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Submission date: 22-Dec-2022 10:32AM (UTC+0700)
Submission ID: 1985723741
File name: 02_Are_Fishermen.pdf (433.04K)
Word count: 12486
Character count: 61358

Marine Policy 106 (2019) 103559

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Are fishermen happier? Evidence from a large-scale subjective well-being survey in a lower-middle-income country

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ARTICLE INFO

Keywords:
Subjective well-being
Happiness
Fishermen
Indonesia

ABSTRACT

The literature on life satisfaction among fishermen is divided between those who argue that fishermen are generally happier because of the unique nature of their activities and those who argue otherwise due, among other reasons, to uncertainty and the risk of the job at sea. However, to the best of our knowledge, all recent empirical studies lack relevant control as they are based mainly on surveys among fishermen. Therefore, they cannot be used to empirically test whether being a fisherman is associated with higher or lower subjective well-being. This study is based on the Indonesian Family Life Survey (IFLS), a survey of almost 20,000 individuals from which fishermen and non-fishermen can be identified. The dataset contains information of various socio-economic and employment characteristics, including subjective well-being, such as happiness, and subjective economic ladders. Applying an ordered-probit regressions model, and after controlling for income, demographics, education, health, and regional characteristics, we do not find a result that supports the hypothesis that fishermen are either less happy or have lower subjective well-being than do non-fishermen. However, we find that, in a certain employment status, i.e., self-employed with workers, fishermen are happier than are non-fishermen. Furthermore, we find that fishermen are generally more optimistic in life, as being a fisherman is associated with a positive attitude toward future change in economic status.

1. Introduction

Deadliest Catch, a documentary television series produced by the Discovery Channel, is a good reminder that commercial fishing is identical to danger. In fact, commercial fishing has been considered one of the most dangerous jobs in the world. The most recent census of US Bureau of Labor Statistics [1] recorded that fishers and fishing-related workers has almost 100 fatal work injury per 100,000 full-time equivalent workers. It is the occupation with the highest fatality. However, despite the risk involved, there has been a notion, particularly known in academic literature, that being fishermen, as a profession, generates a unique satisfaction. In these two different context, being fishermen can become a curse and a blessing at the same time.

The notion that fisherman, being one of the oldest profession, may generate unique satisfaction has been known in the literature. Smith [2], for example, noted that this 'satisfaction bonus' from fishing has been known in both anthropology and economics. Anderson [3] defined this as non-monetary benefit individual can obtain from participating in commercial fishing or from the nature of the work. It was further argued that fishing may provide unique satisfaction from such things as adventure, risk-taking, challenge, fellowship, and ties to traditional behaviour which may not be available from other type of occupation. For example, Pollnac [4] elaborates this satisfaction bonus coming from the nature of the adventure and challenges from commercial fishing. These may include the thrill of the hunt or the challenge facing the power and expanse of the sea. Other aspects that define the extra satisfaction from commercial fishing may also include the cultural forces that facilitate certain group identity. These attributes extend fishing beyond work routines and generate positive self-images and social value.

European fishermen, for example, consider fishing as not merely a job but a way of life [5,6]. Factors that contribute to their positive attitude toward fishing include the cultural forces that facilitate certain group identity, such as esoteric knowledge, skills and expertise; extreme or unusual work demands; and pervasiveness. These attributes extend fishing beyond work routines and generate positive self-images and social value. Some studies observe a similar kind of satisfaction from other related jobs, such as farming or forestry work, due to the physical nature of the activities, including exposure to the outdoor environment [2,7–9].

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https://doi.org/10.1016/j.marpol.2019.103559
Received 22 November 2018; Received in revised form 17 May 2019; Accepted 21 May 2019
Available online 30 May 2019
0308-597X/

Furthermore, Taylor [10,11] suggests that fishermen derive considerable satisfaction from their work and are extremely proud of their identity as fishermen, even when they fish only part time. The study shows that, with respect to an Irish community, fishing can be of modest economic importance yet be the subject of considerable cultural attention. It provides a source of communal and personal identity. Similarly, Byron [12] reported that people in the Swedish fishing village of Ockero have a common awareness of sharing an unusual way of life, a strong sense of community, and intense loyalties to boats, with accompanying status rivalries, all of which lead to happiness in life.

These observations, if generally true and widespread, can have important socio-economic and environmental implications. In a world in which the fish stocks are declining and an industry in which fishermen find it difficult to change occupation, lower availability of stock may not be met by a corresponding reduction in fishing efforts, which results in too many boats chasing too few fish and may lead to acceleration of the rate of depletion of fish stocks. IRIN [13] reported that fish stocks in our oceans are already depleted and could be in terminal decline due to the twin effects of climate change and overfishing. Moreover, a State of Fisheries and Aquaculture Report [14] stated that the marine fish stocks have continued to decline. The report said that the fraction of marine fish stocks exploited within biologically sustainable levels decreased from 90% in 1974 to 66.9% in 2015.

Despite many studies observing such behaviors among fishermen, and despite the important implications for the industry, no studies have attempted to test formally the unique nature of being a fisherman. Although some previous studies did survey fishermen, measure their happiness and analyze the data they generated, those studies were not designed to test such a hypothesis. Almost all of the recent empirical studies of the subjective well-being of fishermen lack relevant control, as they are only based on surveys among fishermen. Therefore, they cannot really answer whether being a fisherman generates either higher or lower life satisfaction, after controlling for other aspects of life.

Many of those studies analyzed subjective well-being and job satisfaction [2,9,15] with the purpose of identifying the factors that are behind either life or job satisfaction among fishermen. They generally found that well-being among fishermen is associated with fishermen's income, work adventure, self-actualization, and physical and psychological health [4,16–19]. Some other studies also found that life satisfaction of fishermen is affected by such variables such as income, work adventure and their self-actualization, physical and psychological health, [4,16–19]. However, since most of these studies collected data only among fishermen, it would be difficult to use such data to test whether being a fisherman creates more life satisfaction than does being a non-fisherman.

The notion that fishermen are generally happier is not without challenges. Fishing is also considered to be a job with a high degree of uncertainty, and it is typically an insecure business. In many places, traditional fishermen tend to be poorer and unhappier than other people. For some people, fishing can be an adventure, but this is not the case for many others. The sea can be a very unfriendly and dangerous environment. Moreover, fishing is considered to be an occupation with lower social status in many societies [20–22].

Furthermore, Kourous [23] shows that many fishing communities are characterized by overcrowding and a low standard of living. Access to education is typically low and health services and other infrastructure are lacking. Being a fisherman is considered to be a less attractive job because it is considered to be one of the most dangerous jobs in the world. Long hours, extreme weather, and working with heavy equipment contribute to a high mortality rate in fishermen [24]. Being away from the family can also be a factor leading to dissatisfaction in being employed as a fisherman. In some countries, government policy issues can also create dissatisfaction among fishermen [22,25,26].

In short, the literature on life satisfaction among fishermen does not agree on whether, after considering all other factors, being fishermen is generally associated with either higher or lower life satisfaction. Moreover, there is a big methodological gap in the existing empirical literature due to lack of control of non-fishermen when assessing whether being a fisherman is associated with either higher or lower life satisfaction. This paper is motivated by these two observations from the literature. That is, we aim first to contribute to the existing debate about whether being a fisherman is associated with different life satisfaction compared to alternative occupations, and in so-doing we also revisit the question of what factors may contribute to a fisherman's life satisfaction. Secondly, we fill the methodological gap in the literature, because we are using a large-scale survey of subjective well-being and its possible determinants and have enough samples of both fishermen and non-fishermen to make a relevant comparison.

2. The concept of subjective well-being

Income per capita has been globally used as a yardstick of a country's development progress. It has been used by international communities, such as organizations like the World Bank, for example, to categorize country into income groups: lower income, middle income or high income countries. It is well-understood that income which is measured by Gross National Income is actually underestimate other things that people value, particularly those outside market places. Despite this, the use of income per capita as a measure of welfare and livelihood continues without challenge in the mainstream economic policies. The increase in income per capita, or economic growth, is more often than not used interchangeably with the increase in welfare in general.[1]

In 1995, the validity of income as measured of wellbeing was challenged by another new frontier of research. Easterlin [28] demonstrate that an increase in income per capita over time is not accompanied by an increase in happiness. Income per capita may rise exponentially overtime yet happiness may just be virtually constant. This is often called “Scissor's or Easterlin's paradox”. For example, it is very evident in Japanese case where income per capita increased fivefold between 1958 and 1987, but level of happiness stays virtually constant over the same period. One may conclude that income is only one of several other factors that contribute to happiness. Since then, the study of happiness which used to be the domain of philosophy, psychology and health, started to expand to the field of economics and other fields [2,29–34].

Terminology of happiness or wellbeing has different definitions in each of these disciplines. Uchida and Oishi [35] stated that happiness is often defined as a feeling or state of satisfaction that resides internally within the individual. While Bartram [36] defined happiness as the affective component of subjective well-being, while “life satisfaction” is the cognitive component, the evaluations we make about how well our lives are going. Examples of objective forms of well-being include income and other economic “goods”, political rights and freedoms, social relationships and health.

Happiness is closely linked to economic concept of utility in utilitarian tradition. In practice economists measure wellbeing in terms of money income or assets such as income per capita. Extension to that approach is the Quality of Life (QoL) approach, an attempt to include measure or indicators beyond monetary aspects. Subjective Wellbeing (SWB), i.e., a self-reported measure of well-being, is one aspect of QoL.

Subjective Wellbeing has been understood to encompass three separate aspects. First is life satisfaction, i.e, a person's overall judgment about their life at a particular point in time; second is the presence of positive feelings or affect, i.e. the flow of positive emotions from moment to moment; and third the absence of negative feelings or affect,

[1] For more discussion about the drawback of income per capita as a measure of progress and how to remedy it including using alternative measure such as happiness, see Stiglitz et al. [38].

i.e. the flow of negative emotions from moment to moment. Many economics research, including this paper, focus on the first one, overall life satisfaction.

Quantitative data on life satisfaction are collected through surveys. The most well-known is the *World Values Survey*. The measure of happiness is based on qualitative responses, such as feeling "quite", "fairly", or "very" happy with one's life. Scale normally varies from survey to survey. The data that we use in this paper, for example, use 4 scale of responses. Other may have 10 scales.

In most SWB surveys conducted, data on characteristics of the respondents are also collected. These leave researchers with ample data to also study what the determinants of life satisfactions. As summarized by Bruno and Stutzer [37] and Stiglitz et al. [38], literature in general agrees with the following observations. First, richer people on average report higher subjective well-being. The results are robust and general. Second, additional income does not raise happiness ad infinitum. The relationship is non-linear. As people are getting richer it is getting more difficult to buy happiness with the same amount of money. Third, variation in income only explain a low proportion of variations in happiness. It means that non-income determinants are a lot stronger to explain variations in happiness. Fourth, per-capita income in western countries like the United States, the United Kingdom, and Belgium, as well as Japan, has risen sharply in recent decades, whereas average happiness has stayed "virtually constant" or has even declined over the same period. Fifth, employment matters. Happiness of unemployed persons is much lower than employed persons with otherwise similar characteristics. These five is among the most common empirical observations. However, more and more studies include other aspects that is found to be correlated with happiness. These include, relative income position in the peers (or society), inequality within the society an individual live, political freedoms, and environmental quality. Health status, marital status and educational status is also commonly found to be strong determinants of happiness in many studies [39].

Happiness or life satisfaction can be caused by various variables in life, including the type of job [37,40–46]. On the other hand, wellbeing is an important indicator of how participants in an industry are doing [2]. The statements are based on the basic premise that participation on the right, fit and meaningful work will lead to happiness and satisfied live, whereas unemployment and unsuitable or favored work will cause unhappiness [47]. Our paper conducted to the comparative analysis of happiness among different job particularly for fishermen and other jobs.

3. Country context: Indonesian fisheries

To the best of our knowledge, almost all studies about happiness or life satisfaction of fishermen were from developed countries. There are a few studies from Caribbean countries [48–50], Guinea-Bissau [51], and Southeast Asian Countries [17], but these studies are about job satisfaction, not happiness or more general life satisfaction. As Indonesia at the moment belong to the lower-middle income country groups and fisheries constitutes an important part of its economy, this study will be an important addition to the existing literature.

Indonesia is an important player in the global fishery production. With 6.5 million ton per year (7% of global production), Indonesia is the second biggest producer of capture fisheries, after China in 2016 [14]. Despite this economic high profile, fisheries sector in Indonesia have been facing many important yet inter-related challenges. Two issues are among the most serious and attract general public debate: illegal fishing and on the issue of the distribution of the economic proceed from fisheries more broadly. The latter is related to the sector's contribution to the reduction of social and economic inequality, including inter-regional disparity.

Illegal fishing has been a serious issue in Indonesia. In Arafuru sea alone, FAO estimated unreported catch of over 1.5 million tons a year [52]. The annual cost of illegal, unreported and unregulated fishing for Indonesia is estimated at around USD 3 billion and estimates of total annual loss including lost tariffs and risk of permanent damage to possibly 65% of their coral reefs can reach USD 20 billion [53].

Under President Jokowi's administration, Indonesia implemented aggressive policies to curtail the country's high levels of illegal fishing it experiences from foreign-flagged vessels. Cabral et al. [54] show the new policies have reduced total fishing effort by at least 25%. This illustrates that achieving fishery reform without short-term losses to the local fishery economy is feasible.

On the issue of fishery sector's economic distribution, can be seen that most of the Indonesia's population live in Java Island where most economic activities exist. Indonesia has regionally unbalance economic development, where Java, particularly Jakarta the capital city, become the biggest part of economic growth. Beside its growing and large population, Java become the region for labor-intensive industry, the market for many commodities, and massive infrastructures development. Whereas other regions, particularly East Indonesia, were far left behind Java in terms of development and welfare. The imbalance between Java and other regions particularly Eastern Indonesia become more feasible recently. For example, almost 60% of Gross Domestic Product is generated in Java Island in 2017. The Indonesian capital, Jakarta, produces 16% of the national output, and has 10 times the GDP per capita of the poorest province in the east like Maluku. The data shows that the proportion of people who live below the national poverty line (headcount poverty incidence in 2018) is also highly diverse, ranging from only 3.55% in Jakarta to almost 27.43% in the Province of Papua.

The regional economic imbalance between the eastern part of the country and the rest is much related to natural resources sector in general and fisheries sector in particular. Provinces in the eastern part of Indonesia is very rich in natural resources yet its exploitation has not translated into the increase in the livelihood of the majority of its population. Despite the fact that economic activity in Eastern Indonesia only less than 9% (8.6% in 2016) of the total economic activities in the country (as measured by its value added), the region's fisheries sector contributed the highest share in its sectoral production. Eastern Indonesia for example in 2016 contributed 39% of ocean fisheries production to the total national output.

Development of fisheries sector has occurred much faster in the west or in Java in particular than the eastern part of the country. It is much related to the general imbalance of the economic growth between regions. Eastern part of Indonesia ended up with under-investment of such infrastructure such as port facilities, electricity, transport and fuel supply for vessels. These is a natural bottleneck for fisheries development. Moreover, the western region is also closer to markets, especially to Java. A shortage of markets can be the constraint for the development of fisheries in the eastern part [55]. This has led to massive exploitation, for example in the north coast of Java, where fisheries have suffered severe depletion [56–58], while in the east, illegal fishing become massive and jeopardize local fishermen.

One of the biggest challenge in Indonesian regional development is how to translate this natural resource extraction, particularly in the fisheries sector in a more equitable way. There are still rooms for policy improvement in fisheries industries in the form of regulation and incentives so the benefit of the economic activities of the industry is more broadly distributed.

4. Methodology

4.1. Dataset

4.1.1. The surveys

For the analysis, we use a dataset called the Indonesian Family Life Survey (IFLS). The IFLS is a longitudinal socioeconomic and health survey that represents approximately 83% of the Indonesian population. The IFLS was first fielded in 1993, when it was called the IFLS1, and it initially collected a sample of almost 7000 households and

24,000 individuals. The survey was carried out by the RAND corporation, USA, together with the Demographic Institute of the University of Indonesia. After the first survey, IFLS2 and IFLS2+ were conducted in 1997 and 1998, respectively, by RAND in collaboration with UCLA and Lembaga Demografi, University of Indonesia. IFLS2+ covered a 25% sub-sample of the IFLS households. IFLS3, which was fielded in 2000 and covered the full sample, was conducted by RAND in collaboration with the Population Research Center, University of Gadjah Mada. The fourth wave of the IFLS (IFLS4), fielded in 2007/2008 and covering the full sample, was conducted by RAND, the Center for Population and Policy Studies of the University of Gadjah Mada, and SurveyMETER. The fifth wave of the IFLS (IFLS-5) was fielded 2014/15. In 2012, SurveyMETER fielded a special IFLS survey in the eastern provinces of Indonesia; this was called the IFLS EAST.

For the purpose of this survey we use two sets of IFLS data. The first is the IFLS5, which was fielded in 2014/15, and the second is IFLS EAST, which was fielded in 2012. Questions in the survey instrument from which we can identify fishermen exist only in these two datasets. IFLS5 interviewed 16,204 households and 50,148 individuals [59]. The samples for IFLS5 were spread over either 13 or 34 Indonesian provinces. IFLS EAST on the other hand, surveyed 10,000 individuals in 2500 households living in 99 communities (enumeration areas) spread over seven provinces in eastern Indonesia: East Nusa Tenggara, East Kalimantan, Southeast Sulawesi, Maluku, North Maluku, West Papua, and Papua. Both surveys used a similar questionnaire, but with different samples. Fig. 1, below, shows the provinces where households were interviewed by IFLS2 and IFLS EAST. We have combined the data to increase the sample size for our analysis.

In both datasets, the questionnaire contains a question that can be used to identify whether a particular individual engages in fishing and can be considered as being a fisherman. In the analysis, we exclude samples of individuals living in non-coastal regions (sub-districts, or "kecamatan" in the Indonesian language) to improve the comparability of both groups. Table 1 shows the number of individual fishermen and non-fishermen in the sample from both data sets categorized into different type of job status. There are 326 individuals identified as fishermen compared to 4326 non-fisherman individuals.

The question in the survey instrument is very specific regarding the issue of the fact that 'fishing' itself covers an immensely broad range of activities. The question (in Indonesian language) ask whether the family member occupation is fishermen (*nelayan*) and explicitly stressed excluding those who work in aqua/marine culture. In Indonesian language *nelayan* is only applied to those who capture fish either in the ocean or other open water. Therefore, those who work in aquaculture as well as those who works as labor in the fishery processing industry, for example, is not part of that we call 'nelayan'.

Despite its richness and unique nature, in the context of this paper, IFLS dataset has various shortcomings. First, the size of the sample of fishermen is relatively small compared to non-fishermen. IFLS is a more general socio-economic survey not intended in particular to survey fishermen. However, we argue that the number of fishermen we identified in the sample (326) is comparable to similar studies found in the literature. Secondly, IFLS only cover 13 out of 27 (in 1993 of the initial survey) provinces in Indonesia. So, the dataset does not represent Indonesian population. However, the 13 provinces are home to 83% of Indonesian population. Thirdly, although IFLS is a longitudinal survey (where it has been done for 5 times) the question in the survey instruments that can be used to identify fishermen is only available more recently. This prevent us from doing more advanced statistical analysis, such as panel data estimation, that is more robust in terms of controlling for unobservable factors that may affect happiness. Fourthly, the data does not allow us to distinguish whether these fishermen work part-time (as a fisherman), fish only in certain seasons (seasonal, such as rainy or dry season), or even only temporarily work as fishermen. We do hope that the effect of these particular situation i.e., being a part-time worker, or in under-employment on happiness will more or less be captured by income variable. We have included this in the model. So, the variable of being fishermen or not-fishermen in the econometric estimation reflects only how being a fisherman, as an occupation, affect happiness. Further research is need for better measure to address this issue.

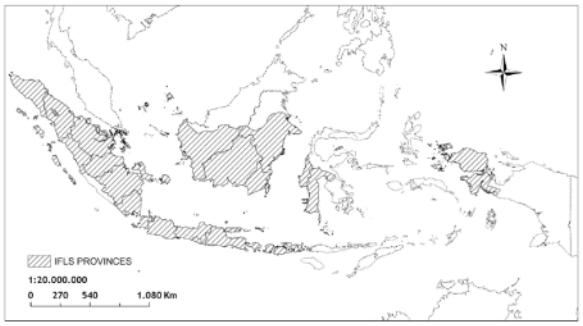

Fig. 1. Location of provinces of households interviewed in IFLS5 and IFLS EAST.

4.1.2. Subjective well-being data

In the survey instruments, there is a subset of questions dedicated to subjective well-being and life-satisfaction. We use the following set of questions for further analysis.

1. Taking all things together, how would you say things are these days; would you say you are (1) very happy, (2) happy, (3) unhappy, or (4) very unhappy?
2. Please imagine a six-step ladder where the poorest people stand on the bottom step (the first step), and the richest people stand on the highest step (the sixth step). On which step are you today?
3. Regarding question no 2, on which step were you five years ago?
4. Still regarding question no 2, On which step do you expect to be five years from now?

4.1.3. Socio-economic and demographic data

Other than happiness-related questions, we also use individuals' socio-economic and demographic variables that are considered as being important determinants of subjective well-being. We pick those variables based on previous studies of subjective well-being, particularly those that used the same IFLS dataset [39,60–62]. The variables include monthly expenditure per person (a proxy for his/her income), level of education, health status, age, marital status, and regions where individuals live.

4.2. Econometric model

We model subjective well-being as a function of its socio-economic determinants and include dummy variables of whether the individual is a fisherman or a non-fisherman. With this multivariate regression model we can test whether being a fisherman is associated with either higher or lower subjective well-being after controlling other relevant confounding factors.

We will estimate the following six models:

$$\text{Prob}(y_i > k \mid \kappa, x_i, d_i, v_i) = \Phi(x_i\beta + \theta d_i + v_i - \kappa_k) \quad (1)$$

$$\text{Prob}(c_i > k \mid \kappa, x_i, d_i, v_i) = \Phi(x_i\beta + \theta d_i + v_i - \kappa_k) \quad (2)$$

$$\text{Prob}(p_i > k \mid \kappa, x_i, d_i, v_i) = \Phi(x_i\beta + \theta d_i + v_i - \kappa_k) \quad (3)$$

$$\text{Prob}(f_i > k \mid \kappa, x_i, d_i, v_i) = \Phi(x_i\beta + \theta d_i + v_i - \kappa_k) \quad (4)$$

$$\text{Prob}(c_i - p_i > k \mid \kappa, x_i, d_i, v_i) = \Phi(x_i\beta + \theta d_i + v_i - \kappa_k) \quad (5)$$

Table 1
Number of fishermen and non-fishermen identified in IFLS 2014 and IFLS 2012 (EAST) dataset.

Year Survey	Fishermen/Non Fishermen	Self-employed without worker	Self-employed with worker	Informal worker	Total
IFLS 2012	Non-fishermen	389	712	490	1591
	Fishermen	87	87	13	187
	Total	476	799	503	1778
IFLS 2014	Non-fishermen	805	1051	879	2735
	Fishermen	93	39	7	139
	Total	898	1090	886	2874
2012 + 2014	Non-fishermen	1194	1763	1369	4326
	Fishermen	180	126	20	326
	Total	1374	1889	1389	4652

$$\text{Prob}(f_i - c_i > k \mid \kappa, x_i, d_i, v_i) = \Phi(x_i\beta + \vartheta d_i + v_i - \kappa_k) \quad (6)$$

Where y_i is the answer to the happiness questions; i.e., Taking all things together how would you say things are these days; would you say you are (1) very happy, (2) happy, (3) unhappy or (4) very unhappy?, $y_i = \{1,2,3,4\}$, c_i is the answer to the current economic ladder questions; i.e., Please imagine a six-step ladder where the poorest people stand on the bottom step (the first step) and the richest people stand on the highest step (the sixth step). On which step are you today? So $c_i = \{1,2,3,4,5,6\}$. p_i is the same as ci but it refers to five years ago, and f_i refers to 5 years ahead. $c_i - p_i$ is the difference between how an individual perceives his/her current economic ladder compared to the previous 5 years. This can be interpreted as being the extent to which the individual is satisfied with the progress he/she made during the last 5 years. On the other hand, $f_i - c_i$ measures the difference between how an individual perceives his/her economic ladder 5 years into the future relative to his/her current economic ladder. This can be interpreted as the extent to which the individual is optimistic about his/her progress in terms of achieving economic ladders within the next 5 years. Socio-economic and demographic variables that may affect the subjective well-being are represented in a vector x_i, and d_i is an indicator variable with the value of 1 if the individual is a fisherman, and zero otherwise.

Due to the categorical ordered nature of dependent variables in longitudinal data, the model was specified as a cross-section ordered-probit model [63], which will be estimated using maximum likelihood. More specifically, k is the categories specific to each model, Φ is the cumulative normal distribution function, v_i is a normally-distributed error term, while β and ϑ_i are parameters to be estimated.

The summary statistics of all variables (dependent and independent) to be used in the estimation are shown in Table 2.

5. Results and discussion

Tables 3–8 present the regressions results with the sample, excluding non-coastal sub-districts ("Kecamatan"). As previously discussed in the methodology section, we estimate 6 different models, each of which has different dependent variables, depending on the type of subjective well-being, but the same regressors. Each table of the regression results has 4 columns showing the estimated coefficient (and its standard errors) of each regressor. The first column shows the results for the full sample, and the second to the fourth columns show the results of the sub-samples according to different types of employment status. We divide employment status into 3; i.e., (1) self-employed without workers, (2) self-employed with workers, (3) informal workers. By dividing the sample into 3 different types of employment status, we attempt to test whether being a fisherman is associated with higher/lower subjective well-being among similar type of employment.

Before we discuss the estimation results related to being a fisherman, we will look at the performance of the model in terms of how well various factors that determine subjective well-being (control variables) predict subjective well-being, such as whether the estimated coefficients have the correct signs and/or are statistically significant at the standard level of significance.

Almost all important determinants of happiness in full sample regression have the correct sign and are statistically significant. Income, which is proxied by expenditure per capita, is positively associated with happiness and is significant at the 1% level (Table 3). This result is what to expect from the literature. Frey and Stutzer [64], in his literature

Table 2
Summary statistics of dependent and independent variables (Non-coastal district excluded).

	Fishermen					Non-fishermen					All				
	obs	mean	s.d.	min	max	obs	mean	s.d.	min	max	obs	mean	s.d.	min	max
Happiness (1 = Very unhappy, 2 = Unhappy, 3 = Happy, 4 = Very happy)	317	3.01	0.51	1	4	4144	3.01	0.51	1	4	4461	3.01	0.51	1	4
Current economic ladder (1–6)	316	2.45	0.99	1	6	4131	2.67	1.06	1	6	4447	2.65	1.06	1	6
Past economic ladder (1–6)	316	2.22	1.16	1	6	4118	2.36	1.12	1	6	4434	2.35	1.12	1	6
Future economic ladder (1–6)	303	3.51	1.21	1	6	3931	3.67	1.32	1	6	4234	3.66	1.31	1	6
Current minus past economic ladder (−5 to 5)	315	0.23	1.08	−3	4	4115	0.31	1.07	−5	5	4430	0.31	1.07	−5	5
Future minus current economic ladder (−5 to 5)	303	1.08	1.09	−2	5	3929	1.01	1.04	−5	5	4232	1.01	1.04	−5	5
Monthly per capita expenditure (Log Rp)	312	13.39	0.64	11.56	15.33	4099	13.49	0.69	11.24	16.65	4411	13.49	0.69	11.24	16.65
Age (years)	326	40.72	11.02	20	76	4306	42.22	14.19	12	96	4632	42.12	14.00	12	96
Sex (Male = 1, 0 otherwise)	326	0.94	0.25	0	1	4306	0.59	0.49	0	1	4632	0.61	0.49	0	1
Marital status (Married = 1, 0 otherwise)	326	0.92	0.27	0	1	4306	0.81	0.39	0	1	4632	0.82	0.39	0	1
Primary education (Yes = 1, 0 otherwise)	326	0.59	0.49	0	1	4306	0.46	0.50	0	1	4632	0.47	0.50	0	1
Junior secondary education (Yes = 1, 0 otherwise)	326	0.21	0.40	0	1	4306	0.19	0.39	0	1	4632	0.19	0.39	0	1
Senior secondary education (Yes = 1, 0 otherwise)	326	0.14	0.35	0	1	4306	0.22	0.41	0	1	4632	0.21	0.41	0	1
Tertiary education (Yes = 1, 0 otherwise)	326	0.02	0.13	0	1	4306	0.04	0.20	0	1	4632	0.04	0.20	0	1
Very healthy (Yes = 1, 0 otherwise)	326	0.13	0.34	0	1	4313	0.17	0.38	0	1	4639	0.17	0.38	0	1
Healthy (Yes = 1, 0 otherwise)	326	0.58	0.49	0	1	4313	0.57	0.50	0	1	4639	0.57	0.50	0	1
Fisherman (Yes = 1, 0 otherwise)	326	1	0	1	1	4326	0	0	0	0	4652	0.07	0.26	0	1

Source: Indonesian Family Life Survey (authors' calculation).

Table 3
Ordered-Probit Model Regression result for Fishermen vs non-Fishermen Dependent Variable: Happiness.

	All	Self-employed	Self-employed	Informal
	Samples	without worker	with worker	worker
lnpce	0.130	0.149	0.080	0.157
	(0.033)**	(0.058)**	(0.054)	(0.061)**
age	−0.047	−0.029	−0.046	−0.060
	(0.009)**	(0.015)	(0.015)**	(0.017)**
agesq	0.000	0.000	0.000	0.001
	(0.000)**	(0.000)	(0.000)*	(0.000)**
male	−0.108	−0.145	−0.101	−0.084
	(0.043)*	(0.087)	(0.072)	(0.080)
married	0.434	0.464	0.453	0.450
	(0.060)**	(0.108)**	(0.112)**	(0.103)**
primary	0.190	0.119	0.148	0.303
	(0.081)*	(0.180)	(0.120)	(0.141)*
junior	0.300	0.122	0.266	0.497
	(0.091)**	(0.196)	(0.136)	(0.160)**
senior	0.284	0.177	0.329	0.329
	(0.092)**	(0.193)	(0.138)*	(0.169)
tertiary	0.418	0.031	0.547	0.713
	(0.139)**	(0.265)	(0.221)*	(0.252)**
health1	0.459	0.295	0.611	0.454
	(0.068)**	(0.116)*	(0.109)**	(0.126)**
health2	0.288	0.263	0.317	0.278
	(0.052)**	(0.099)**	(0.082)**	(0.096)**
island2	0.125	0.109	0.025	0.221
	(0.084)	(0.138)	(0.138)	(0.158)
island3	0.191	0.087	0.075	0.366
	(0.086)*	(0.158)	(0.140)	(0.155)*
island4	0.338	0.104	0.353	0.550
	(0.109)**	(0.179)	(0.183)	(0.206)**
island5	0.316	0.201	0.254	0.478
	(0.104)**	(0.181)	(0.165)	(0.200)*
island6	0.274	0.147	0.115	0.611
	(0.119)*	(0.204)	(0.190)	(0.232)**
yeard	0.118	0.024	0.140	0.234
	(0.090)	(0.154)	(0.135)	(0.182)
fisherman	0.035	−0.099	0.284	0.027
	(0.084)	(0.123)	(0.134)*	(0.160)
cut1	−0.835	−0.499	−1.740	−0.142
	(0.468)	(0.834)	(0.800)*	(0.858)
cut2	0.249	0.694	−0.516	0.755
	(0.468)	(0.827)	(0.806)	(0.864)
cut3	2.852	3.320	2.139	3.334
	(0.471)**	(0.833)**	(0.811)**	(0.869)**
N	3796	1106	1531	1159

*$p < 0.05$; **$p < 0.01$.

Table 4
Ordered-Probit Model Regression result for Fishermen vs non-Fishermen Dependent Variable: Current Subjective Economic Ladder.

	All	Self-employed	Self-employed	Informal
	Samples	without worker	with worker	worker
lnpce	0.241	0.193	0.293	0.196
	(0.028)**	(0.051)**	(0.043)**	(0.052)**
age	0.002	0.007	−0.006	0.004
	(0.008)	(0.015)	(0.014)	(0.015)
agesq	0.000	−0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
male	−0.194	−0.214	−0.254	−0.205
	(0.037)**	(0.074)**	(0.061)**	(0.066)**
married	0.113	0.161	0.181	−0.006
	(0.051)*	(0.100)	(0.088)*	(0.089)
primary	0.371	0.418	0.354	0.329
	(0.076)**	(0.150)**	(0.124)**	(0.130)*
junior	0.469	0.494	0.376	0.512
	(0.083)**	(0.165)**	(0.135)**	(0.144)**
senior	0.573	0.739	0.469	0.510
	(0.083)**	(0.167)**	(0.134)**	(0.146)**
tertiary	0.607	0.797	0.575	0.423
	(0.113)**	(0.204)**	(0.185)**	(0.215)*
health1	0.187	0.196	0.209	0.167
	(0.057)**	(0.106)	(0.095)*	(0.100)
health2	0.057	0.004	0.078	0.062
	(0.042)	(0.083)	(0.065)	(0.077)
island2	0.190	0.192	0.160	0.192
	(0.065)**	(0.111)	(0.111)	(0.118)
island3	0.017	0.028	0.044	0.001
	(0.067)	(0.129)	(0.116)	(0.117)
island4	0.243	0.288	0.127	0.246
	(0.086)**	(0.144)*	(0.145)	(0.177)
island5	0.007	−0.227	−0.102	0.325
	(0.082)	(0.144)	(0.141)	(0.148)*
island6	0.004	−0.304	−0.048	0.351
	(0.101)	(0.189)	(0.160)	(0.187)
yeard	0.331	0.160	0.305	0.570
	(0.077)**	(0.153)	(0.115)**	(0.144)**
fisherman	−0.071	−0.150	−0.022	0.013
	(0.069)	(0.095)	(0.124)	(0.264)
cut1	2.998	2.224	3.374	2.722
	(0.413)**	(0.781)**	(0.659)**	(0.766)**
cut2	3.862	3.153	4.245	3.543
	(0.414)**	(0.784)**	(0.663)**	(0.767)**
cut3	5.103	4.539	5.469	4.707
	(0.418)**	(0.791)**	(0.669)**	(0.773)**
cut4	6.041	5.400	6.552	5.540
	(0.426)**	(0.802)**	(0.684)**	(0.784)**
cut5	6.466	5.803	6.994	5.975
	(0.429)**	(0.796)**	(0.694)**	(0.796)**
N	3785	1103	1526	1156

*$p < 0.05$; **$p < 0.01$.

review, suggest that persons with higher income are generally happier than persons with lower income. For Indonesian data, Sohn [39] also found similar results. It should be noted however, as Frey and Stutzer [64] suggested the positive association between income and happiness is generally work with cross-section data in one point in time, but the association is uncertain when we look at it overtime. The so-called *Scissor paradox* suggest that income may increase over time yet life-satisfaction can be constant suggesting no relationship between the two [28].

Happiness tends to fall as people grow older, as age is negative and significant, but tends to rise at certain older age, as age-squared is also significant (at the 1% level of significance). Happiness tends declines as individuals grow older but increases after a certain point (i.e., non-linearity). This is consistent with other studies' findings, which, generally, reveal this kind of U-shaped relationship between age and happiness. Example include Easterlin [65], Ferreri Carbonell and Gowdy [66], Blanchflower and Ostwald [67], and Sohn [39].

Being a female is associated with more happiness, although with a lower level of statistical significance of 5%. As it is stated by Batz, and Tay [68]; Parker & Brotchie [69], the result regarding whether men and women differ in terms of their well-being levels have been highly inconsistent. Study from Stevenson and Wolfers [70] found that men has significantly happier than women, while study from Sohn [39]; Brereton et al. [71]; Alesina et al. [72]; Fujita et al. [73] shown on the contrary. Other studies that make the conclusion rather difficult shows that there are no significant differences of happiness between men and women, especially after controlling for some relevant demographic factors such as age and marital status [74–76].

Being married is strongly associated with more happiness. Its effect, as measured by its coefficient, is the largest, after tertiary education, among other dummy variables of regressors and is statistically significant at 1%. It is quite common in studies on happiness to find being marriage adds positively to subjective wellbeing. Stacks and Eshelman [77], for example, review a 17 nations-survey on the effect of marriage on happiness and found that the positive association holds in the 16 out of the 17 studies. Stacks and Eshelman [77] added that marriage may affect happiness through two intervening process: the promotion of financial satisfaction and the improvement of health. Some argue that life events such as marriage may increase happiness but it may not last

Table 5
Ordered-Probit Model Regression result for Fishermen vs non-Fishermen Dependent Variable: Past Subjective Economic Ladder.

	All	Self-employed	Self-employed	Informal
	Samples	without worker	with worker	worker
lnpce	0.129	0.123	0.143	0.099
	(0.027)**	(0.051)*	(0.044)**	(0.051)*
age	−0.003	0.009	−0.020	0.010
	(0.008)	(0.014)	(0.013)	(0.014)
agesq	0.000	−0.000	0.000	−0.000
	(0.000)	(0.000)	(0.000)*	(0.000)
male	−0.075	−0.059	−0.123	−0.091
	(0.037)*	(0.072)	(0.062)*	(0.067)
married	−0.106	−0.094	−0.032	−0.206
	(0.049)*	(0.093)	(0.088)	(0.085)*
primary	0.295	0.149	0.401	0.263
	(0.075)**	(0.153)	(0.121)**	(0.126)*
junior	0.331	0.128	0.301	0.490
	(0.083)**	(0.171)	(0.132)*	(0.141)**
senior	0.472	0.308	0.580	0.436
	(0.084)**	(0.172)	(0.133)**	(0.147)**
tertiary	0.651	0.554	0.703	0.646
	(0.112)**	(0.201)**	(0.183)**	(0.226)**
health1	0.203	0.224	0.280	0.084
	(0.057)**	(0.103)*	(0.094)**	(0.103)
health2	0.093	0.086	0.172	−0.020
	(0.042)*	(0.079)	(0.065)**	(0.081)
island2	0.007	−0.142	−0.133	0.320
	(0.068)	(0.103)	(0.122)	(0.128)*
island3	−0.171	−0.322	−0.285	0.112
	(0.070)*	(0.123)**	(0.127)*	(0.127)
island4	0.130	0.071	−0.006	0.353
	(0.090)	(0.136)	(0.153)	(0.191)
island5	−0.198	−0.493	−0.324	0.264
	(0.090)*	(0.151)**	(0.157)*	(0.161)
island6	−0.166	−0.468	−0.210	0.234
	(0.106)	(0.194)*	(0.175)	(0.192)
yeard	0.147	−0.007	0.222	0.233
	(0.081)	(0.160)	(0.127)	(0.144)
fisherman	−0.013	−0.016	−0.021	−0.187
	(0.074)	(0.101)	(0.128)	(0.271)
cut1	1.451	1.232	1.285	1.564
	(0.396)**	(0.730)	(0.667)	(0.734)*
cut2	2.413	2.153	2.323	2.487
	(0.397)**	(0.732)**	(0.669)**	(0.737)**
cut3	3.264	2.944	3.248	3.322
	(0.399)**	(0.735)**	(0.673)**	(0.740)**
cut4	3.879	3.586	3.836	3.956
	(0.402)**	(0.744)**	(0.676)**	(0.748)**
cut5	4.578	4.295	4.515	4.699
	(0.405)**	(0.745)**	(0.689)**	(0.740)**
N	3774	1099	1522	1153

*$p < 0.05$; **$p < 0.01$.

Table 6
Ordered-Probit Model Regression result for Fishermen vs non-Fishermen Dependent Variable: Future Subjective Economic Ladder.

	All	Self-employed	Self-employed	Informal
	Samples	without worker	with worker	worker
lnpce	0.290	0.284	0.296	0.251
	(0.029)**	(0.056)**	(0.044)**	(0.052)**
age	−0.015	−0.020	−0.008	−0.012
	(0.008)	(0.015)	(0.013)	(0.015)
agesq	0.000	0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
male	−0.190	−0.237	−0.261	−0.230
	(0.037)**	(0.073)**	(0.063)**	(0.067)**
married	0.087	0.090	0.230	−0.017
	(0.049)	(0.097)	(0.090)*	(0.082)
primary	0.361	0.599	0.289	0.223
	(0.077)**	(0.151)**	(0.118)*	(0.136)
junior	0.554	0.721	0.445	0.502
	(0.083)**	(0.166)**	(0.129)**	(0.148)**
senior	0.592	0.843	0.471	0.489
	(0.084)**	(0.164)**	(0.128)**	(0.154)**
tertiary	0.670	0.897	0.685	0.415
	(0.112)**	(0.218)**	(0.171)**	(0.188)*
health1	0.272	0.381	0.208	0.279
	(0.057)**	(0.108)**	(0.092)*	(0.102)**
health2	0.043	0.032	0.019	0.094
	(0.043)	(0.083)	(0.067)	(0.080)
island2	0.078	0.031	−0.126	0.295
	(0.076)	(0.127)	(0.131)	(0.138)*
island3	0.006	0.003	−0.110	0.129
	(0.077)	(0.138)	(0.134)	(0.134)
island4	−0.060	−0.143	−0.278	0.203
	(0.098)	(0.157)	(0.166)	(0.202)
island5	0.040	−0.236	−0.090	0.434
	(0.095)	(0.153)	(0.165)	(0.177)*
island6	−0.095	−0.238	−0.195	0.161
	(0.109)	(0.183)	(0.181)	(0.206)
yeard	0.233	0.125	0.264	0.419
	(0.080)**	(0.139)	(0.127)*	(0.155)**
fisherman	0.107	0.119	0.063	0.154
	(0.068)	(0.096)	(0.122)	(0.217)
cut1	2.211	2.030	2.124	2.033
	(0.414)**	(0.800)*	(0.672)**	(0.748)**
cut2	3.003	2.868	3.002	2.716
	(0.415)**	(0.801)**	(0.676)**	(0.751)**
cut3	3.856	3.744	3.877	3.535
	(0.417)**	(0.806)**	(0.679)**	(0.752)**
cut4	4.705	4.612	4.726	4.394
	(0.419)**	(0.810)**	(0.682)**	(0.755)**
cut5	5.488	5.359	5.512	5.232
	(0.421)**	(0.816)**	(0.687)**	(0.758)**
N	3605	1039	1462	1104

*$p < 0.05$; **$p < 0.01$.

long. However, in another review, Easterlin [78], provides contradictory evidence to that notions. He found that from studies of the life cycle experience of cohorts, marriage effect on happiness is quite lasting. For example, he demonstrate that at ages 18–19, when most women and virtually all men have not yet married, their mean happiness is ≈ 2.1; over the next 10 years, as up to 50% or more of a cohort becomes married, those who are married report significantly higher happiness levels, on average, ≈2.2–2.3, whereas those who have never married remain at ≈2.1.

Having better education is also associated with more happiness. All dummy variables that measure highest education relative to no education are positive and significant at the 5% level, at least. Among other education variables, having a university education has the largest effect on happiness among all the dummy variables. It is bigger than even health and marital status. Ilies et al. [79] conducted a four-year study following more than 9000 individuals from the Netherland. They found that education predict general life satisfaction, independent on other determinants. Ilies et al. [79] argued that those who are more educated have jobs that fit with their knowledge and skills better, compared to those who are less educated, and this better achieved fit leads to higher job satisfaction. Moreover, it is not common that unlike in developed countries higher education, particularly having a university degree (such as bachelor degree) has a "higher premium" on life satisfaction. Sohn [39] found similarly that high levels of education in Indonesia, appears to be attributable to the higher returns to education not captured by conventional variables. Ferrer-i-Carbonell [80] also present evidence suggesting that this relationship is stronger in low-income countries. In Indonesia, in particular, the higher value people place on having higher education degree may also be related to the so-called *degreeism* or *diploma disease* that has a long history in Indonesia [81].

Being healthy is also positive and strongly significant (1% level). There is not much controversy about the positive association. Some view the issue from biological perspective. In a rather recent systematic review, Dfarhud et al. [82], searched all the literature that look at the effect of biological factor (such as genetic, brain and neurotransmitters, endocrinology and hormones, physical health, morphology and

Table 7
Ordered-Probit Model Regression result for Fishermen vs non-Fishermen Dependent Variable: Difference between current and past Subjective Economic Ladder.

	All	Self-employed	Self-employed	Informal
	Samples	without worker	with worker	worker
lnpce	0.105	0.055	0.141	0.108
	(0.026)**	(0.048)	(0.042)**	(0.050)*
age	0.004	−0.006	0.016	−0.007
	(0.007)	(0.014)	(0.013)	(0.013)
agesq	−0.000	0.000	−0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
male	−0.110	−0.150	−0.113	−0.108
	(0.037)**	(0.073)*	(0.062)	(0.066)
married	0.209	0.243	0.186	0.192
	(0.048)**	(0.095)*	(0.084)*	(0.084)*
primary	0.058	0.212	−0.007	0.023
	(0.069)	(0.136)	(0.115)	(0.114)
junior	0.130	0.323	0.122	−0.006
	(0.078)	(0.156)*	(0.127)	(0.130)
senior	0.064	0.320	−0.084	0.034
	(0.078)	(0.154)*	(0.127)	(0.135)
tertiary	−0.140	0.073	−0.147	−0.354
	(0.106)	(0.194)	(0.170)	(0.203)
health1	−0.031	−0.060	−0.071	0.062
	(0.058)	(0.103)	(0.096)	(0.106)
health2	−0.045	−0.066	−0.102	0.055
	(0.042)	(0.077)	(0.065)	(0.080)
island2	0.192	0.337	0.312	−0.125
	(0.068)**	(0.110)**	(0.121)*	(0.124)
island3	0.218	0.371	0.361	−0.069
	(0.071)**	(0.125)**	(0.126)**	(0.126)
island4	0.107	0.158	0.192	−0.116
	(0.087)	(0.134)	(0.159)	(0.163)
island5	0.231	0.312	0.283	0.067
	(0.087)**	(0.149)*	(0.154)	(0.155)
island6	0.213	0.251	0.243	0.126
	(0.100)*	(0.180)	(0.171)	(0.183)
yeard	0.177	0.160	0.122	0.299
	(0.075)*	(0.143)	(0.122)	(0.137)*
fisherman	−0.049	−0.098	−0.004	0.181
	(0.069)	(0.097)	(0.120)	(0.196)
cut1	−1.289	−1.800	−0.828	−1.607
	(0.403)**	(0.754)*	(0.671)	(0.742)*
cut2	−0.942	−1.572	−0.482	−1.091
	(0.395)*	(0.753)*	(0.648)	(0.722)
cut3	−0.480	−1.150	0.087	−0.662
	(0.385)	(0.721)	(0.634)	(0.709)
cut4	0.170	−0.444	0.755	−0.066
	(0.382)	(0.722)	(0.619)	(0.706)
cut5	0.840	0.180	1.452	0.628
	(0.381)*	(0.722)	(0.620)*	(0.700)
cut6	1.956	1.333	2.585	1.702
	(0.382)**	(0.724)	(0.623)**	(0.702)*
cut7	3.129	2.494	3.792	2.855
	(0.385)**	(0.726)**	(0.628)**	(0.707)**
cut8	4.051	3.477	4.623	3.875
	(0.392)**	(0.741)**	(0.639)**	(0.727)**
cut9	4.634	4.000	5.226	4.517
	(0.408)**	(0.773)**	(0.651)**	(0.770)**
cut10	4.847	4.336	5.390	4.726
	(0.421)**	(0.816)**	(0.669)**	(0.782)**
N	3771	1099	1520	1152

*$p < 0.05$; **$p < 0.01$.

Table 8
Ordered-Probit Model Regression result for Fishermen vs non-Fishermen Dependent Variable: Difference between future and current Subjective Economic Ladder.

	All	Self-employed	Self-employed	Informal
	Samples	without worker	with worker	worker
lnpce	0.118	0.148	0.097	0.100
	(0.029)**	(0.058)*	(0.044)*	(0.051)*
age	−0.014	−0.030	0.001	−0.009
	(0.008)	(0.015)	(0.013)	(0.014)
agesq	−0.000	0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
male	−0.038	−0.057	−0.066	−0.086
	(0.037)	(0.075)	(0.063)	(0.069)
married	0.004	−0.015	0.100	−0.031
	(0.050)	(0.101)	(0.090)	(0.084)
primary	0.087	0.367	−0.008	−0.046
	(0.079)	(0.159)*	(0.128)	(0.135)
junior	0.252	0.495	0.161	0.138
	(0.088)**	(0.174)**	(0.143)	(0.148)
senior	0.217	0.399	0.141	0.153
	(0.086)*	(0.172)*	(0.138)	(0.150)
tertiary	0.277	0.424	0.239	0.226
	(0.119)*	(0.217)	(0.180)	(0.233)
health1	0.151	0.300	0.055	0.151
	(0.058)**	(0.109)**	(0.092)	(0.104)
health2	0.006	0.058	−0.030	0.038
	(0.043)	(0.083)	(0.067)	(0.079)
island2	−0.012	−0.040	−0.225	0.225
	(0.075)	(0.126)	(0.138)	(0.129)
island3	0.033	−0.017	−0.094	0.174
	(0.076)	(0.137)	(0.138)	(0.125)
island4	−0.298	−0.439	−0.433	−0.036
	(0.102)**	(0.156)**	(0.188)*	(0.191)
island5	0.130	0.027	0.053	0.291
	(0.095)	(0.154)	(0.172)	(0.171)
island6	−0.052	0.072	−0.152	−0.076
	(0.110)	(0.181)	(0.191)	(0.203)
yeard	−0.023	0.042	−0.019	−0.012
	(0.082)	(0.133)	(0.135)	(0.161)
fisherman	0.198	0.267	0.105	0.238
	(0.073)**	(0.108)*	(0.119)	(0.161)
cut1	−2.528	−1.179	−2.447	−2.408
	(0.492)**	(0.834)	(0.773)**	(0.783)**
cut2	−2.339	−0.337	−2.253	−2.185
	(0.470)**	(0.835)	(0.731)**	(0.761)**
cut3	−2.141	0.886	−1.660	−1.572
	(0.445)**	(0.839)	(0.692)*	(0.724)*
cut4	−1.481	2.224	−0.967	−0.974
	(0.417)**	(0.843)**	(0.682)	(0.723)
cut5	−0.785	3.025	0.356	0.301
	(0.414)	(0.847)**	(0.682)	(0.721)
cut6	0.487	3.781	1.717	1.614
	(0.414)	(0.846)**	(0.684)*	(0.721)*
cut7	1.818	4.262	2.438	2.402
	(0.415)**	(0.872)**	(0.686)**	(0.722)**
cut8	2.577		3.062	3.017
	(0.417)**		(0.688)**	(0.723)**
cut9	3.227		3.459	3.664
	(0.418)**		(0.696)**	(0.755)**
cut10	3.715			
	(0.428)**			
N	3604	1039	1461	1104

*$p < 0.05$; **$p < 0.01$.

physical attractiveness) on happiness. They concluded that biological and health factors are critical in underlying happiness and its role in happiness is undeniable. Furthermore, Easterlin [78] concluded that adverse health changes have a lasting and negative effect on happiness.

We also control for island fixed effect and year of survey conducted. Controlling for island is necessary to capture other unobserved variables that at least region specific. It is important to note that having good control variables is crucial in estimating the effect of being a fisher on happiness, as ignoring and excluding these variables is highly likely to bias the results. For example, being a fisher can be associated with lower income, and lower income affects happiness. Omitting income in the regression will tend to bias the association between being fishermen and happiness, and its coefficient may simply capture the difference in happiness due to income difference (omitted variable bias) and not due to being a fisherman.

Regression results generally show no support for the hypothesis that being a fisher is associated with a lower level of happiness (Table 3). We did not find any coefficient of fishermen being negative and statistically

significant in any of the regressions. We find similar results for the regressions that use subjective economic ladders (current, past, future, or changes, Tables 4–8) as the dependent variables instead of happiness. In short, all of our regression analysis does not find evidence to support the hypothesis that fishermen have lower levels of well-being.

We do, however, find that, in a certain category of employment — self-employed with workers — being fishermen is associated with a higher level of happiness. In that particular regression, the being fishermen variable is statistically significant (at the 1% level of significance), with a non-trivial positive coefficient. The size of the coefficient is comparable to other important determinants of happiness such as being healthy or being married. This result, arguably, supports the hypothesis that the extra happiness generated from being a fisherman comes from the unique nature of the activity, such as exposure to the outdoor environment [2,7–9,83], as all other standard variables affecting happiness have been controlled for. The exact reasons of why only fishermen that employ workers that happen to be happier than non-fishermen need to be explored more and empirically verified with further research. However, we may offer one intuitive explanation. Fishermen who are helped by workers typically will have more leisure time while they are at sea. Therefore, they get more satisfaction from the unique nature of the profession compared with those who worked without the help of workers or the workers themselves.

We also find a strong association between change of future and current subjective economic position (centril ladder) and being a fisherman, as shown in Table 8. However, we find this association only among general workers (column 1) but not for a particular type of employment (columns 2–4). This relationship is quite strong and statistically significant (at the 1% level). As the difference between subjective future and present economic position may reflect how optimistic a particular individual is about his/her future, and the livelihood and economic aspects in particular, we argue that this may indicate that being a fisher is associated with such an attitude. Of course, this is open to being explored in further research, particularly about the detailed aspects and the cause of such an attitude.

6. Concluding remarks

In this paper, we test whether being a fisherman is associated with higher (or lower) subjective wellbeing. We did this by estimating an econometric model of subjective wellbeing where happiness of individual is a function of various socio, economic and demographic variables including whether that particular individual is a fisherman. We use a unique dataset from a large-scale survey of Indonesian households from which we can identify fishermen from the data and also contain a question on subjective wellbeing of the individuals.

This paper was motivated by the unresolved question in the literature about the happiness associated with being a fisherman, particularly whether being a fisherman is associated with either a lower or a higher level of happiness. The literature on this particular issue includes many studies that discuss various aspects of life satisfaction among fishermen but only a few of those studies do test directly the effect of being a fisherman on any dimension of life satisfaction. Example includes Seara et al. [49] and Pollnac et al. [84]. The main reason for this is that the data used in most studies found in the literature are collected mainly from surveys of fishermen only, without any relevant benchmark (non-fishermen). In Indonesian context, a large archipelagic country where fisheries are quite important in its economy, this study will be the first of its kind, or perhaps even in the Asian context. Our findings suggest the following. First, none of our results supports the hypothesis that fishermen are either less happy or have lower subjective well-being than to non-fishermen. We find that, in a certain employment status, i.e., self-employed with workers, fishermen are happier than are non-fishermen. Furthermore, we find also evidence that fishermen are generally more optimistic in life, as being a fisherman is associated with a positive attitude toward future change in economic status.

Future direction of research on this area should at least cover three important aspects. First in regards to finding more evidences from various different countries, particularly in the developing world where fisheries are important and also poorly managed. Existing literature only cover limited number of countries majority of which are from the developed world. Secondly, in improving the robustness of the methods used or the quality of the data. Despite the richness and uniqueness of the data used in this paper, as discussed previously, is still has many shortcomings. Thirdly, the research that focus on the implication to policy or improving fisheries management. This will be an interesting undertaking because on the one hand, it is desirable to devise better policies to increase fishermen's happiness or wellbeing but on the other hand, if being happiness is associated with the 'satisfaction bonus' that uniquely found as fishermen only, fishermen may tend not to leave the occupation easily. This may not be socially desirable in the context of economic structural transformation where changing occupation into more productive sectors is the key to better livelihood or in the context of serious depletion of the fishery resources.

Acknowledgement

The authors would like to thank Universitas Padjadjaran for funding the research through and Academic Leadership Grant (ALG) scheme, and Directorate General of Higher Education, Ministry of Research, Technology and Higher Education Indonesia for funding research through PDUPT Scheme. We would also like to thank Megananda Suryana for excellent research assistance.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.marpol.2019.103559.

References

[1] Bureau of Labor Statistics (BLS), National Census of Fatal Occupational Injuries in 2017, Census Fatal Occup. Inj. (CFOI, U.S. Dep. Labor., 2018, https://www.bls.gov/news.release/pdf/cfoi.pdf , Accessed date: 30 March 2019.
[2] C.L. Smith, P.M. Clay, Measuring subjective and objective well-being: analyses from five marine commercial fisheries, Hum. Organ. 69 (2010) 158–168.
[3] L.G. Anderson, Necessary components of economic surplus in fisheries economics, Can. J. Fish. Aquat. Sci. 37 (1980) 858–870.
[4] R.B. Pollnac, J.J. Poggie Jr., Job satisfaction in the fishery in two southeast Alaskan towns, Hum. Organ. (2006) 329–339.
[5] J. Van Maanen, S. Barley, Occupational Communities: Culture and Control in Organizations, (1982) http://www.dtic.mil/docs/citations/ADA122826 , Accessed date: 4 November 2018.
[6] H.M. Trice, Occupational Subcultures in the Workplace, Cornell University Press, 1993.
[7] C. Hope, Farmers, Forestry Workers and Fishermen Happier than the Rest of Us, ONS happiness study to find - Telegraph, 2012, https://www.telegraph.co.uk/finance/jobs/9418690/Farmers-forestry-workers-and-fishermen-happier-than-the-rest-of-us-ONS-happiness-study-to-find.html , Accessed date: 4 November 2018.
[8] ONS, Analysis of Experimental Subjective Well-Being Data from the Annual Population, (2012) http://webarchive.nationalarchives.gov.uk/20160107225833/http://www.ons.gov.uk/ons/dcp171776_257882.pdf , Accessed date: 4 November 2018.
[9] N.M. Duc, Contribution of fish production to farmers' subjective well-being in Vietnam - a logistic model, J. World Aquac. Soc. 40 (2009) 417–424, https://doi.org/10.1111/j.1749-7345.2009.00262.x.
[10] L.J. Taylor, Tá Jonn an Éisc, State University of New York at Stony Brook, 1977.
[11] L. TAYLOR, "man the Fisher": salmon fishing and the expression of community in a rural Irish settlement, Am. Ethnol. 8 (1981) 774–788, https://doi.org/10.1525/ae.1981.8.4.02a00070.
[12] R. Byron, Ockerö, Domestic organisation and social change in a Swedish maritime community, Ethnol. Scand. 23 (1993) 58–72.
[13] IRIN, IRIN | A Perfect Storm: Climate Change and Overfishing, (2016) https://www.irinnews.org/feature/2016/09/19/perfect-storm-climate-change-and-overfishing , Accessed date: 4 November 2018.
[14] FAO, The State of World Fisheries and Aquaculture 2018 - Meeting the Sustainable Development Goals, (2018) Rome www.fao.org/publications , Accessed date: 4 November 2018.
[15] J. Poggie, C. Gersuny, Fishermen of Galilee: the Human Ecology of a New England Coastal Community, (1974) https://scholar.google.co.id/scholar?hl=en&as_sdt=0%2C5&q=Fishermen+of+Galilee%3A+The+human+ecology+of+a+New

+England+coastal+community&btnG= , Accessed date: 4 November 2018.
[16] S. Coulthard, More than just access to fish: the pros and cons of Fisher participation in a customary marine tenure (Padu) system under pressure, Mar. Policy 35 (2011) 405–412.
[17] R.B. Pollnac, R.S. Pomeroy, I.H.T. Harkes, Fishery policy and job satisfaction in three southeast Asian fisheries, Ocean Coast Manag. 44 (2001) 531–544.
[18] S. Coulthard, N. Paranamana, Others, Exploring Wellbeing in Fishing Communities (South Asia), Methods Handbook, Online Open Access Publ, 2015 Available Www. Researchgate.Net/Profile/Sarah_Coulthard.
[19] M. Trimble, D. Johnson, Artisanal fishing as an undesirable way of life? The implications for governance of Fishers' wellbeing aspirations in coastal Uruguay and southeastern Brazil, Mar. Policy 37 (2013) 37–44.
[20] J.W. Pitchford, E.A. Codling, D. Psarra, Uncertainty and sustainability in fisheries and the benefit of marine protected areas, Ecol. Model. 207 (2007) 286–292.
[21] J.-M. Fromentin, S. Bonhommeau, H. Arrizabalaga, L.T. Kell, The spectre of uncertainty in management of exploited fish stocks: the illustrative case of Atlantic bluefin tuna, Mar. Policy 47 (2014) 8–14.
[22] R.A. Campbell, A new spatial framework incorporating uncertain stock and fleet dynamics for estimating fish abundance, Fish Fish. 17 (2016) 56–77.
[23] G. Kourous, Poverty in Fishing Communities Poses Serious Risks, (2007) http://www.fao.org/Newsroom/en/news/2007/1000544/index.html , Accessed date: 4 November 2018.
[24] C. Matheson, S. Morrison, E. Murphy, T. Lawrie, L. Ritchie, C. Bond, The health of fishermen in the catching sector of the fishing industry: a gap analysis, Occup. Med. (Chic. Ill). 51 (2001) 305–311.
[25] J.M. Acheson, Anthropology of fishing, Annu. Rev. Anthropol. 10 (1981) 275–316.
[26] Z. Anna, The role of fisherwomen in the face of fishing uncertainties on the North Coast of Java, Indonesia, Asian Fish. Sci. Spec. Issue 25S (2012) 145–158.
[28] R.A. Easterlin, Will raising the incomes of all increase the happiness of all? J. Econ. Behav. Organ. 27 (1995) 35–47.
[29] D. Kahneman, A.B. Krueger, D. Schkade, N. Schwarz, A. Stone, Toward national well-being accounts, Am. Econ. Rev. 94 (2004) 429–434.
[30] P. Brey, Well-being in philosophy, psychology, and economics, Good Life a Technol. Age, Routledge, 2012, pp. 33–52.
[31] A. Krause, Happiness and Work, (2014).
[32] L. Machado, H. Tavares, K. Petribú, M. Zilberman, R.F. Torres, A. Cantilino, Happiness and health in psychiatry: what are their implications? Arch. Clin. Psychiatry (São Paulo). 42 (2015) 100–110.
[33] B. Barcaccia, G. Esposito, M. Matarese, M. Bertolaso, M. Elvira, M.G. De Marinis, Defining quality of life: a wild-goose chase? Eur. J. Psychol. 9 (2013) 185–203.
[34] F. Gul, W. Pesendorfer, Others, The case for mindless economics, 2005.
[35] Y. Uchida, S. Oishi, The happiness of individuals and the collective, Jpn. Psychol. Res. 58 (2016) 125–141.
[36] D. Bartram, Economic migration and happiness: comparing immigrants' and natives' happiness gains from income, Soc. Indicat. Res. 103 (2011) 57–76.
[37] B. Frey, A. Stutzer, The economics of happiness, World Econ. 3 (2002) 1–17, https://doi.org/10.1162/001152604323049361.
[38] J.E. Stiglitz, A. Sen, J.-P. Fitoussi, Mismeasuring Our Lives: Why GDP Doesn't Add up, The New Press, 2010.
[39] K. Sohn, Sources of happiness in Indonesia, Singapore Econ. Rev. 58 (2013) 1350014, https://doi.org/10.1142/S0217590813500148.
[40] A.L. Booth, J.C. Van Ours, Job satisfaction and family happiness: the part-time work puzzle, Econ. J. 118 (2008) F77–F99.
[41] T.A. Wright, R. Cropanzano, D.G. Bonett, The moderating role of employee positive well being on the relation between job satisfaction and job performance, J. Occup. Health Psychol. 12 (2007) 93.
[42] N.A. Bowling, K.J. Eschleman, Q. Wang, A meta-analytic examination of the relationship between job satisfaction and subjective well-being, J. Occup. Organ. Psychol. 83 (2010) 915–934.
[43] E.J.K. Wadsworth, K.S. Chaplin, P.H. Allen, A.P. Smith, What is a good job? Current perspectives on work and improved health and well-being, Open Occup. Health Saf. J. 2 (2010) 9–15.
[44] E. Argentzell, C. Håkansson, M. Eklund, Experience of meaning in everyday occupations among unemployed people with severe mental illness, Scand. J. Occup. Ther. 19 (2012) 49–58.
[45] T. Bille, C.B. Fjællegaard, B.S. Frey, L. Steiner, Happiness in the arts—international evidence on artists' job satisfaction, Econ. Lett. 121 (2013) 15–18.
[46] T. Markussen, M. Fibæk, F. Tarp, N.D.A. Tuan, The happy farmer: self-employment and subjective well-being in rural Vietnam, J. Happiness Stud. 19 (2018) 1613–1636.
[47] G. McIntyre, L. Howie, Adapting to widowhood through meaningful occupations: a case study, Scand. J. Occup. Ther. 9 (2002) 54–62.
[48] R. Pollnac, M. Bavinck, I. Monnereau, Job satisfaction in fisheries compared, Soc. Indicat. Res. 109 (2012) 119–133.
[49] T. Seara, R. Pollnac, J.J. Poggie, C. García-Quejano, I. Monnereau, V. Ruiz, Fishing as Therapy: Impacts on Job Satisfaction and Implications for Fishery Management, (2017).
[50] I. Monnereau, V. Ruiz, R. Pollnac, Fishers' Job Satisfaction in the Caribbean, Études Caribéennes, (2010).
[51] R.M. Fernandes, Job satisfaction in the marine and estuarine fisheries of Guinea-Bissau, Soc. Indicat. Res. 109 (2012) 11–23.
[52] D.J. Agnew, J. Pearce, G. Pramod, T. Peatman, R. Watson, J.R. Beddington, T.J. Pitcher, Estimating the worldwide extent of illegal fishing, PLoS One 4 (2009) e4570.
[53] I. Chapsos, S. Hamilton, Illegal fishing and fisheries crime as a transnational organized crime in Indonesia, Trends Organ. Crime (2018) 1–19.
[54] R.B. Cabral, J. Mayorga, M. Clemence, J. Lynham, S. Koeshendrajana, U. Muawanah, D. Nugroho, Z. Anna, A. Ghofar, N. Zulbainarni, others, Rapid and lasting gains from solving illegal fishing, Nat. Ecol. Evol. 2 (2018) 650.
[55] Food and Agriculture Organization (FAO), Fishery and Aquaculture Country Profiles Indonesia, (2011) Rome http://www.fao.org/fishery , Accessed date: 3 April 2019.
[56] M. Cardinale, D. Nugroho, P. Jonson, Serial depletion of fishing grounds in an unregulated, open access fishery, Fish. Res. 108 (2011) 106–111.
[57] M. Heazle, J.G. Butcher, Fisheries depletion and the state in Indonesia: towards a regional regulatory regime, Mar. Policy 31 (2007) 276–286.
[58] D. Squires, I.H. Omar, Y. Jeon, J. Kirkley, K. Kuperan, I. Susilowati, Excess capacity and sustainable development in Java Sea fisheries, Environ. Dev. Econ. 8 (2003) 105–127.
[59] J. Strauss, F. Witoelar, S. Bondan, The Fifth Wave of the Indonesia Family Life Survey: Overview and Field Report, (2016), p. 5, https://doi.org/10.7249/WR1143.1.
[60] S. Sujarwoto, G. Tampubolon, Decentralisation and citizen happiness: a multilevel analysis of self-rated happiness in Indonesia, J. Happiness Stud. 16 (2015) 455–475, https://doi.org/10.1007/s10902-014-9518-3.
[61] S. Sujarwoto, G. Tampubolon, A.C. Pierewan, Individual and contextual factors of happiness and life satisfaction in a low middle income country, Appl. Res. Qual. Life (2017) 1–19.
[62] K. Sohn, Height and happiness in a developing country, J. Happiness Stud. 17 (2016) 1–23, https://doi.org/10.1007/s10902-014-9566-8.
[63] W.H. Greene, Econometric Analysis, International edition, 2000.
[64] A. Stutzer, B.S. Frey, Recent Developments in the Economics of Happiness: A Selective Overview, Recent Dev. Econ. Happiness A Sel. Overview, IZA Discuss. Pap., 2012.
[65] R.A. Easterlin, Life cycle happiness and its sources: intersections of psychology, economics, and demography, J. Econ. Psychol. 27 (2006) 463–482, https://doi.org/10.1016/j.joep.2006.05.002.
[66] A. Ferrer-i-Carbonell, J.M. Gowdy, Environmental degradation and happiness, Ecol. Econ. 60 (2007) 509–516, https://doi.org/10.1016/j.ecolecon.2005.12.005.
[67] D.G. Blanchflower, A.J. Oswald, Is well-being U-shaped over the life cycle? Soc. Sci. Med. 66 (2008) 1733–1749, https://doi.org/10.1016/j.socscimed.2008.01.030.
[68] C. Batz, L. Tay, Gender Differences in Subjective Well-Being, Handb. Well-Being, UT DEF Publ, Salt Lake City, 2018 Nobascholar. Com..
[69] G. Parker, H. Brotchie, Gender differences in depression, Int. Rev. Psychiatry 22 (2010) 429–436.
[70] B. Stevenson, J. Wolfers, The paradox of declining female happiness, Am. Econ. J. Econ. Policy 1 (2009) 190–225.
[71] F. Brereton, J.P. Clinch, S. Ferreira, Happiness, geography and the environment, Ecol. Econ. 65 (2008) 386–396, https://doi.org/10.1016/j.ecolecon.2007.07.008.
[72] A. Alesina, R. Di Tella, R. MacCulloch, Inequality and happiness: are Europeans and Americans different? J. Public Econ. 88 (2004) 2009–2042.
[73] F. Fujita, E. Diener, E. Sandvik, Gender differences in negative affect and well-being: the case for emotional intensity, J. Personal. Soc. Psychol. 61 (1991) 427.
[74] R. Inglehart, Gender, aging, and subjective well-being, Int. J. Comp. Sociol. 43 (2002) 391–408.
[75] J.M. White, Marital status and well-being in Canada: an analysis of age group variations, J. Fam. Issues 13 (1992) 390–409.
[76] P. Warr, R. Payne, Experiences of strain and pleasure among British adults, Soc. Sci. Med. 16 (1982) 1691–1697.
[77] S. Stack, J.R. Eshleman, B. Philp, D. Wheatley, W. Tov, Marital status and happiness: a 17-nation study, J. Marriage Fam. 60 (1998) 527, https://doi.org/10.2307/353867.
[78] R. a. Easterlin, Explaining happiness, Proc. Natl. Acad. Sci. U.S.A. 100 (2003) 11176–11183, https://doi.org/10.1073/pnas.1633144100.
[79] R. Ilies, J. Yao, P.L. Curseu, A.X. Liang, Educated and happy: a four-year study explaining the links between education, job fit, and life satisfaction, Appl. Psychol. (2019), https://doi.org/10.1111/apps.12158.
[80] A. Ferrer-i-Carbonell, Income and well-being: an empirical analysis of the comparison income effect, J. Public Econ. 89 (2005) 997–1019.
[81] G.W. Fry, degreeism: disease or cure? High. Educ. 10 (1981) 517–527.
[82] D. Dfarhud, M. Malmir, M. Khanahmadi, Happiness & health: the biological factors-systematic review Article, Iran, J. Public Health 43 (2014) 1468.
[83] S. Treleaven, Why Farmers Are Happier than the Rest of Us - Chatelaine, (2014) https://www.chatelaine.com/health/why-farmers-are-happier-than-the-rest-of-us , Accessed date: 4 November 2018.
[84] R.B. Pollnac, T. Seara, L.L. Colburn, Aspects of fishery management, job satisfaction, and well-being among commercial fishermen in the northeast region of the United States, Soc. Nat. Resour. 28 (2015) 75–92.

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