, offshore (oil and gas, shipping) and tourism are among the sectors that offers alternative employment for fishers, and thus contributes to uphold population.

The most general model has the best fit to the data, implying that the underlying growth and urbanization trends are the strongest drivers for relative population growth. These trends show that the larger the population in a municipality, the higher is the relative population growth. A tight labor market is the only additional variable that explains faster population growth. A higher share of employees in the public sector or in fishing is associated with lower population growth relative to other municipalities, while fish landings have no impact. No impact of landings might seem counterintuitive, as one might observe that some of the most fisheries-dependent municipalities grow as landings increase. But even though increased landings may have an impact in some municipalities, the overall effect of landings is small compared to general trends. The public sector result (negative influence) is not surprising, as this is a sector less influenced by economic activity, and it's importance increases in municipalities that are losing employment in the private sector.

Our finding that municipalities with a larger share of fishers in the labor force have lower population growth highlights a challenge for fisheries dependent municipalities, as it indicates that municipalities with the highest share of fishers are more vulnerable for population decline as the overall number of fishers is reduced as a result of structural measures. In a country like Norway where real wages are increasing, the number of fishers must also be reduced for those who remain to have an income development on par with other occupations, and fisheries dependent municipalities will be strongly exposed to this effect. Moreover, fishing is a unique industry in that it depends on a common pool resource. As quotas limiting catch are essential for the long-term sustainability of the fish stocks, one cannot respond to market signals by producing more. Therefore, the economic opportunity provided in fisheries is limited. When catch limitations are combined with a continuous pressure to increase productivity, like all other industries, a steady reduction in employment in the sector must be expected. According to the Nordic model, this will cause redundant labor in the fisheries sector to be reallocated even when it involves migration [73].

6.1. Policy implications

Our findings have important policy relevance. Even if the reduction in employment in fisheries and fish-processing will continue, fisheries management policy is not the tool politicians assume it to be when it comes to support remote coastal municipalities.

When landings have no impact on net, relative population growth at the municipality level this also suggests that *measures* to ensure landings to specific municipalities have no impact on net, relative population growth for the municipalities dependent on the fisheries industry. This does not mean that fisheries are not of importance to coastal communities. But it does mean that major industry trends like productivity increase and automation, and thus reduced employment, combined with general trends of demographic change, like globalization, centralization and urbanization, have greater influence on population than do fisheries.

Hence, measures like community quotas and landing obligations is inefficient as regional policy tools. In addition, they become wasteful when they also reduce economic efficiency. This means that while maintaining population in coastal municipalities will still be a political goal, fisheries is not an appropriate tool. The assumption that so many politicians and law makers base their policy on, does not hold: Fisheries do not influence population strongly enough to be used as a policy instrument for population growth.

With the limitation of the fisheries industry's ability to maintain employment and settlement, municipalities where the fisheries industry accounts for a large part of the employment depend on development of alternative industries in order to break the negative population trend. Fisheries can not take a leading role in supporting population levels in coastal communities, at least not in its current form.

6.2. Limitations and need for further research

In studying fisheries policy, it would be a huge advantage to study the effect of every single measure employed. It is a challenge, though, that the effects of these measures might be rather limited, and at least in the Norwegian context much smaller than some of the changes that have already taken place "naturally" in the last 15 years. From discussing how changes in fisheries activity influence population development, it would be natural to progress to studying the effect of diverse measures. This though might require both more detailed data and more advanced models. For the (relatively few) municipalities with more than one fisheries community, it would also be an advantage if data could later be obtained on a lower level.

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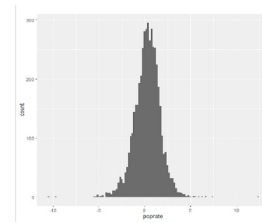
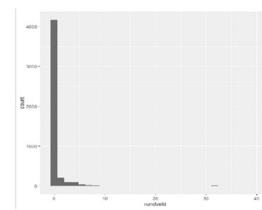
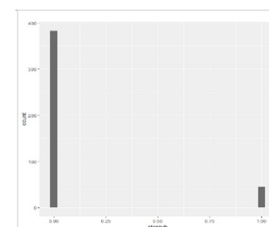
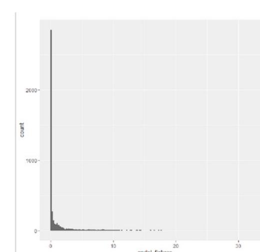
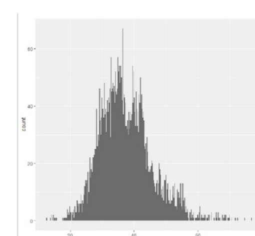
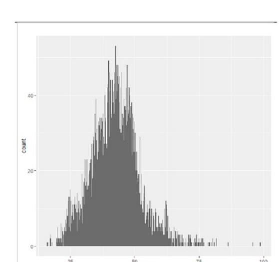
Appendix. Description of variables

Variable Name	Definition	Min	Mean	Max	Histogram
Population growth (dependent variable)	Yearly net relative population growth in the municipality (measured as percentage net increase from one year to the next)	−10.43	0.29	12.28	
Trend	Yearly trend	0	5	10	
Total weight of yearly landings	Total weight of yearly landings measured in thousands of tonnes	0	0.55	39.99	
Large, fisheries dependent municipalities	Based on Lindkvist [49] the dummy variable is defined by a combination of employment (above 5% of population in fisheries) and production (aggregated catches and landings above national average)	0	0.11	1	
Percentage employed as fishermen	Percentage of employed in the municipality as fishermen	0	1.53	33.33	
Percentage employed in public sector	Percentage of employed in the municipality in public sector (municipality or state level)	12.56	37.50	76.85	
Percentage general employment	Percentage of the municipality population working	15.90	42.56	98.81	

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