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PROFITABILITY IN A RESOURCE-BASED INDUSTRY: EVIDENCE FROM ICELANDIC FISHERIES, 1990–2022

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Abstract. This study examines the long-term profitability of Iceland's fisheries sector, which has always played a vital role in the country's economy. Since the 1980s, the industry has been managed under an Individual Transferable Quota (ITQ) system. This rights-based approach limits access to fish stocks by allocating tradable quotas to individual operators. The system was introduced primarily to reduce fleet overcapacity and stop mounting financial losses. While it has clearly transformed the industry, the long-term factors behind profitability under the ITQ regime have not been systematically analyzed at the sector level over an extended period. The purpose of this study is to identify and quantify the main drivers of profitability in Icelandic fisheries from 1990 to 2022. The analysis focuses on how economic conditions, operational efficiency, and institutional change have shaped profitability over time. Profitability is measured as earnings before interest and taxes (EBIT) from both harvesting and processing, plus the fishing fee, expressed as a share of total export revenues. To explore this, the study applies a simple regression-based methodology using annual data over 33 years. Four explanatory variables are included: the real exchange rate of the Icelandic króna, catch efficiency (measured as catch per unit of oil consumed), a real export price index in U.S. dollars, and a linear time trend capturing structural and institutional developments. The model explains 88 percent of the variation in profitability, indicating strong explanatory power. The results show that the real exchange rate has the most significant short-term effect. A stronger króna reduces profits, reflecting the export-oriented nature of the sector. As expected, higher export prices and improved fuel efficiency contribute positively to profitability. However, the most important long-term factor is the positive time trend, which reflects gradual gains from quota consolidation, better management practices, and technological progress – developments reinforced by the ITQ system itself. In conclusion, the findings suggest that the ITQ framework has supported sustained profitability by enabling long-term adaptation and structural reform. Although short-term outcomes remain sensitive to external shocks, the sector has become more resilient and financially stable. These insights may prove useful for other countries seeking to design effective governance systems for natural resource industries.

Keywords: profitability, fisheries, exchange rate, Iceland, resource governance.

JEL Classification: Q22, Q28, Q13

1. Introduction

Fisheries have long played a crucial role in Iceland's economy, generating significant export revenues, supporting coastal communities, and providing employment for generations of Icelanders. While the sector has experienced periods of growth and decline throughout its history, by the late 20th century it faced a major crisis. The industry was grappling with overfishing, fleet overcapacity, declining fish stocks, and a severe financial downturn (Daníelsson, 1997; Einarsson, 2011). Concerned about both the sustainability of fish stocks and the long-term profitability of the sector, Icelandic policymakers initiated a series of reforms that culminated in the implementation of the Individual Transferable Quota (ITQ) system. Officially launched in 1984 and progressively expanded in subsequent years, the ITQ system marked a significant shift in the management of Icelandic fisheries (Matthíasson, 2003). ITQs are a form of rights-based fisheries management, in which a proportion of the Total Allowable Catch (TAC) for a given species is allocated to individual vessels or organizations. These shares are tradable, divisible, and transferable, enabling market transactions to reallocate fishing rights. The underlying rationale is to establish secure, long-term incentives for investment,

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operational efficiency, and responsible resource stewardship (Árnason, 2013; Garrity, 2011).

Iceland's ITQ system brought about notable transformations in the fishing sector. It led to the rationalization and consolidation of fishing rights, as well as technological improvements such as more efficient fuel use, advancements in vessel technology, and enhanced gear selectivity (Byrne et al., 2021; Eythórsson, 1996; Knútsson et al., 2016; Kristófersson et al., 2021). Although the ITQ system provided a strong institutional foundation for improved fisheries management, the path to sustained profitability has not been straightforward and still warrants further study. External and operational factors – including fluctuations in world seafood prices, fuel costs, stock health and catch composition, and exchange rate variations – continue to significantly influence the financial performance of the sector (Guillen & Maynou, 2016; Gunnlaugsson & Agnarsson, 2019).

Iceland was among the first countries to implement Individual Transferable Quotas (ITQs) on a large scale in its fisheries (Árnason, 1993). The long-standing application of the ITQ system, combined with the relatively large size of Iceland's fishing industry, makes it a valuable case study for examining the complex interaction between rights-based fisheries management and broader economic forces in shaping long-term profitability. This paper addresses a fundamental question in fisheries economics: To what extent has the ITQ system driven long-term profitability in Icelandic fisheries, relative to market and operational factors? To our knowledge, this is the first empirical study to model sector-wide profitability in Icelandic fisheries over a multi-decade period. It employs a regression-based model on financial and operational data from 1990 to 2022 to assess the impacts of catch efficiency (measured as catch per unit of oil consumed), real exchange rate fluctuations, export prices, and a time trend reflecting cumulative institutional and technological advancements. Furthermore, by analyzing how profitability evolved under restricted access conditions in a small open economy, this study provides broader insights into how resource-based industries behave when access to natural resources is institutionally limited. The findings may offer lessons applicable to other sectors and economies where resource governance and external market forces interact to shape outcomes.

The following sections present a detailed analysis of Iceland's fisheries sector. Section 2 reviews the historical development of the ITQ system. Section 3 charts previous research. Section 4 describes the data sources and methodology employed in the study. Section 5 presents the results, while Section 6 discusses the implications for governance and policy. Finally, Section 7 concludes the paper.

2. Historical Background: The Development of the ITQ System in Iceland

As a small island nation with limited natural resources, Iceland has long depended on its abundant fishing grounds as a foundation for economic growth and export revenue. The country's approach to fisheries management has evolved in response to the persistent tension between ecological constraints and economic dependence (Matthíasson, 2003). Aided by technological developments such as motorization, freezing technologies, and improvements in vessel design, the fishing industry expanded rapidly from the early 20th century through the postwar period (Sigfusson et al., 2013). However, this path of growth was marked by serious environmental and financial shocks. Among the most significant was the collapse of the Atlanto-Scandian herring stock in the late 1960s (Matthíasson, 2003). Herring had been a major species within the Icelandic economy, supporting entire communities and a thriving export sector. The unexpected decline of the herring stock due to overfishing had severe economic and social consequences.

Following the collapse of the herring stock, concerns about the state of demersal fish stocks, particularly cod, grew as evidence of overfishing became apparent by the mid-1970s (Daníelsson, 1997). In response, Iceland acted decisively in 1975 by extending its exclusive fishing zone to 200 nautical miles. Known internationally as part of the "Cod Wars," this action allowed Iceland to assert full sovereign control over its maritime resources and to exclude foreign vessels from its waters (Bilms, 2023). Although this represented a major geopolitical and institutional turning point, domestic fisheries management remained difficult and chaotic. Regulatory initiatives introduced during this period – such as effort limitations (skrapdagakerfið), seasonal closures, and gear restrictions – were unable to address the underlying problems of fleet overcapacity and the open-access nature of the domestic fisheries (Matthíasson, 2003). Low profitability, with astronomical losses in some years, ineffective effort allocation, and persistent overfishing continued to plague the sector (Daníelsson, 1997; Gunnlaugsson & Valtýsson, 2022).

Recognizing the shortcomings of conventional regulatory approaches, Icelandic legislators began moving toward rights-based fisheries management (Árnason, 2009). In 1984, vessel-specific quotas were introduced for major demersal species, including cod and haddock. These quotas were initially non-transferable and were allocated based on historical catch data. However, the system lacked the economic flexibility needed to improve allocation efficiency, even though annual Total Allowable Catches (TACs) established a biological ceiling on overall harvests

(Daníelsson, 1997). As a result, incentives for long-term investment and sustainable resource management remained weak.

The next significant development was the official establishment of near-universal quota transferability in 1990 (Árnason, 1993). This reform allowed vessel owners to purchase, sell, or lease quotas, thereby creating a viable market for fishing rights. The shift to a fully transferable quota system enabled more efficient and better-capitalized operators to consolidate harvesting rights. Over time, this consolidation led to a reduction in fleet size, vertical integration between harvesting and processing activities, and greater investment in technology that enhanced both profitability and product quality (Knútsson et al., 2016). By the mid-1990s, nearly all of Iceland's commercial fisheries operated under the ITQ system. This transition marked a major turning point: ITQs aligned economic outcomes with environmental sustainability, enabled long-term strategic planning, and created persistent incentives for responsible resource management (Árnason, 2013). As companies adapted to specific market niches and resource conditions, the industry became increasingly specialized and scaled up operations. By the late 2000s, these efficiency gains had become more pronounced, contributing to a significant rise in overall profitability (Gunnlaugsson & Agnarsson, 2019).

Nevertheless, the system has not been without controversy. Critics have pointed to the concentration of quota ownership, the marginalization of small-scale and community-based fishermen, and the perceived commercialization of a public resource (Chambers & Carothers, 2017; Eythórsson, 1996). In response to these concerns, fishing fees (veiðigjöld) were introduced in 2003 to capture a portion of the resource rent for the public. Initially modest, these fees were significantly increased in 2012 and have since become a politically sensitive and ongoing aspect of the management system (Gunnlaugsson et al., 2018). To further address public dissatisfaction, Iceland introduced small-scale or coastal fisheries in 2009, operating under an open-access model. This initiative allowed nearly all small boats to participate in limited fishing activities, primarily targeting cod, during the summer months (Gunnlaugsson et al., 2021; Kokorsch et al., 2015).

3. Previous Research

The introduction of Individual Transferable Quotas (ITQs) has generated a substantial body of academic literature. These studies have examined the implications of ITQs for sustainability, efficiency, and distributional equity (Brandt, 2005; Grafton & McIlgorm, 2009; Putten et al., 2014). Grounded in property rights economics, ITQs are designed to address the "tragedy of the commons" by assigning enforceable, transferable shares of the Total Allowable Catch (TAC) to individual actors (Feeny et al., 1990; Valle et al., 2006). This system is intended to promote stewardship incentives, reduce fleet overcapacity, and encourage a more rational allocation of fishing effort (Putten et al., 2014; Soliman, 2014).

International research broadly supports the notion that ITQs improve both technical and allocative efficiency (Valle et al., 2006). By enabling the reallocation of fishing rights through market transactions, ITQ systems are expected to lead to the consolidation of quota holdings among more efficient operators, thereby reducing redundant capital investment and enhancing overall productivity (Árnason, 2013; Grafton & McIlgorm, 2009). Evidence also suggests that ITQs can stabilize catch levels, foster long-term planning, and incentivize investment in innovation and quality improvements (Árnason, 2012; Chu, 2009; Putten et al., 2014). However, these economic gains have often been accompanied by adverse social effects, such as the concentration of ownership, reduced access for small-scale fishers, and the decline of traditional fishing communities (Edwards & Pinkerton, 2019; Soliman, 2014).

Several countries have implemented ITQ-based systems with broadly similar results. New Zealand was an early adopter, introducing ITQs in the 1980s as a response to overfishing and economic inefficiencies. The reform established secure, transferable harvesting rights, enabling improved planning, consolidation, and enhanced sector-wide profitability and sustainability (Mace et al., 2014; Yandle & Dewees, 2008). Australia implemented a similar ITQ-based model, which facilitated fleet rationalization and led to economic gains across various fisheries (Grafton & McIlgorm, 2009). In the United States, catch share programs modeled on ITQ principles – such as those governing the Alaska halibut and sablefish fisheries – have improved vessel profitability, catch quality, and safety outcomes (Árnason, 2013; Brinson & Thunberg, 2016).

In Northern Europe, Denmark introduced transferable quotas in 2007, leading to fleet reduction, improved resource utilization, and enhanced planning capacity among efficient operators (Andersen et al., 2010). Norway, while not implementing a fully transferable system, introduced individual vessel quotas and a limited quota market that increased profitability, particularly in demersal fisheries, through more effective harvesting, technological advancements, and capital investment (Hannesson, 2013; Standal & Aarset, 2008). Studies across Nordic countries, including Sweden and the Faroe Islands, similarly suggest that institutional design plays a critical role in balancing economic, ecological, and social objectives. Nevertheless, these national experiences also highlight persistent concerns about equity and

social cohesion, particularly in regions dependent on small-scale or artisanal fishing (Danielsen & Agnarsson, 2018; Holm et al., 2015; Nielsen et al., 2018; Tirrell, 2017).

Extensive academic research has examined the ITQ system and its development in Iceland. These studies have explored the concentration of fishing rights within Icelandic fisheries (Byrne et al., 2020), the functioning of quota markets (Oostdijk et al., 2019), the social outcomes and inequalities associated with the system (Chambers et al., 2017; Kokorsch & Benediktsson, 2018), strategic management practices within fishing companies (Vigfússon et al., 2023, 2025), and the overall sustainability of Icelandic fisheries (Woods et al., 2015). In addition, research has documented the development of profitability within the ITQ framework (Gunnlaugsson et al., 2018, 2022). However, to our knowledge, no academic study has systematically charted the long-term development of profitability in the Icelandic fishing industry and identified the key variables associated with increased profits. This study seeks to address this gap in the literature.

4. Methodology and Data

This study investigates the profitability of the Icelandic fishing industry from 1990 to 2022 under the Individual Transferable Quota system, examining its relationship with four key explanatory variables. The analysis is based on annual data, resulting in 33 yearly observations. Table 1 summarizes the main variables analyzed in the study and presents their descriptive statistics.

In this analysis, profitability is defined as the sum of earnings before interest and taxes (EBIT) and fishing fees (veiðigjöld), expressed as a share of total export revenues (the dependent variable Y in Equation 1 and the second column in Table 1). Fishing fees, introduced in 2003, are levied on quota holders to capture a portion of the resource rent and are recorded as operational costs in company accounts. Although initially insignificant, these fees were substantially increased in 2012 (Gunnlaugsson et al., 2018). As fishing fees function essentially as a tax, they are excluded from the profitability measure used in this study.

The Icelandic fishing industry is predominantly composed of vertically integrated firms engaged in both harvesting and processing activities. Financial data from Statistics Iceland were utilized for this analysis. Because Statistics Iceland reports financial performance separately for harvesting and processing, these two components were combined to reflect the integrated structure of the industry and to provide a comprehensive, sector-level measure of profitability. Thus, the EBIT used in this study is the sum of EBIT from the harvesting and processing operations of the entire sector. The data show that profitability was highest in the final year of the study period, 2022, and lowest in 1999, with an average of 16.1% over the full period. The development of this profitability ratio is also illustrated in Figure 1.

$$Y\ ((\text{EBIT+Fishing fee})/\text{Export value}) = \alpha + \beta_1\ (\text{Real Exchange rate}) + \beta_2\ (\text{Catch/Fuel}) + \beta_3\ (\text{Price}) + \beta_4\ (\text{Time trend})$$

This study includes four explanatory variables. The first is the real exchange rate of the Icelandic króna (the first independent variable in Equation 1 and the third column in Table 1). The real exchange rate is defined as the ratio of the foreign price level to the domestic price level, where the foreign price level is converted into domestic currency units via the current nominal exchange rate. Thus, the real exchange rate reflects both currency values and inflation (The Nominal and Real Exchange Rate, 2025). A stronger Icelandic króna is expected to reduce profitability in the fisheries sector, as almost 98% of products are exported and paid for in foreign currencies, while most costs – such as wages and services – are denominated in Icelandic króna. Consequently, a depreciation of the króna has a positive effect on profitability, whereas an appreciation tends to reduce profits. The real exchange rate data used in this analysis were obtained from the Central Bank of Iceland, which calculates the real exchange rate of the króna against a basket of foreign currencies on

Table 1
Descriptive statistics of the key variables and their sources

	(EBIT+ fishing fee)/ Export value	Real exchange rate	Catch/Fuel	Price (USD real)
Type of data	Percentage	Index (2005=100)	Number	Index (1990=100)
Average	16.1%	83.7	3.23	88.7
Median	16.8%	84.4	3.06	89.1
St.dev.	8.6%	9.3	0.49	9.1
Lowest	3.3% (1999)	63.6 (2009)	2.52 (1998)	70.2 (2001)
Highest	31.6% (2022)	100.0 (2005)	4.22 (2019)	104.3 (1991)
Source:	Statistics Iceland	Central bank of Iceland	Directory of Fisheries and Radarinn.is	Statistics Iceland

a monthly basis to construct an index. For this study, annual averages of the index were used. Table 1 shows that the Icelandic króna was at its weakest in 2009 and at its strongest in 2005.

The second explanatory variable, shown in the fourth column of Table 1, captures fuel efficiency, measured as the ratio of catch (expressed in cod-equivalents) to the quantity of oil consumed. In Icelandic fisheries, "cod-equivalents" are used to standardize catches across species under the ITQ system. A cod-equivalent value is calculated as the average price per kilogram of a species relative to cod in the previous year. This assigns each species a conversion factor based on its historical market price relative to cod, thereby reflecting their respective economic values (Oostdijk et al., 2020). As such, the ratio of catch per liter of oil serves as a proxy for operational efficiency and reflects factors such as technological improvements, fleet rationalization, and the status of fish stocks. An increase in stock size should be captured by this variable, as more abundant stocks typically lead to higher catch rates per unit of effort and consequently lower fuel consumption. Data on fuel consumption for the Icelandic fishing fleet were obtained from Fisheries Iceland (radarinn.is), an industry association representing a large share of quota holders. Catch volume data were sourced from the Directorate of Fisheries, a governmental body responsible for monitoring landings and allocating fishing rights. Table 1 indicates that fuel efficiency was lowest in 1998, with just 2.52 kilograms of catch per liter of oil, and highest in 2019.

The third explanatory variable is an export price index denominated in U.S. dollars and adjusted for inflation (see the last column in Table 1). The data used to calculate this index were obtained from Statistics Iceland. This variable reflects international market conditions, with higher real export prices expected to lead to greater profitability in Icelandic fisheries. According to this measure, prices were highest in 1991 and lowest in 2001.

The fourth explanatory variable is a time trend that increases by one unit each year, beginning with a value of 1 in 1990. This variable is intended to capture gradual, cumulative changes in the structure of the industry, including innovation, technological advancement, efficiency improvements, and institutional learning. These developments are largely attributable to the long-term effects of the rights-based management regime implemented in the sector.

Other potential explanatory variables – such as catch volume, fuel prices, and employment levels – were considered during the model development process. However, none of these additional factors significantly improved the explanatory power of the regression model and were therefore excluded from the final specification.

5. Results

The regression results, presented in Table 2, are noteworthy. This relatively simple model specification yields an R^2 of 0.88, indicating that it explains 88 percent of the variation in the dependent variable – EBIT profitability plus fishing fees as a share of export revenues. This represents an exceptionally high level of explanatory power for a model applied to the complex and dynamic fisheries sector. The strength of the R^2 suggests that the selected explanatory variables successfully capture the key structural and economic determinants of profitability in the Icelandic fisheries industry. In particular, the combination of real exchange rate movements, fuel-adjusted catch efficiency, international product prices, and the sector's cumulative adaptation over time appears to reflect the principal mechanisms influencing profitability.

Figure 1 illustrates the development of the dependent variable – defined as the ratio of EBIT plus fishing fees to total export revenues – over the study period. The solid line represents the actual development of this ratio, while the dotted line labeled "Predicted by the equation" shows the predicted values based on the regression model. As shown in the figure, the profitability ratio remained at or below 10% from 1990 to 2005, with a notable spike in 2001, followed by a decline the following year. Since 2008, the lowest recorded value for this measure was 17% in 2017, while the highest was 32% in 2022. The figure demonstrates that the model closely tracks the actual development of profitability over time. The main outlier occurs in 2001, when the observed profit ratio was 21.5%, compared to a predicted

Table 2
Regression Results Based on Equation 1

Variable	Coefficient	t-value	P-value
α (constant)	0.13	1.95	0.061
β_1 (real exchange rate)	-0.0044	-6.43	0.00000057
β_2 (Catch/fuel)	0.043	1.87	0.073
β_3 (Price)	0.0019	2.56	0.016
β_4 (Time trend)	0.0051	4.97	0.000030

Sources: Statistics Iceland, Directory of Fisheries and author's calculations

value of only 12.7%. This suggests that profits were substantially higher than expected. The most likely explanation is that the Icelandic króna depreciated significantly that year, and firms – particularly their processing component – benefited from holding substantial inventories of finished products that gained value when converted into foreign currencies.

The results indicate that the real exchange rate has the most statistically significant effect on profitability. Its negative coefficient suggests that an appreciation of the Icelandic króna is associated with a decline in profitability, as expected. This finding is consistent with the structure of the industry, in which nearly all revenues are earned in foreign currency, while a substantial share of operating costs is denominated in Icelandic króna.

The variable representing fuel-adjusted catch efficiency also shows a positive relationship with profitability, although it is statistically significant only at the 10% level. This ratio – measured as cod-equivalents caught per unit of oil consumed – serves as a proxy for both fleet efficiency and fish stock abundance. The positive coefficient implies that improvements in operational efficiency and increases in stock size, which lead to higher catch rates, contribute directly to higher profitability.

The export price index, expressed in real U.S. dollar terms, is positively associated with profitability, as anticipated. The coefficient for this variable is statistically significant at the 5% level. Increases in real prices for Icelandic seafood products in international markets raise export revenues when converted into Icelandic krónur, thereby improving EBIT margins.

The most important finding of this study is the effect of the time trend variable. This variable is highly statistically significant and positive. The coefficient value of 0.0051 indicates that, holding all other variables constant, the profitability measure has increased by 0.51 percentage points per year over the study period. This suggests that, beyond the influence of exchange rate fluctuations, operational efficiency, and export prices, profitability has steadily improved over time. This upward trend likely reflects a range of structural transformations within the industry, including the consolidation of fishing rights, capital investment, technological innovation, and enhanced marketing strategies. The statistical significance of the time trend implies that long-term institutional developments – most notably the rights-based management regime – as well as continued technological advancement, have had a sustained and positive impact on the performance of the sector.

A series of diagnostic tests were conducted to assess the robustness of the regression model, and the results support its reliability. Residual diagnostics suggest that the model is well-specified. White's test ($p = 0.3449$) indicates no evidence of heteroskedasticity, while the Jarque-Bera test ($p = 0.08015$) suggests that the residuals are approximately normally distributed. The Durbin-Watson statistic (1.61) points to mild positive autocorrelation ($p = 0.037$); however, this is not confirmed by the Breusch-Godfrey test ($p = 0.43$) or

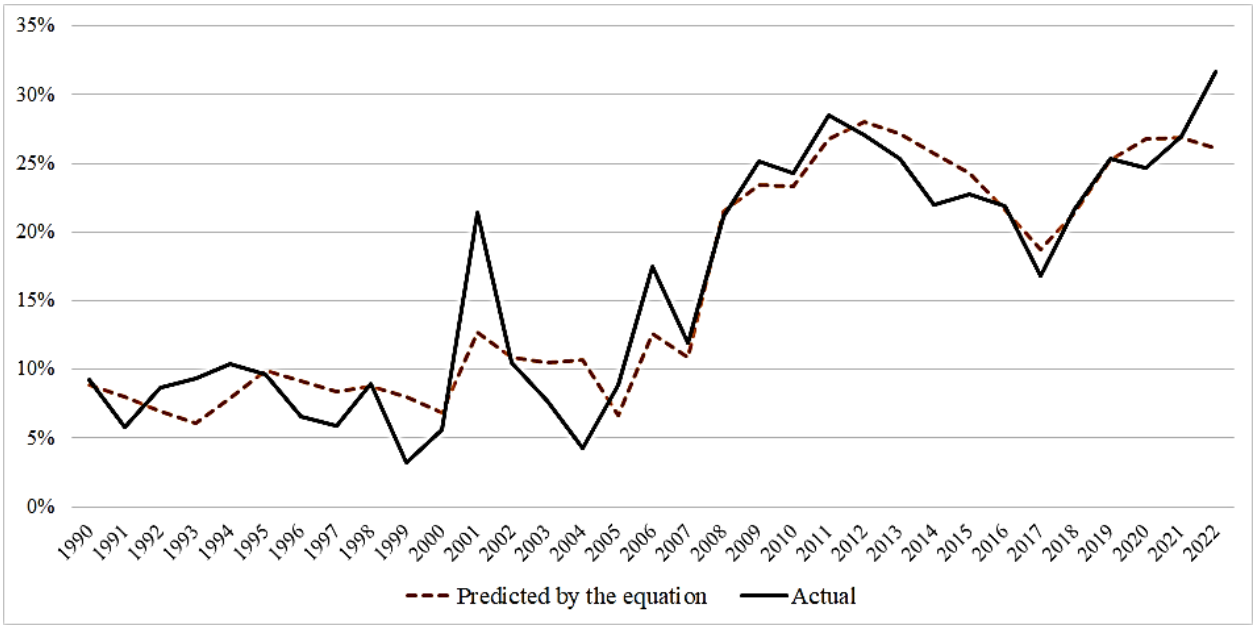

Figure 1. Development of (EBIT + fishing fees)/export revenues from 1990 to 2022 for harvesting and processing (solid line, labeled "actual"). The dotted line (labeled "predicted by the equation") shows this ratio according to the regression equation (see Equation 1)

Sources: Statistics Iceland and author's calculations

the Ljung-Box Q test (p = 0.401), indicating that serial correlation is not a major concern. Multicollinearity appears limited, as all variance inflation factors (VIFs) are below 10. Structural stability is further supported by the Chow test (p = 0.2105), which found no significant structural break at 2006 – the midpoint of the study period.

6. Discussion

The results of this study offer new insights into the key factors influencing profitability in the Icelandic fishing industry under the ITQ system. The regression analysis reveals that both external economic forces and internal structural developments affected profitability over the period 1990–2022. Among these factors, the real exchange rate emerges as the most influential, demonstrating a substantial and statistically significant negative effect. This finding aligns with the industry's structure, in which nearly all revenue is earned in foreign currency, while a large share of costs is incurred in Icelandic króna. As a result, when the króna appreciates, profit margins contract – highlighting the sector's vulnerability to macroeconomic fluctuations.

The analysis indicates that catch per unit of effort – measured as catch in cod-equivalents per kilogram of fuel – has a positive correlation with profitability. This reflects improvements in operational efficiency, fleet modernization, and increases in fish stock abundance, all of which contribute to higher profits. The export price index, measured in real U.S. dollar terms, also has a positive effect, underscoring the importance of global market conditions. The statistical significance of the time trend variable suggests that long-term institutional and technological developments – such as quota consolidation, capital investment, and adaptive governance – have consistently contributed to rising profitability within the ITQ framework.

These findings imply that, under current conditions, a significant decline in profitability is unlikely. Key fish stocks have mostly increased in size and are being utilized more efficiently. Catch efficiency has also improved. Notably, the model forecasts a profitability ratio of 16.3% for the following year (2023), even in a worst-case scenario in which both the real exchange rate and export prices return to their historical extremes – namely, the strongest króna on record and the lowest inflation-adjusted export prices. This suggests that, even in the face of multiple adverse shocks, the industry would remain reasonably profitable.

Taken together, these findings support the conclusion that the ITQ system has not only improved the allocative and operational efficiency of Icelandic fisheries but also enhanced the sector's ability to withstand external economic volatility. While earnings remain sensitive to short-term fluctuations in market prices and exchange rates, the combination of strong institutional design, adaptive industry behavior, and ongoing productivity gains has established a resilient foundation for long-term success. Moreover, these results demonstrate how a natural resource sector in an open economy can adapt and maintain profitability under conditions of restricted access to resources. The key drivers of profitability identified in this study – exchange rate dynamics, operational efficiency, global market prices, and institutional evolution – may offer broader insights into similar processes in other resource-dependent industries.

7. Conclusion

This study examined the long-term profitability of Iceland's fisheries sector from 1990 to 2022, focusing on the relative importance of institutional, technological, operational, and market-related factors. The results indicate that profitability has been shaped by the interplay of these forces. The real exchange rate emerged as the most statistically significant short-term determinant, while catch efficiency – reflecting both technological advancement and biological stock rebuilding – and higher real export prices also contributed positively. However, the most important driver of long-term profitability was the consistent positive time trend, which captures the cumulative effects of ITQ-based governance, technological modernization, industry consolidation, and institutional learning. This trend highlights the pivotal role of institutional reform in fostering a more efficient, resilient, and profitable sector. In directly addressing the research question, the study finds that the ITQ system has served as the foundation for profitability growth in Icelandic fisheries over the past three decades. Its success, however, has been reinforced by ongoing technological progress and operational adaptation. Ultimately, long-term profitability in the sector has resulted from the dynamic interaction between sound institutional design and continuous adjustment to evolving economic and environmental conditions.

More broadly, this case study demonstrates how resource-based sectors in open economies can adapt and evolve under conditions of controlled access to natural resources. The key economic drivers of profitability identified here – exchange rate dynamics, operational efficiency, market prices, and institutional evolution – are likely to have broader applicability to other industries facing similar structural constraints and market environments.

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