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ASSESSING THE IMPACT OF CPEC ON JOB SWITCHING OF THE LOCAL FISHING COMMUNITY IN GWADAR

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1. INTRODUCTION

Developmental projects are backbone of an economy. Therefore, developing countries around the world are in need of such projects that enhance their regional and international connectivity, create employment opportunities and consequently improve their living standards. The concept of economic corridor was first introduced at the GMS (Greater Mekong Sub region) Eighth Ministerial Meeting in 1998 (Ishida, 2009). The basic idea behind economic corridors is to facilitate economic activity through accumulation of industrial estates on the borders and coastal areas and construction of oil refineries and natural gas pipelines. Additionally, the aim is to enhance tourism as well as achieve access to regional and international markets to boost trade. An important characteristic of most development projects are the Special Economic Zones (SEZs). The SEZs are the specific geographical region with less economic regulations than a country's usual

regulation laws. SEZs consist of Export Processing Zone (EPZ) or Free Trade Zone (FTZ) and therefore get special tax exemptions. SEZs have become a leading promoter for regional economic growth and development in countries like ASEAN and China (Ishida, 2009). One of the main stimulating factors for the establishment of SEZs is when a country decides to increase regional trade through economic corridors (De and Iyengar, 2014).

Economic corridor encompasses infrastructure development that facilitates the access to different markets thus accelerating trade and economic growth (Ishida, 2009). According to Bhattacharya (2012), regional infrastructure development increases the standard of living and reduces poverty by connecting different places and people with major economic hubs and markets. Thus, economic corridors play a vital role in the growth and development of a country. One such corridor is the China-Pakistan Economic Corridor (CPEC) that interlinks the Gwadar coast of Pakistan with the Xinjiang (Kashghar) province of western China through a road of 2700 km. Gwadar coastline is the gateway of Central Asia and Middle East. Hence, China aims to broaden its export of industrial goods and imports of oil, gas and raw material through this shortest route of trade to fulfill its increasing energy demands. Therefore, it is going to invest $50 billion in CPEC projects, which will considerably reduce its transportation cost and shipment time (Aqeel, 2016). On the other hand, Pakistan wants to counter social and economic problems to attain economic development. Hence, CPEC is expected to play a vital role in connecting both countries and fulfilling their aims.

Apart from the economic gains, CPEC may also positively impact the environment. This could be in the form of utilization of barren land to provide access to different areas where human access was not possible initially. Resultantly, this may generate employment opportunities for people whose livelihoods depend on activities that are harmful for the environment. The new employment opportunities created may shift the

attention from environment-unfriendly occupations such as fishing, hunting and deforestation to relatively environment-friendly occupations. In this context, an important positive impact of CPEC could be the preserving of fish stock at Gwadar. Currently, more than 90% of the population in Gwadar relies on fish hunting due to lack of employment opportunities in other sectors such as agriculture and industry (Nisar, 2016). Consequently, the fish stock is depleting and is posing a threat to the marine ecosystem and livelihood of fishermen in Gwadar. However, the new capital inflow through CPEC projects is expected to provide different employment opportunities to the fishermen and reduce the pressure on Gwadar's marine ecosystem.

In contrast, CPEC may negatively impact the environment. This could be because the project may provide access and opportunities to the people of surrounding area of corridor for possible degradation of forest and loss of biodiversity. Moreover, the growth and development accompanying the CPEC may adversely affect the environment through pollution and greater use of environmental resources. This relationship is postulated by the Environmental Kuznets Curve (EKC) according to which massive development results in environmental degradation due to emission of pollution and excessive usage of environmental resources. However, this occurs in the early phase of development when people are poor and environment is not their concern. But during advance phase of development as income increases, people and regulatory authorities become more concerned about the environment.

The massive dependence on fishery in Gwadar is creating marine ecosystem imbalances and is also threatening the livelihoods of fishermen. They have no other employment opportunities; neither agriculture sector nor industrial sector is developed enough to provide such opportunities. However, CPEC is expected to provide different employment opportunities to the fishermen through various industrial setups. It may reduce the excessive fish catch and the marine ecosystem imbalances may be addressed. Nonetheless, the question arises whether they would like to leave this profession and switch to a new one? If yes, at what expected return the fishermen would be willing to

switch to the industrial sector? Which wage will they demand and what kind of skill will be required for them to adjust in the industrial sector? Even if they are willing to switch, are there any constraints that may prevent this switching? These constraints may include different skill requirement, uncertainty of job (contract or daily wages) and distance to the place of job. If there is training required for the jobs provided to the fishermen, who will bear the cost of the training? Even if the cost is borne by the Government/Industry, will the fishermen be willing to participate in the training?

1.1 Research Questions

The research questions of the study are:

1. What are the fishermen's actual preferences regarding job opportunities provided by CPEC?
2. What are the potential hurdles in the smooth transition from fishery to industrial sector?
3. If the dependency of fishermen on fishery sector is decreased through new job opportunities, will it have positive impact on excessive fish catch?

1.2 Objectives of the Study

Following are the objectives of the study:

1. To estimate the actual amount of income at which the fishermen will be willing to switch to the industrial sector.
2. To assess the impact of labor switching on fish catch.
3. To identify the potential hurdles in the smooth transition from fishery to industrial sector.

1.3 Significance of the Study

Switching of fishing class to industry could be a challenging task because it is not the shifting of labor from one sector to another of the same skill. Rather, it is the switching

of fishing labor to industrial sector which needs totally different set of skills. Therefore, it is important to estimate the fishermen's willingness to switch in monetary terms. This study provides the data and information on fishermen's willingness to switch from fishery to industry and the hurdles they may face during the transition. The findings may assist the policy makers in identifying the hurdles that may arise while switching from fishery to industrial sector. These hurdles may include the skill difference between the two sectors, access to training opportunities, distance from the site of the job, and uncertainty (contract and daily wages) in jobs. Thus, knowing about these hurdles in advance may encourage the policymakers to devise different measures that could be taken to resolve these issues and ensure a smooth transition.

2. FISHERIES IN PAKISTAN

Pakistan's coastal areas are rich in marine resources and also have potential for industrialized fisheries. However, very few researches have been conducted on fish species, stock and marine biology in Pakistan. There are many fish vessels and boats engaged in fishing near coastal areas of Pakistan and their numbers are increasing every year. Despite this, there was a decline in fish production between 2003 and 2014. On April 2010, the director general of marine fisher told that fish catches had diminished by 29 percent over the last decade. Some rare fish species have been completely vanished, like gallo and Kalaki fish in Baluchistan, Zardum, Paplet, and Kalgun in other coastal areas of Baluchistan and Palla in Sindh.

As far as the length and size of fish is concerned, it has also become smaller. According to khan and Khan (2011), Indian mackerel from Sindh is smaller in size than mackerel present in Baluchistan due to excessive fish catch. The chairman of Pakistan Fisheries Export Association (PFEA) stated that fish stocks are depleting due to the use of illegal nets and fishing during breeding periods. It is important to note that even if the fishermen do not reduce fish catch after job creation by CPEC, they can at least give up fishing activities during breeding months which may not be possible during open access scenario and competition. Table 2.1 shows the number of fishermen in Gwadar. The

number of all fishermen whether they are full time, half/part time or occasional fishermen increased during 2003-2014. The total number of fish workers during 2003 was 40,876 which increased to 58,075 in 2014. Table 2.2 shows the increasing number of launches, mechanized boats, sail boats and motorized boats during the period 2003-2014. The number of fishing vessels in 2003 was 5996 which increased to 8969 in 2014 while the number of mechanized boats increased from 1459 to 1963 and motorized boats from 4463 to 6753 respectively. Table 2.3 shows the monthly production and value of marine fish catch at Gwadar during 2012, 2013 and 2014. Total fish production in 2012 was 146684.66 metric tonnes and its value was 13358839 PKR. Total fish production in 2013 was 155155.07 metric tonnes and value of production was 13802053 PKR while total fish production in 2014 declined to 143976.38 metric tonnes.

Table 2.1: Fisherman population in Gwadar

Year	Full time fishermen	Part time fishermen	Occasional fishermen	Total
2003	26211	9893	4772	40876
2004	27040	9638	5108	41786
2005	27284	9808	5211	42303
2006	27959	10415	4621	42995
2007	28398	10657	4810	43865
2008	28813	10873	5074	44760
2009	30815	12808	6348	49971
2010	30514	12240	6025	48779
2011	33255	13144	6413	52812
2012	35465	14353	7069	56887
2013	35475	15201	7301	57977
2014	38377	13598	6100	58075

Source: Directorate of Fisheries, Baluchistan

Table 2.2: Number of fishing vessels in Gwadar coastal area

Year	Launches	Mechanized Boats	Motorized Boats	Sail Boats	Total
2003	49	1459	4463	25	5996

2004	70	1471	4487	21	6049
2005	72	1510	4556	13	6151
2006	127	1516	4613	N.A	6256
2007	161	1514	4641	N.A	6316
2008	140	1573	4665	0	6378
2009	1617	4724	8736	0	15077
2010	N.A	1747	4916	189	6852
2011	N.A	1831	5144	211	7186
2012	N.A	1985	5347	291	7623
2013	N.A	2017	5611	310	7938
2014	N.A	1963	6753	253	8969

Source: Directorate of Fisheries, Baluchistan

Table 2.3: Monthly fish production at Gwadar bay

	2012		2013		2014	
Months	Quantity (Metric tonnes)	Value	Quantity (Metric tonnes)	Value	Quantity (Metric tonnes)	Value
January	12318.42	1204022	9463.25	927398	12996.23	1180847
February	16438.16	1037015	21380.23	1389715	10081.26	1698365
March	18633.19	1841817	20232.19	1982754	16856.46	1701792
April	17123.94	1234220	19538.33	1406759	16630.16	1154082
May	4436.39	351860	6130.29	398468	4293.42	331889
June	3380.23	169013	3664.19	183209	3621.52	186580
July	4253.13	219013	3452.20	176061	5877.13	321033
August	6884.14	1231273	5836.88	1038965	8930.59	1338849
September	13821.18	1293330	13603.23	1292306	14633.10	1400963
October	14280.17	1441523	15383.11	1538311	15790.89	1485969
November	17344.17	1601324	19254.15	1790636	15574.38	1807202
December	17771.54	1734429	17217.02	1677471	18691.24	1916515
Total	146684.66	13358839	155155.07	13802053	143976.38	14524086

Source: Directorate of Fisheries, Baluchistan

3. LITERATURE REVIEW

3.1 Economic Corridors and Economic Development

Economic corridors have no clear definition in literature however they may be domestic, regional or global. The concept became famous when Asian Development Bank's (ADB) greater Mekong Sub region (GMS) projects started. Economic corridors involve infrastructural development that accelerates economic activities. The better infrastructure links economies across the region and thereby improves trade ties and investment and reduces transportation costs. Consequently, per capita

income increases and poverty reduces (Kuroda et al., 2007). It is explained in the literature that if the member countries are not linked through advance means of transportation, regional integration declines (De and Iyengar, 2014). According to Bhattacharya (2012), regional infrastructure increases the standard of living and reduces poverty by connecting different places and people with major economic hubs and markets, thus narrowing developmental gaps between regions.

3.2 Economic Corridors and Special Economic Zones

One of the main stimulating factors for the establishment of Special Economic Zones (SEZs) are the economic corridors. When a country decides to increase regional connectivity through economic corridors; it also establishes SEZs along the route. The SEZs are specific geographical regions with less economic regulations than a country's usual regulation laws and consist of Free Trade Zones (FTZs) or Export Processing Zones (EPZs) (ADB report, 2016). Several studies show that SEZs have become a leading promoter for regional economic growth and development in developing countries like ASEAN countries and China (see for instance, Wong and Chu, 1984; Nema and Pokhariyal, 2008; Ishida, 2009; Aggarwal, 2010).

3.3 Economic Corridors and its Adverse Environmental Impacts

Economic corridors accelerate pace of economic growth and development. However, development and connectivity brought about by them can have adverse environmental impacts. For instance, Fearnside (2007) found that paving roads affect environment adversely and encourages deforestation in Brazil. Moreover, roads and corridors provide opportunity of hunting which raises animal mortality and escaping (see for instance, Lahm et al., 1998; Blake, et al., 2007; Laurance et al., 2009). Furthermore, Tracy et al. (2017) found that pollution emitted by corridors such as air, water and noise has adverse effects on water, forests and biodiversity in China. Similarly, Pratt and Lottermoser (2007) concluded that the effects of chemical pollutants and nutrient runoff are likely to be detrimental for streams and wetlands

near roads, with major pulses of aquatic pollutants and nutrients entering marine ecosystems of Australia.

3.4 Corridor, Fisheries and Livelihood

Most studies of small-scale fisheries in low income countries in the last 25 years have tended to emphasize small scale fisher folks' resource dependence and the open access nature of fisheries that together lead to resource degradation (see for instance, Pauly, 1997). According to Gerrits (2015), economic corridors can have positive as well as negative impact on the livelihoods of fishermen. The positive impact is usually in the form of development and improvement of area support infrastructure and services that may also benefit the local residents such as fishermen. While the negative impact includes environmental impact on fish resources, reduced area/access to fisheries, physical and economic displacement of local residents. On the same lines, Shombong (2010) analyzed the impact of petroleum development project between Chad and Cameroon on the local community and concluded that many villagers lost their livelihood sources such as fishing, hunting and gathering owing to the project. On the other hand, Steel and Lindert (2017) investigated the impact of infrastructural development in Cameroon, Ghana and Tanzania on the rural livelihoods. It was revealed that the infrastructural developments created numerous non-farm employment opportunities for the local residents thus stimulating positive socio-economic dynamics in the region.

3.5 Use of Contingent Valuation Method in Different Scenario

Non-marketed goods and services of ecosystem such as wildlife, scenic beauty etc. and marketed goods and services such as fisheries demand to be preserved and used efficiently. Unfortunately, they are neither being preserved nor used efficiently because the value of such environmental assets is unknown. Hence, it is necessary to identify how individuals value and make choices involving environmental goods. This process is known as Contingent Valuation Method (CVM) whereby the

respondent is asked about his willingness to pay to avoid injury to natural resources/environment or restore the injury (Rahim, 2005). Various studies have utilized this method to assess the value of environmental goods and services. For instance, Kramer et al. (2003) used the Contingent Valuation to estimate the value of forest ecosystem protection in various states of America. The results were in accordance with the theory whereby the consumer preferences regarding forest ecosystems were well behaved and consistent. Similarly, Sales et al. (2009) used the CVM to estimate a recreational value for the freshwater inflows into the Kowie and the Kromme Estuaries in South Africa and found that the residents were willing to pay R938 296.59 and R974 019.20 for the freshwater inflows into Kowie and Kromme Estuaries so as to save the fisheries.

4. DATA AND METHODOLOGY

This section presents the survey methodology, sample selection, data and variables as well as the model specification employed to achieve the objectives of the study. The descriptive statistics of the data is provided in the last subsection (4.6).

4.1 Survey Methodology

The study used Contingent Valuation Method (CVM) for the estimation of willingness to accept of fishermen (respondents) to switch from fishing to industrial sector. CVM is used to display the "economic value" of environmental goods and services. For these goods and services, the study created a hypothetical scenario of job market through which Willingness to Switch (WTS) of the fishing labor into industrial sector was estimated. The major elicitation techniques used in the literature include open-ended, take it or leave it (Dichotomous choice), double bound dichotomous choice method, and modified dichotomous choice method. However, in this study firstly the fishermen were asked to state their preference of switching amount (open ended). Next, they were offered three bids so as to reveal their real preference and for the WTS

calculation. Here, the responses are “Yes” or “No” for the initial bid which is offered to the respondents. The respondents who respond with a “Yes” for the initial bids are then offered a lower bid (minimum) and if the respondents refuse the initial bid, the bid is increased to a maximum amount. Hence, in the context of the study a bid (25000) was offered to the respondent to switch from fishing to industrial sector. For those who said “yes”, the bid was decreased to minimum (15000) and then they were asked if they accept this bid in terms of “yes” or “no”. Next, they were offered a bid of 25000 again and those who refused the bid average income (25000) were then asked if they would switch by offering them the maximum income (35000). Thus, three bids of minimum, average and maximum gave a better idea about their willingness to switch from fishing to industrial sector. This process of calculating willingness to switch also logically provided a closer estimate of the distribution of respondent’s income. Moving from average income offer to minimum income offer on their agreement and from average to maximum on their disagreement is bound dichotomous choice biding approach and when tested in a hypothetical job market, this technical process turns into a CVM.

4.2 Sample selection

The study was conducted for district Gwadar (Baluchistan). The 600 km long coastline comprises of many tehsils such as Pasni, Jiwani and Ormara. However, due to limited time and financial resources only tehsil Gwadar was chosen for survey. Using 95% CL and 5% CI, a sample size of 266 respondents (fishermen) was initially selected from tehsil Gwadar coastal area through Random sampling technique. However, after cleaning the data, sample size was reduced to 234 respondents.

4.3 Data Analysis

The study used primary data source. More precisely, data was collected through surveys from the field and analyzed to assess the responses of some variable to the corresponding socio-economic variables of that particular individual. Hence, Stata software was used for data analysis and graphical representation.

4.4 Variables

Willingness to Switch (WTS) from fishing to industry depends on a set of socio-economic and demographic variables. Theoretically, these include income, education, household size, age, distance, skill adaptation, transportation and marital status. The present study makes use of all these variables. More specifically, it examines the current income impact on WTS and uses monthly expenditure plus the savings of the respondents as a single variable for income. This is an indirect way of asking their monthly income since they are often reluctant to tell their incomes directly. Hence, respondents with higher incomes may have a lower WTS and vice-versa. Moreover, married respondents may have a higher WTS than unmarried ones. Therefore, dummy variable is used for the marital status of the respondents which takes the value 1 if married and 0 otherwise. Furthermore, WTS also depends on the level of education of the respondents as those who are more educated may have a greater WTS. Thus, the education variable is taken in terms of years of schooling. In addition, household size also affects the WTS because if the size is large then WTS would be greater in order to meet the necessities of family members. The household size is taken as the number of family members sharing kitchen. Similarly, age also affects the WTS as older individuals may have a lower WTS because they may not be able to work in the industrial sector. Hence, age is taken as number of years. Moreover, gender is taken as a dummy which takes the value 1 if male and 0 otherwise. Distance from home to working place is another important variable because it could cost half the income if workplace is outstation. Thus, distance is taken in kilometers. Furthermore, skill-adaptation is another factor that would affect WTS since respondents who would be able to adopt new skills would be more willing to shift to industrial sector and vice-versa. Hence, skill-adaptation is taken as a dummy whereby if the worker is able to adopt a new skill the dummy would take the value 1 and 0 otherwise. On the same lines, for the variable of transport the dummy

would take the value 1 if the respondents require transportation to their workplace and 0 otherwise.

4.5 Model Specification

The model for this study has been adopted from Ressurreicao et al. (2012) and is given as:

$$\mathbf{WTS = \beta_0 + \beta_1\,(income) + \beta_3\,(education) + \beta_2\,(household\ size) + \beta_4\,(age) + \beta_6\,(distance) + \beta_7\,(skill\ adaption) + \beta_8\,(transportation) + \beta_9\,(marital\ status) + \mu_i}$$

All the assumptions are tested for incorporating OLS regression before the estimation of final results.

4.6 Descriptive Statistics

The descriptive statistics of variables is provided in Table 4.1. As evident, only 47 percent respondents are willing to switch to the final bidding amount. The biding amount, with a mean of 26090, varies between 15000 and 35000 PKR. The average household income, on the other hand, is approximately 26000 PKR. Furthermore, the average education in the area is very low and almost 82 percent of the respondents are married. The household size is very large with a mean value of 9 persons per household. Overall, the descriptive statistics present a very grim picture of the socio-economic situation of the sample area.

Table 4.1: Descriptive Statistics

Variables	Mean	Standard deviation	Minimum	Maximum

Fish catch per month	5.73	10.25	0.6	150
Willingness to switch 1 (Yes, No)	0.52	0.50	0	1
Willingness to switch 2 (Amount)	30110.64	7721.964	15000	35000
Income of the households	26089.74	9655.241	9000	70000
Age	34.09	10.51	17	70
Education	2.14	3.54	0	14
Marital status	0.82	0.38	0	1
Household size	9.08	4.03	1	20
Fishing in breeding months after job provision	0.21	0.41	0	1
Total cost of trips/month 5 years ago	100837.6	67901.65	30000	300000
Total cost of trips/m now	158127.7	112799.5	30000	750000
Time spent all trips/month 5 years ago	360.20	142.11	40	240
Time spent all trips/m now	120.06	47.37	40	240
Observations	234	234	234	234

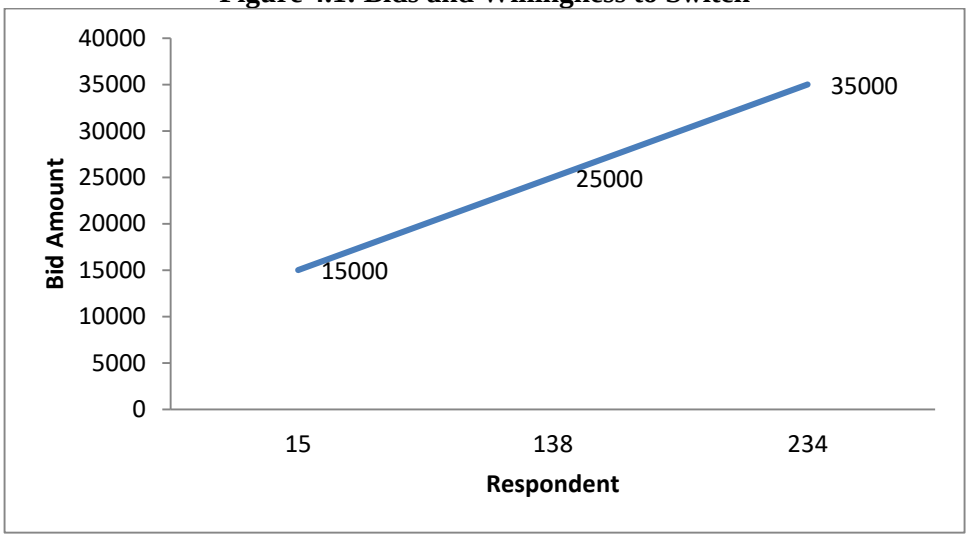
Source: Author's calculation.

4.6.1 Willingness to Switch and Positively Sloped Curve

The answers of the respondents to get jobs (compensation) in industrial sector and leave fishing are elicited through dichotomous choice offers. By focusing on "yes" and "no" responses for the proposed bids a positively sloped curve is derived which indicates that as the bid amount increases, willingness to accept to switch also increases (see Figure 4.1). More specifically, for the initial bid amount which is 25000 PKR the number of respondents who are ready to switch to industrial sector is 123 which comprises of 52.56% of the total respondents (234). When the respondents are not ready by the initial bid offer of 25000 PKR, the bid is increased to 35000 PKR (maximum bid). For the respondents who are ready to switch with initial bid of 25000 PKR, the bid amount is decreased to 15000 PKR (minimum bid) in which case 15 (6.4%) respondents are ready to switch to industrial sector with the minimum bid

amount. Hence, the total respondents who are willing to switch by 25000 PKR are 138 (15+123). Interestingly, all the respondents are ready to switch to industrial sector with the maximum bid amount. It is due to the fact that the previous compensations offered to them are lesser than this maximum compensation.

Figure 4.1: Bids and Willingness to Switch



5. RESULTS AND DISCUSSION

This section presents the results and discussion. Subsection 5.1 presents the estimation of mean willingness to switch between sectors. While the subsection 5.2 presents the determinants of final biding amount to switch. Lastly, subsection 5.3 discusses the hurdles that the fishermen may face while switching from fishing to industrial sector.

5.1 Estimation of Mean Willingness to Switch (WTS)

The mean willingness to switch is a monetary amount at which fishermen are willing to switch from fishing to industrial sector. The logit results presented in Table 5.1 show that the bid amount coefficient in model 1 is 0.0004. It is positive and statistically

significant which shows that the bid amount positively affects the mean willingness to switch when other variables are not controlled for. On the other hand, model 2 controls for other variables but the bid amount still remains positive and highly significant. Thus, it can be concluded that the Bid amount (Compensation amount offered) has a positive relationship with willingness to switch.

In model 1, the mean willingness to accept to switch from fishing to industrial sector is 28,475 PKR. This is approximately 2,500 PKR higher than the mean income of the households in this region. However, model 1 does not control for other characteristics and this may bias the mean willingness to accept to switch (WTS). Hence, in model 2 when other characteristics are controlled, the coefficient of bidding is 0.0019 which is positive and statistically significant. Moreover, the mean willingness to accept for switching is 30,326 PKR which is significantly higher than the mean WTS in model 1. This indicates that model 1 under estimates the mean willingness to accept to switch.

Table 5.1: Results Logistic Regression for Mean Willingness to Switch

Variables	**Model 1**	**Model 2**
Bid Amount	0.0004*** (0.0001)	0.0019*** (0.0007)
Age	---	-0.6016 (0.5038)
Age Squared	---	0.01118 (0.0091)
Education	---	-0.125903 (0.1047)
Household Size	---	-0.030269 (0.0855)
Log of Income	---	2.344484 (2.8021)
Marital Status	---	-32.8860** (14.8800)
Constant	-11.39*** (1.8408)	-47.32 (30.6600)
Observations	234	234
Mean WTS (WTA)	**28475**	**30326**

Note: The ***, ** and * indicates the significance level at 1, 5 and 10 percent benchmark respectively. Standard errors are reported in parenthesis.

5.2 Determinants of Final Biding Amount to Switch

Simple regression model is estimated to find minimum monetary amount that people are willing to accept to switch from fishing to industrial sector. The regression results of these variables are presented in Table 5.2. In model 1, the coefficient of fish catch per month is 0.0015 which shows that as fish catch per month increases by 1 tonne, on average final willingness to accept to switch increases by 0.15 percent. Hence, there is a positive relationship between final willingness to accept to switch and fish catch per month when other variables are not controlled. However, the relationship is statistically insignificant. Therefore, in model 2 when other important variables are controlled, the coefficient for fish catch per month is 0.003 and becomes statistically significant. More specifically as fish catch per month increases by 1 tonne, the minimum willingness to accept to switch increases by 0.3 percent on average. Hence, there is a positive and significant relationship between minimum willingness to accept to switch and fish catch per month when other variables are controlled in the model.

As far as the coefficient of income is concerned, it is 0.852 which shows positive and significant association with willingness to accept to switch. In other words, as income increases by 1 percent the total amount of willingness to switch increases by 0.852 percent keeping other variables as constant. As far as other control variables are concerned, they are statistically insignificant suggesting that the respondents (Fishermen) do not differ significantly within those characteristics.

Table 5.2: Results Simple Linear Regression Model

Variables	Model 1	Model 2
Fish catch per month	0.0015 (0.0016)	0.003*** (0.0007)
Age	---	0.0067 (0.0001)
Age squared	---	-0.0000 (-0.0001)
Education	---	0.0014 (0.0058)
Household size	---	0.0047 (0.0058)
Marital status	---	-0.032

		(0.0695)
Log of Income		0.852***
		(0.051)
Trust	---	-0.013
		(0.036)
Time spent before 5 years/month	---	-0.000
		(0.0003)
Time spent now/month	---	0.0000
		(0.000)
Total cost 5 years/m	---	-4.19e-07
		(3.96e-07)
Total cost now/m	---	3.94e-08
		(1.96e-07)
Family members involve in fishing	---	0.027
		(0.021)
Constant	10.01***	1.257**
	(0.030)	(0.5077)
R-Squared	0.0013	0.628
Observations	234	234

Note: The *** and ** indicates significance level at 1 and 5 percent benchmark respectively. Standard errors are reported in parenthesis.

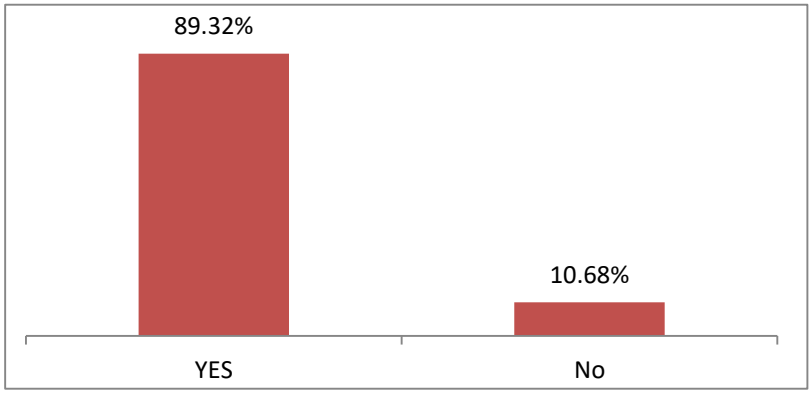
5.3 Hurdles in Switching Fishermen to Industrial Sector

The main hurdles that the fishermen may face in switching to industrial sector are technicalities of job, skill requirement issue, nature of job whether job is permanent/contract based or daily wages based etc. These hurdles are elaborated in the following subsections.

5.3.1 WTS (WTA) for technical and non-technical job

Literacy rate in Gwadar coastal area is very low especially education condition of the respondents (fishermen) was deplorable. The total number of respondents was 234 fishermen and the highest education level achieved is matriculation. Most of the fishermen preferred non-technical and low ranked jobs. Only 25 (10.68%) respondents were ready to shift to the industrial sector as a Plumber, Control Panel Operator and Supervisor. Rest of the respondents who were 209 (89.32%) preferred non-technical employment such as driver, security guard, packing, helper etc. (see Figure 5.1).

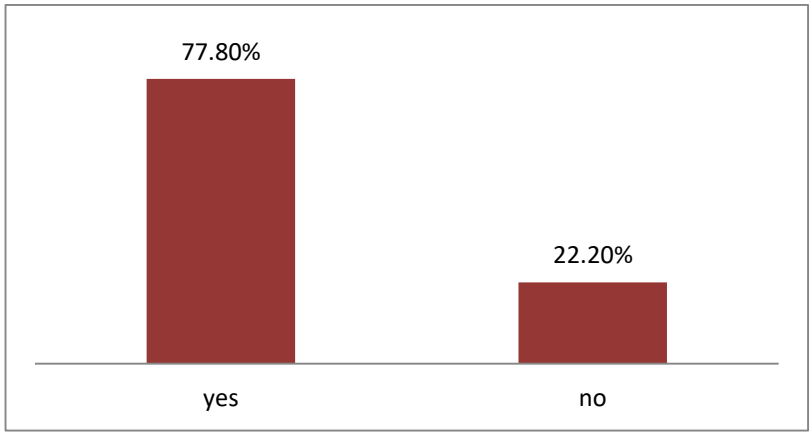
Figure 5.1: WTS (WTA) for Technical and Non-Technical Job



5.3.2 Willingness to switch and skill adaptation

The shifting of fishermen to industrial sector is not an easy task. It requires totally different skills. However, when the respondents were asked if the training is provided to them would they adapt to it and shift to the industrial sector? To this, 52 (22.2%) of the respondents replied with a "No" whereas 182 (77.8%) answered in affirmative. Hence, if the cost of the training is borne by either the government or employer then more people would be willing to shift (see Figure 5.2).

Figure 5.2: WTS and Skill Adaptation

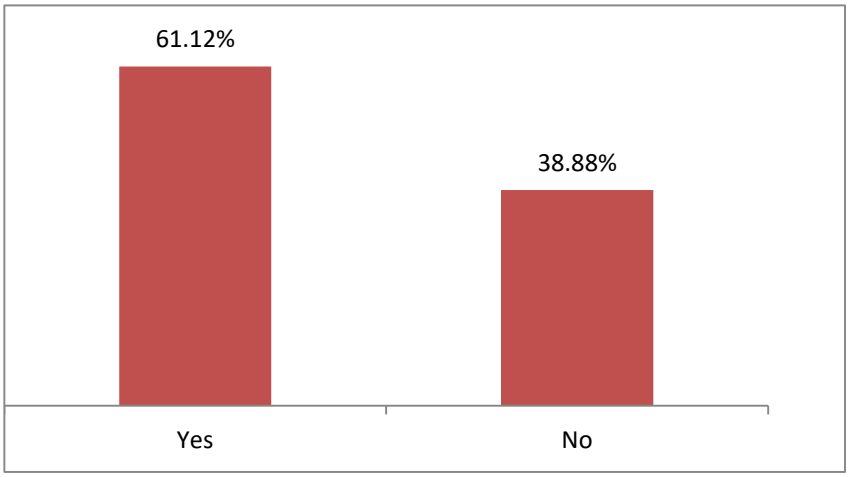


5.3.3 Willingness to switch and transportation facility

The respondents were asked whether they require any transportation facility to reach to their workplace from home. 52 (22%) of the respondents replied that they do not need

any type of transportation while 182 (77.8%) said they do need transportation facility (see Figure 5.3). This indicates that majority of the people require transportation facility and this could prove as a hurdle in their switching if not provided. If the industrial sector is interested in attracting these workers, they need to remove this hurdle.

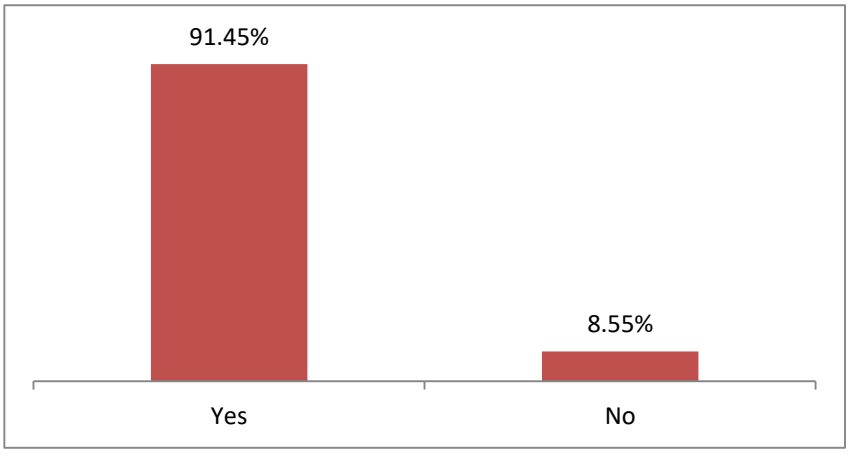
Figure 5.3: WTS and Transportation Facility



5.3.4 Willingness to switch and nature of job

The respondents were asked whether they would shift if the job is contract/permanent based. To this, 20 (8.5%) of the respondents said "No" while 214 (91.5%) of them said "Yes" (see Figure 5.4). This proves that majority of the fishermen want certainty in new jobs as most of them agreed to shift on the regular based employment in newly projected industrial sector rather than having uncertain jobs (daily wages).

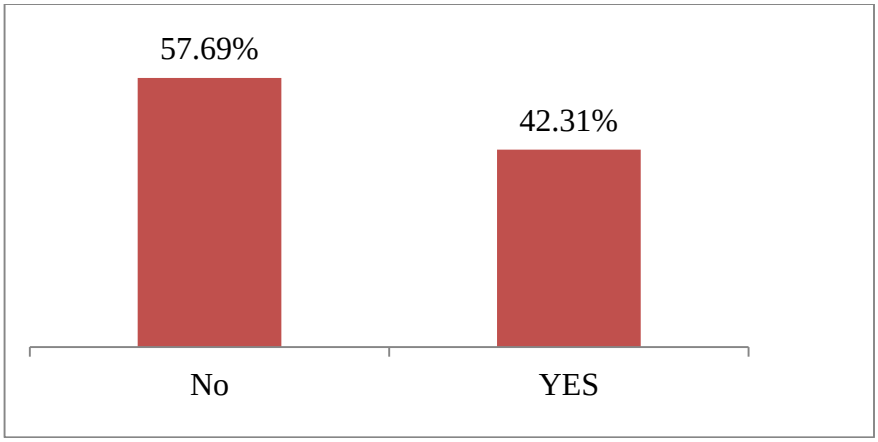
Figure 5.4: WTS and Contract Jobs Provision



5.3.5 Willingness to switch and daily wages job provision

The respondents were asked whether they would switch if the job is on daily wages. To this, 135 (57.7%) of the respondents answered “No” while 99 (42.3%) respondents were ready to shift to industrial sector even if daily wages jobs were provided to them (see Figure 5.5). Hence, it is evident from Figures 5.4 and 5.5 that majority of the respondents are willing to switch if they are offered contract based instead of daily wages jobs. This indicates that most of them demand job security and less volatility in their monthly income. Therefore, daily wage job offers could prove to be a hurdle in switching and so contract based jobs should be offered in order to facilitate switching between sectors.

Figure 5.5: WTS and Daily Wages Job Provision



6. CONCLUSION AND RECOMMENDATION

Economic corridors lead to economic growth and development however they can have both positive and negative effects on the environment. For instance, the infrastructural development under the corridors can cause pollution and environmental degradation. In contrast, corridors could also positively impact the marine ecology by creating alternative employment opportunities and thus reducing the pressure on fisheries and the marine

ecosystem. All around the world, the marine ecosystem is endangered and coastal areas of Gwadar are no different. The fish stocks of Gwadar are depleting and the livelihoods of fishermen is at stake. In the current context, a very important positive impact of CPEC projects could be the preserving of fish stock in Gwadar. This could be achieved by shifting the fishermen to industrial sector through creation of employment opportunities. Their skills could also be upgraded through workshops and trainings which could significantly reduce pressure on the fisheries.

The results of the study reveal that the average age of the respondents (fishermen) is 34 years and the average income is 26,000 PKR per month. Income is significantly associated with minimum willingness to accept to switch in model 2 when other variables are included in the model while it is insignificant in model 1. When income of the respondents increases, willingness to accept to switch also increases. Average education is 2 years that is primary which is insignificant but positively related to the minimum willingness to accept to switch. The average household size is 9 people per household. House hold size is also positively related but not significant. Average fish catch per month was 5.73 tonnes. Moreover, it is significant and positively related to willingness to accept to switch. The respondent who catches more fish were ready to shift to industrial sector and demanded higher compensation. Logit regression model was estimated to quantify willingness of the respondents, where they were willing to switch to industrial sector. The mean willingness to accept to switch was found to be approximately 30,000 PKR. The curve between bid amounts and willingness to accept to switch and logit regression results show that there is a positive relationship between both. In other words, the percentage of the respondents who are willing to switch to industrial sector increases as bid offer increases. The study further found that lack of skill and transportation facility, nature of job offered, contract and daily wages could affect peoples' willingness to switch from fishing to industrial sector.

Based on the findings of the study, following recommendations are made to convince fishermen to switch to the industrial sector:

1. The mean willingness to accept is found to be approximately 30,000 PKR. Hence, the jobs that would be offered should at least offer this amount or above.
2. The fishermen should be offered free of cost trainings to adapt new skills for the industrial sector.
3. They should be offered contract or long term jobs to ensure them job security and reduce their income volatility.
4. They should be provided with transportation facility for their potential.

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