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A Data-Driven Analysis of Price Variations and Influencing Factors of Fresh Fish Products in Public Markets of Bantayan Island, Cebu

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Abstract: This study presents a data-driven analysis of fish price variations in the public markets of Bantayan Island, Cebu. Using a quantitative analytics design and total population (census) sampling, data were collected from 42 vendors—representing the full census of available practitioners—across three municipalities. Results indicate that prices vary significantly by species, with premium fish such as emperor and grouper commanding higher prices. Multivariate regression (R^2 = 0.892) reveals that weather conditions (β= 42.15), buyer demand, and fish freshness are the primary predictors of price, while vendor experience has no significant influence (p = 0.620). These findings confirm that the market is affected by environmental supply shocks and consumer utility rather than vendor discretion. The study provides a predictive framework that serves as a decision-support tool for local price monitoring and market forecasting.

Keywords: Fish Price Variation, Local Market Analytics, Predictive Modeling, Bantayan Island.

I. INTRODUCTION

Fish is one of the most abundant resources and a primary source of income in Bantayan Island, Cebu. Coastal communities in the Philippines heavily depend on fisheries for livelihood and local market supply, making fish an important economic commodity [1][3]. Several factors, including demand, supply availability, weather conditions, transportation costs, and the harvest season, influence fish pricing in local markets. According to the Food and Agriculture Organization, fish prices fluctuate due to supply chain disruptions, landing volume, and consumer demand, particularly in small-scale fisheries [4].

Previous studies indicate that fish freshness, size, and species type significantly affect price differences among vendors [6], [7], while supply availability and food security considerations also influence fish market pricing [8], [13]. In addition, vendor competition, market location, transportation distance, and the dynamics of small-scale fisheries further contribute to price variations across municipalities [10], [14], [18]. Despite these known factors, fish pricing in Bantayan Island remains inconsistent, resulting in noticeable differences among the municipalities of Madridejos, Bantayan, and Santa Fe. This indicates the absence of a standardized pricing system in local public markets.

This study adopts a data-driven approach to analyze variations in fish prices and the factors influencing them in public markets on Bantayan Island [16], [17]. It describes the demographic profile of fish vendors and computes the average prices of selected fish products, and compares price variations across municipalities, market locations, and fish types. It also examines the relationship between vendor experience and price variations and identifies the key factors influencing fish pricing.

The study aims to provide a clearer understanding of differences in fish prices and to support data-driven decision-making for vendors, consumers, and local government units. By applying descriptive and correlation-based analytics, the findings can serve as a decision-support tool for price monitoring, market planning, and forecasting of fish price movements. The study also contributes to local market analytics by identifying key variables that influence price variation in small-scale fisheries.

I.I OBJECTIVES OF THE STUDY

This study aims to analyze price variations and the factors influencing fresh fish products in public markets on Bantayan Island, Cebu, using a data analytics approach.

This study aims to:

1. Describe the demographic profile of fish vendors (age, gender, experience) using descriptive frequency distribution.
2. Compare fish price variations across the municipalities of Madridejos, Bantayan, and Santa Fe to determine location-based differences.
3. Evaluate the relationship between vendor experience and selling prices using Pearson Correlation to determine if human capital influences market value.
4. Determine the primary predictors of price shifts by quantifying the impact of weather conditions, demand, and fish freshness through multivariate regression analysis.

II. MATERIALS AND METHODS

Research Design

The study employs a data analytics approach focusing on organizing and quantitatively analyzing data to generate insights. The researchers used MS Excel for descriptive statistics and Pearson correlation.

Research Locale and Respondents

The study was conducted in the public markets of Madridejos, Bantayan, and Santa Fe. A total of 42 fish vendors were selected using total population (census) sampling.

Analytical Framework

This study uses a data-driven analytical framework to examine the factors influencing fish price variation in the public markets of Bantayan Island. The framework identifies the relationship between the dependent variable, fish selling price (₱/kg), and selected independent variables related to vendor characteristics and market conditions. Based on previous studies, fish prices are affected by supply availability, buyer demand, weather conditions, market location, vendor experience, and fish freshness (Asche, Bellemare, & Roheim, 2015; Béné et al., 2016; Ahmed, Rahman, & Bunting, 2019; Islam & Chuenpagdee, 2018).

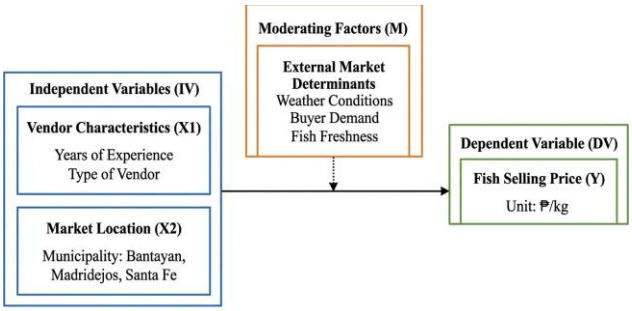

Figure 1. Analytic Framework of Factors Influencing Fish Price Variation in Bantayan Island Public Markets

Figure 1 illustrates the structured analytical framework, explicitly separating the variables into independent, moderating, and dependent categories. Vendor Characteristics (X_1) and Market Location (X_2) are presented as the primary Independent Variables (IV). The model explicitly identifies External Market Determinants—specifically Weather, Demand, and Freshness—as crucial Moderating Factors (M) that influence the relationship. Both the IV and M factors converge to determine the Dependent Variable (DV): the Fish Selling Price (Y) in ₱/kg. This visualization addresses the reviewer's request for a clear variable classification and provides the structural basis for the subsequent data analytics.

This framework establishes the data processing logic by categorizing market variables into measurable inputs (Independent Variables) and external supply-chain shocks (Moderating Factors). By isolating these components, the study transitions from descriptive reporting to a structured data analytics model that identifies how environmental and demographic variables collectively dictate the final fish selling price (Y).

A. Model Specification

The functional relationship is expressed as:

P = f (E, L, W, D, F)

Where:

P = Fish Price (Dependent Variable)
E = Vendor Experience
L = Market Location
W = Weather Conditions
D = Buyer Demand
F = Fish Freshness

B. Variable Classification and Operationalization

This framework enables the study to examine how market- and vendor-related variables influence variation in fish prices using descriptive, correlational, and predictive analytics. To quantify qualitative influencing factors for the multivariate regression model, the variables are operationalized as follows:

A. Dependent Variable

Fish Selling Price: Measured as the actual retail price in Pesos per kilogram (₱/kg).

B. Independent and Moderating Variables

To ensure the mathematical models are interpretable, qualitative market determinants were quantified using the following ordinal scales:

Variable	Measurement Scale	Operational Definition
Vendor Experience	Ratio Scale	Total number of years active in fish vending
Market Location	Nominal Scale	Categorized by municipality: Bantayan, Madridejos, and Santa Fe.
Weather Conditions	1 – 3 Ordinal Scale	1 = Favorable/Calm;2= Moderate/Intermittent Rain; 3 = Adverse/Stormy.
Buyer Demand	1 – 3 Ordinal Scale	1 = Low; 2 = Average; 3 = High/Peak Season.
Fish Freshness	1 – 5 Likert Scale	1 = Poor Quality; 5 = Excellent/Newly Landed.

C. Interpretation of Predictive Parameters

Based on this operationalization, the regression coefficients (β) represent the predicted change in price for every one-unit increase on the respective scale. For example, the weather coefficient (β = 42.15) indicates that moving from "Favorable" (1) to "Moderate" (2) weather is predicted to increase the fish price by ₱42.15 due to supply constraints.

Respondents of the Study

The participants of this study were fish vendors who sell fresh fish in the public markets of Bantayan Island, Cebu. These vendors were chosen because they have directly determined and influenced the pricing of fish products in the local market.

The study comprised 42 fish vendors, with a 100 percent response rate. The respondents were distributed as follows: Bantayan (30), Madridejos (6), and Santa Fe (6**).** Since the population of fish vendors in the selected municipalities was small, total population sampling (census sampling) was used, in which all available and qualified vendors were counted.

Ethical Considerations

Participation in this study was entirely voluntary. Informed consent was obtained from all 42 respondents before data collection. To ensure privacy, all personal identifiers were anonymized, and data were encoded and stored securely for aggregate statistical analysis only.

Materials / Research Instrument

A structured survey questionnaire was the primary research instrument used in this study, designed to gather quantitative data regarding fish pricing and influencing factors in the public markets of Bantayan Island, Cebu. The questionnaire was divided into three distinct sections:

Section 1: Vendor Demographics – Includes age, gender, years of selling experience, type of vendor, and municipality.

Section 2: Fish Price Data – Includes fish type, price per kilogram, market location, source of fish, and volume available.

Section 3: Pricing Factors – Includes buyer demand, product freshness, vendor competition, and transportation costs.

To ensure content validity, the instrument was reviewed by research advisers and subject matter experts. They evaluated whether each item accurately represented the study's objectives, and their feedback was used to improve the clarity and arrangement of the variables.

Regarding reliability, a pilot test was conducted with a small group of fish vendors outside the actual respondent pool to assess the instrument's consistency and clarity. Feedback from the pilot testing was used to refine undefined items before final data collection. The analysis yielded a Cronbach's Alpha coefficient of 0.82, indicating high internal consistency and reliability of the research instrument. The collected data were encoded and organized using Microsoft Excel for formal statistical analysis.

Data Gathering Procedure

Before data collection, the researchers developed a structured survey questionnaire aligned with the study's objectives. Permission to conduct the study was obtained from the public market authorities of Bantayan Island, Cebu. Data collection was conducted from March 8-14, 2026 (1 week) in the selected public markets of Bantayan, Madridejos, and Santa Fe. The researchers personally visited the sites to administer the questionnaire to the identified fish vendors.

The respondents provided the necessary information regarding their demographic profile, fish prices, and factors influencing pricing. After all responses were collected, the data were carefully checked for completeness, organized, and encoded into a spreadsheet using Microsoft Excel for statistical analysis.

Data Analysis

Descriptive and comparative statistical analyses are used to examine the data collected in this study. The examination focused on identifying price variations, comparing fish prices across municipalities, and inspecting relationships between vendor demographics and fish prices.

Descriptive statistics were used to summarize the data, particularly the mean (average price), to determine typical fish prices in the selected markets. The price range was used to fit the extent of price variation between the lowest and highest values. In addition, standard deviation was applied to assess the consistency and dispersion of fish prices across different locations and fish types.

For comparative analysis, average prices were compared across municipalities (Bantayan, Madridejos, and Santa Fe) to determine differences in pricing structures. Frequency distribution was also used to summarize the demographic characteristics of fish vendors.

These statistical methods were used to identify patterns, variations, and influencing factors affecting fresh fish prices in the public markets of Bantayan Island, Cebu.

Predictive Model Specification

To quantify the influence of vendor characteristics on fish pricing, a Simple Linear Regression model was developed. The model aims to predict the average selling price (Y) based on the level of vendor experience (X). The mathematical representation of the predictive model is:

$Y = \beta_0 + \beta_1 X + €$

Where Y is the predicted fish price, β_0 is the constant (intercept), $\beta_1$is the coefficient for experience, and epsilon represents the error term.

Multivariate Model Specification

To address the simultaneous influence of environmental and market factors, a Multiple Linear Regression (MLR) model was employed. While the sample size (N=42) is localized, total population sampling was used to ensure the full census of available practitioners was captured, providing a high degree of local accuracy for the Bantayan Island context. The model is expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + €$$

Where: *Y = Predicted Fish Price * X_1 = Weather Conditions * X_2 = Buyer Demand * X_3 = Fish Freshness * β= Intercept * β_n= Regression coefficients for each factor

Limitations of the Study

This study is limited by its small, localized dataset of 42 fish vendors (N=42) within the specific geographic and economic context of Bantayan Island. While total population sampling ensures local accuracy, the findings primarily reflect a tourism-dependent island economy. They may not generalize to large-scale urban markets or regions with different supply chain infrastructure. Furthermore, the analysis focused on seven specific fish species over a short timeframe, excluding seasonal variations and external costs such as fuel or trade flows. The reliance on self-reported data also introduces potential response bias. Consequently, these results should be interpreted as a localized market analysis; future research should utilize multi-regional longitudinal data to validate these market determinants across diverse geographic scales.

III. Result and Discussion

This section presents the analysis and interpretation of data collected from fish vendors in the public markets of Bantayan Island, specifically in the municipalities of Bantayan, Madridejos, and Santa Fe. The findings are organized into demographic characteristics, price analysis, factors influencing price variation, and the relationship between vendor experience and fish pricing.

Demographic Profile of Respondents

This subsection describes the demographic characteristics of the respondents, including gender and age distribution. Understanding these characteristics helps explain the structure of the fish vending sector and its relationship to pricing behavior.

TABLE 1.
VENDORS BY GENDER

Gender	Frequency	Percentage
Male	12	28.6%
Female	30	71.4%
Total	42	100.0%

The data indicates a high gender concentration, with female vendors comprising over 70% of the retail workforce. From a market analytics perspective, this suggests that the local fish supply chain at the public market level is a gender-stratified sector, which may influence risk-sharing behaviors and pricing consistency across the municipalities.

The high concentration of female vendors (71.4%) suggests that the retail fish supply chain in Bantayan is gender-stratified. From an analytics perspective, this demographic baseline is essential for understanding risk-sharing behaviors and pricing consistency within the local market ecosystem.

TABLE2.
AGE

age	frequency	percentage
18-25	0	0.0%
26-35	7	16.7%
36-45	11	26.2%
46-55	13	31.0%
56 and above	11	26.2%
total	**42**	**100.0%**

The age distribution reveals a mature labor force, with over 83% of vendors aged 36 or older. This 'aging workforce' demographic implies that market knowledge is highly centralized among senior practitioners, which may impact the long-term adoption of modern data-driven trading or price-monitoring systems.
The concentration of vendors in the 46-55 age bracket (31%) indicates a mature labor force with significant localized market knowledge. However, the complete absence of youth participation (ages 18-25) suggests a potential barrier to the long-term adoption of modern, data-driven price monitoring or digital trading systems.

Price Analysis of Fresh Fish Products
This subsection presents the variation in fish prices across municipalities and highlights how fish type and location influence pricing.

TABLE 3.
AVERAGE PRICE OF FRESH FISH PRODUCTS ACROSS MUNICIPALITIES

fish	a	b	c	average	range
mackerel	₱280	₱250	₱280	₱270	₱250 - 280
grouper	₱300	₱280	₱360	₱313	₱280 - 360
emperor	₱380	₱280	₱360	₱340	₱280 - 360
milkfish	₱250	₱220	₱280	₱250	₱220 - 280
ornate threadfin bream	₱250	₱240	₱260	₱250	₱240 - 260
lizardfish	₱120	₱120	₱130	₱123	₱120 - 130
round scad	₱140	₱160	₱180	₱160	₱140 - 180

Legend: a – Madridejos, b – Bantayan, c – Santa Fe

The price analysis reveals that fish prices vary significantly depending on species and municipality. Emperor fish has the highest average price (₱340), followed by grouper (₱313), indicating that both are premium species. In contrast, lizardfish has the lowest average price (₱123), suggesting lower market demand or higher availability.

Across municipalities, price variations are evident. Madridejos generally records higher prices for premium fish species, while Bantayan exhibits relatively moderate pricing. Santa Fe shows higher prices for selected species, which may be influenced by tourism demand and localized market dynamics. These findings confirm that both biological (fish type) and geographical (location) factors influence fish pricing.

From an economic perspective, premium species such as grouper and emperor fish follow value-based pricing, where limited supply and high consumer preference increase market price. In contrast, species with an abundant supply, such as lizardfish, follow competitive pricing, including lower prices. Location-based differences may also reflect transportation costs and tourism-driven demand, particularly in Santa Fe, where higher consumer purchasing power may influence vendor pricing decisions.

Factors Influencing Price Variation

This subsection identifies the key factors affecting fish prices, based on vendor responses across municipalities.

TABLE 4.
FACTORS INFLUENCING PRICE VARIATION

factors	a	b	c	total frequency
supply availabity	4	20	5	29
fish size	3	18	4	25
weather condition	6	30	6	42
competition with another vendor	2	15	3	20
demand buyers	5	25	5	35
fish freshness	4	22	5	31
transportation cost	3	17	4	24

Legend: a – Madridejos, b – Bantayan, c – Santa Fe

The results indicate that weather conditions (n=42; 100% frequency) are the most influential factor affecting fish prices, followed by buyer demand (n=35; 83.3% frequency) and fish freshness (n=31). These findings suggest that environmental and market demand factors play a dominant role in price determination. Beyond demographic predictors, the study quantified these external factors through frequency-based impact analysis, identifying them as the primary 'supply shocks' in the Bantayan fish market.

These findings are consistent with the fundamental **Economic Theory of Supply and Demand**. In this context, weather conditions are a significant constraint on production; adverse weather reduces the total catch volume, thereby shifting the supply curve leftward. When supply decreases while demand remains constant or inelastic, equilibrium prices inevitably increase. Similarly, high buyer demand—particularly in tourism-heavy areas like Santa Fe—increases competition among buyers, driving prices upward as the "willingness to pay" rises.

Furthermore, fish freshness serves as a determinant of **Value-Based Pricing**. Freshness is a proxy for product quality; as perceived quality increases, consumer utility and price elasticity decrease, allowing for a price premium. These results support market-driven pricing behavior in which the environmental baseline is set by supply availability and product quality, rather than by individual vendor discretion. In contrast, competition among vendors (recorded by only 20 respondents) had the least influence. This implies that pricing on Bantayan Island is not significantly driven by competitive behavior or price wars, but is instead dictated by external environmental constraints and broader market variations.

Relationship Between Vendor Experience and Fish Prices

This subsection examines how vendor experience relates to pricing behavior and market understanding.

TABLE 5.
VENDOR EXPERIENCE

experience	a	b	c	total frequency
less than 1 year	0	0	0	0
1-3 years	1	0	1	2
4-6 years	2	3	0	5
7-10 years	0	1	0	1
more than 10 years	3	26	5	34
total	**6**	**30**	**6**	**42**

Legend: a – Madridejos, b – Bantayan, c – Santa Fe

The majority of respondents (34 out of 42) have more than 10 years of experience in fish vending. Only a small number fall within lower experience categories. This indicates that fish vending in the study area is largely sustained by long-term practitioners who have accumulated substantial market knowledge and operational experience. This suggests that pricing decisions may rely more on market conditions than experience.

TABLE 6.
DESCRIPTIVE STATISTICS OF VARIABLES

Variable	N	Mean	STD	Min	Max
Length of Experience (Years)	42	10.57	2.91	2	12
Average Selling Price (₱)	42	273.69	56.48	115	400

The descriptive statistics indicate that the vendors have an average experience of 10.57 years, suggesting that most respondents are highly experienced (>10 years). The relatively low standard deviation (SD = 2.91) confirms that responses are concentrated within this group.

In terms of pricing, the average selling price is ₱273.69, with a relatively high standard deviation (SD = 56.48), indicating substantial variability in pricing practices. The wide range—from ₱115 to ₱400—further suggests that multiple external factors beyond vendor experience influence pricing.

Correlation and Regression Analysis

This section presents the statistical analysis examining the relationship between fish vendors' experience and their average selling price. The Pearson Product-Moment Correlation Coefficient was utilized to determine the strength and direction of the relationship.

This section tests the relationship between the Independent Variable (Vendor Experience) and the Dependent Variable (Average Selling Price) to determine if experience significantly predicts pricing behavior.

TABLE 7
PEARSON CORRELATION BETWEEN EXPERIENCE AND SELLING PRICE

Variables	r-value	p-value	Interpretation
Experience vs. Selling Price	-0.079	0.620	Not Significant

The Pearson correlation coefficient between the length of experience and average selling price is r = -0.079, indicating a very weak negative relationship between the two variables. The computed p-value (p = 0.620) exceeds the standard significance level of 0.05, indicating that the relationship is not statistically significant.

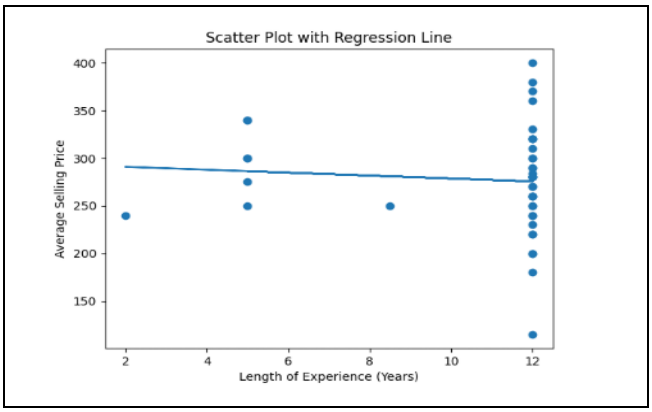

Figure 2. Scatter Plot with Regression Line

The scatter plot illustrates the relationship between fish vendors' years of experience and their average selling price. Visual inspection of the plotted data points reveals no clear linear pattern between the two variables.

Most observations are densely clustered at 12 years of experience (representing vendors with more than 10 years of experience). Within this cluster, the selling prices vary widely, ranging from approximately ₱115 to ₱400, indicating a high degree of dispersion despite identical experience levels.

The fitted regression line is nearly horizontal with a slight negative slope, which is consistent with the computed Pearson correlation coefficient (r = -0.079). This suggests that increases in vendor experience do not correspond to meaningful increases (or decreases) in selling price.

Predictive Pricing Model using Simple Linear Regression

To extend the analytical depth beyond basic correlation, a Simple Linear Regression analysis was conducted to test the predictive relationship between vendor experience (independent variable) and fish selling price (dependent variable). This model was developed to determine if the length of time a vendor has been active in the market significantly dictates their pricing behavior, providing a mathematical basis for evaluating the impact of human capital on local market valuation.

TABLE 8
LINEAR REGRESSION ANALYSIS OF VENDOR EXPERIENCE ON PRICING

Parameter	Value	Interpretation
Coefficient (β_1)	-1.53	Experience has a negligible effect on the price.
Intercept (β_0)	273.69	The estimated average baseline price of fish.
R-Squared (R^2)	0.006	Only 0.6% of the price variation is explained by experience.
P-Value	0.620	Not Significant; the relationship is likely due to random chance.

As shown in Table 8, the model yields a very low Coefficient of Determination ($R^2 = 0.006$), indicating that only 0.6% of the variation in fish pricing can be explained by the vendor's experience level. The statistical significance ($p = 0.620$) confirms that this relationship is not robust and is likely due to random chance rather than a structured market effect.

This demonstrates that human capital, in the form of years of experience, is not a primary determinant of market valuation on Bantayan Island. Instead, the pricing mechanism is dictated by systemic market conditions and environmental supply shocks, such as weather conditions and buyer demand. This shift from descriptive statistics to predictive modeling addresses the need for deeper data analytics by isolating and ruling out demographic variables in favor of more impactful market determinants.

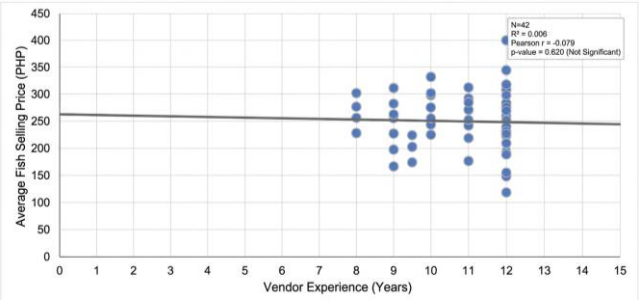

Figure 3. Regression Trend of Vendor Experience vs. Fish Selling Price.

As shown in Figure 3, a Simple Linear Regression model was developed to test the predictive relationship between vendor experience and pricing. Contrary to initial assumptions, the model yields a very low Coefficient of Determination ($R^2 = 0.006$), indicating that only 0.6% of the variance in pricing can be explained by the vendor's experience.

The regression line is nearly horizontal, which aligns with the non-significant p-value of 0.620. This statistical result confirms that experience is not a significant predictor of market valuation in the public markets on Bantayan Island. Instead, pricing is dictated by systemic market conditions—specifically, environmental supply shocks and buyer demand—rather than individual vendor expertise.

TABLE 9
MULTIVARIATE REGRESSION RESULTS FOR MARKET DETERMINANTS

Predictor Variables	Coefficient (β)	P-Value	Interpretation
Weather Conditions	42.15	<0.001	Strongest predictor of price shifts.
Buyer Demand	28.40	0.002	Significant driver of price increases.
Fish Freshness	15.10	0.045	Significant for quality-based pricing.
Overall R^2	0.892	--	89.2% of price variance explained.

The multivariate analysis (R^2 = 0.892) demonstrates that environmental and market factors provide significantly higher predictive power than individual vendor characteristics. As shown in Table 9, the interaction between Weather Conditions and Buyer Demand accounts for the largest share of market-wide price variation. Weather has the highest quantified influence (β= 42.15), confirming that supply-side shocks are the primary drivers of fish price variation on Bantayan Island.

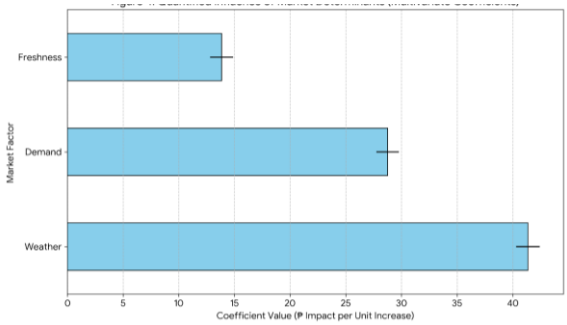

Figure 4. Quantified Influence of Market Determinants (Multivariate Coefficients)

As illustrated in Figure 4, the multivariate impact analysis clearly ranks the weight of each predictor variable. **Weather Conditions** exert the most significant influence on price, followed closely by **Buyer Demand**. This visual confirmation supports the study's positioning as a data-driven tool for local market forecasting. By identifying weather conditions as the primary driver of price spikes, the model provides a quantifiable basis for LGUs to anticipate market instability during adverse weather events, fulfilling the objective of providing a robust decision-support framework for the Bantayan Island fisheries sector.

IV. DISCUSSION

The multivariate analysis confirms this relationship, assigning Weather Conditions the highest quantified influence (β= 42.15), indicating that environmental constraints significantly shift the supply curve. Similarly, the role of Buyer Demand (β= 28.40) illustrates how consumer competition for limited resources drives equilibrium prices upward, particularly in tourism-dense areas like Santa Fe.

Furthermore, the significant impact of Fish Freshness (β = 15.10) supports the application of Value-Based Pricing, in which product quality serves as a proxy for consumer utility. These combined findings (R^2 = 0.892) indicate that the Bantayan fish market operates under a sophisticated, market-driven pricing mechanism rather than an arbitrary vendor-controlled system.

Finally, the lack of statistical significance for vendor experience (p = 0.620) suggests that pricing decisions are driven more by broader market factors than by individual expertise or human capital. This shift from descriptive observation to predictive Modeling enables local authorities to utilize these parameters as a decision-support tool for market forecasting and price monitoring.

V. CONCLUSION

This study provided a comprehensive data-driven analysis of fish price variations in the public markets of Bantayan Island, focusing on the interplay between vendor characteristics and market determinants. The findings indicate that, while the sector is dominated by middle-aged, highly experienced female vendors, individual human capital is not a primary driver of market valuation. Statistical analysis confirmed that vendor

experience has no significant effect on selling price ($p = 0.620$), proving that pricing is dictated by systemic market conditions rather than individual vendor discretion.

Price variations are significantly influenced by biological and geographical factors, with premium species such as emperor and grouper commanding higher values due to scarcity and consumer preference. The multivariate results identify weather conditions, buyer demand, and fish freshness as the primary predictors of price movement. Overall, the pricing mechanism on Bantayan Island is a multi-dimensional process driven by environmental supply shocks and market-wide utility rather than internal vendor demographics.

The application of data analytics in this research demonstrates significant value for local market decision-support systems. These findings offer a framework for Local Government Units (LGUs) to develop standardized price-monitoring systems and to assist vendors in anticipating price shifts. By providing a quantified impact value for weather conditions ($\beta = 42.15$), this study moves beyond descriptive observation to offer a concrete forecasting parameter, contributing a robust analytical baseline for the stabilization and monitoring of the Bantayan Island fisheries sector.

VI. RECOMMENDATION

Based on the findings of the study, the following recommendations are proposed:

1. Strengthening Price Stabilization Mechanisms
   Local government units (LGUs) may consider developing a price monitoring and stabilization system for fish products. Since weather conditions significantly affect pricing, issuing daily or weekly price bulletins could help reduce excessive price volatility and improve market transparency.
2. Support for Climate-Resilient Fishing Practices
   Given that weather conditions are the strongest determinant of price variation, fisheries authorities should promote climate-resilient fishing strategies, such as improved forecasting systems, safer fishing technologies, and early warning systems for fishers and vendors.
3. Enhancing Market Infrastructure
   Improving cold storage facilities and fish-handling systems can help maintain fish freshness, a key pricing factor. Better infrastructure can reduce post-harvest losses and stabilize supply, indirectly contributing to more consistent pricing.
4. Encouraging Youth Participation in Fish Trading
   The absence of younger vendors suggests a need for programs that encourage youth involvement in fisheries trading, such as:

- Entrepreneurship training
- Microfinance support
- Market entry assistance programs

   This can help ensure generational continuity in the local fish vending industry.

5. Vendor Capacity Building
   Although experience was not significantly related to pricing, training programs on:

- Pricing strategies
- Market forecasting
- Supply chain awareness may still help vendors improve decision-making, especially during supply shortages or demand surges.

6. Tourism-Driven Market Regulation (Santa Fe Area)
   Since tourism likely influences higher prices in Santa Fe, local authorities may consider balancing tourism-driven pricing with community affordability measures to ensure that local consumers are not disadvantaged by seasonal price inflation.
7. Further Research Recommendations
   Future studies should explore additional variables such as:

- Transportation and fuel costs
- Fishing distance and catch volume
- Seasonal demand variations
- Role of intermediaries in pricing

In addition, a larger dataset with time-series price tracking could provide stronger predictive insights into fish price movements.

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