

An Analysis of Fish Meal Prices and Macroeconomic Drivers 1987-2007

EXECUTIVE SUMMARY

Oberon produces a high-quality protein ingredient, ProFloc™, with an amino acid balance suggesting use as a fish meal replacement (FMR) ingredient. As a result, Oberon has been motivated to understand macroeconomic forces that influence fish meal pricing.

An analysis of the factors driving fish meal prices reveals that they are and continue to be pushed by a sustained 6%+ annual increase in aquaculture production. Seafood demand is driven by increasing per capita GDP in the developing world, and with an inexorable decline in wild caught fish supplies, aquaculture is the only production alternative to increase overall fish supply levels. Like other wild catch, fish meal supplies are capped, creating a critical input constraint for aquaculture growth. The probability of changing these macro conditions in the near and medium term are small, and therefore the underlying assumptions in Oberon's business plan are realistic and appropriate.

INTRODUCTION

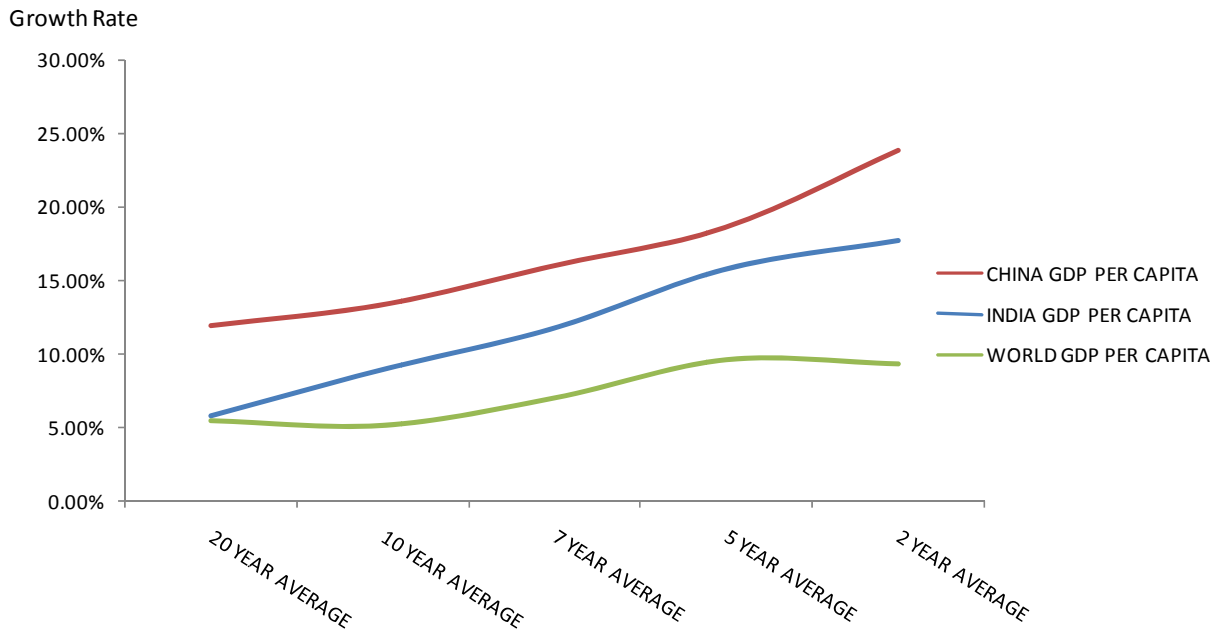
Fish meal price is a cornerstone of the Oberon FMR business model, in that ProFloc demand and Company profitability both derive from the the need and value for fish meal by the aquaculture market. As a direct substitute, potential fluctuations in fish meal price could drastically impact sales of ProFloc both positively and negatively. This paper seeks to explore the nature of fish meal price movement and further clarify the underlying drivers of these movements with particular focus on fundamental supply and demand dynamics during the 1987 to 2007 time period. While determining future prices with complete certainty is not achievable, this discussion will put forth and interpret data to corroborate Oberon's view that fish meal prices are likely to remain at what are today viewed as historically high levels and that significant drops in pricing, if they occur, will be anomalistic rather than the norm.

The information contained here is not intended to provide precisely accurate data for any particular moment, but is intentionally aggregated and averaged over various time periods to demonstrate consistent trends, that when taken together, provide meaningful results. The data upon which the discussion rests comes from three primary sources, The Food and Agriculture Organization of the United Nations (www.fao.org), the United States Department of Agriculture Economic Research Service (www.ers.usda.gov) and the International Monetary Fund (www.imf.org). Each of these organizations maintain historical data bases for various livestock, foodstuffs, feed, crop yields, demand, prices and trade. As qualified by the resources themselves, some data sets are estimated or statistically determined, particularly when representing activity in the developing countries. Therefore, while every attempt for accuracy has been made, this study should be interpreted as generally accurate rather than exact.

ECONOMIC GROWTH

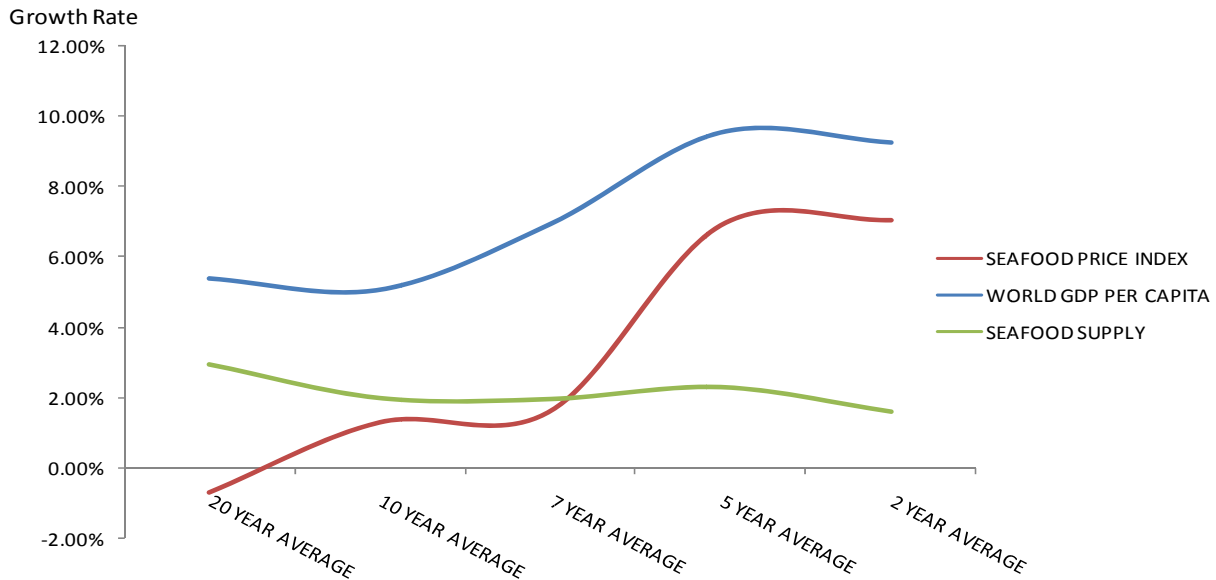
The global economy is growing and growing quickly. More goods and services are being produced and consumed on a worldwide basis than at any time in human history. A principal driver of this economic growth is the increasing wealth of the vast populations of Asia, which for centuries have lived at subsistence levels, but now have entered the ranks of discretionary consumers limited previously to Western Europe and North America.

FIGURE 1: GDP PER CAPITA



The effect on protein consumption has been significant. For example, according to a FAO report by Zhang Ziyi of the Chinese Academy of Science, the average daily consumption of animal protein in China increased from 12.9 grams per day to 24.8 grams per day between 1980 and 2000, before the more dramatic GDP acceleration between 2000 and 2010.

FIGURE 2: SEAFOOD – PRICE, SUPPLY AND GDP



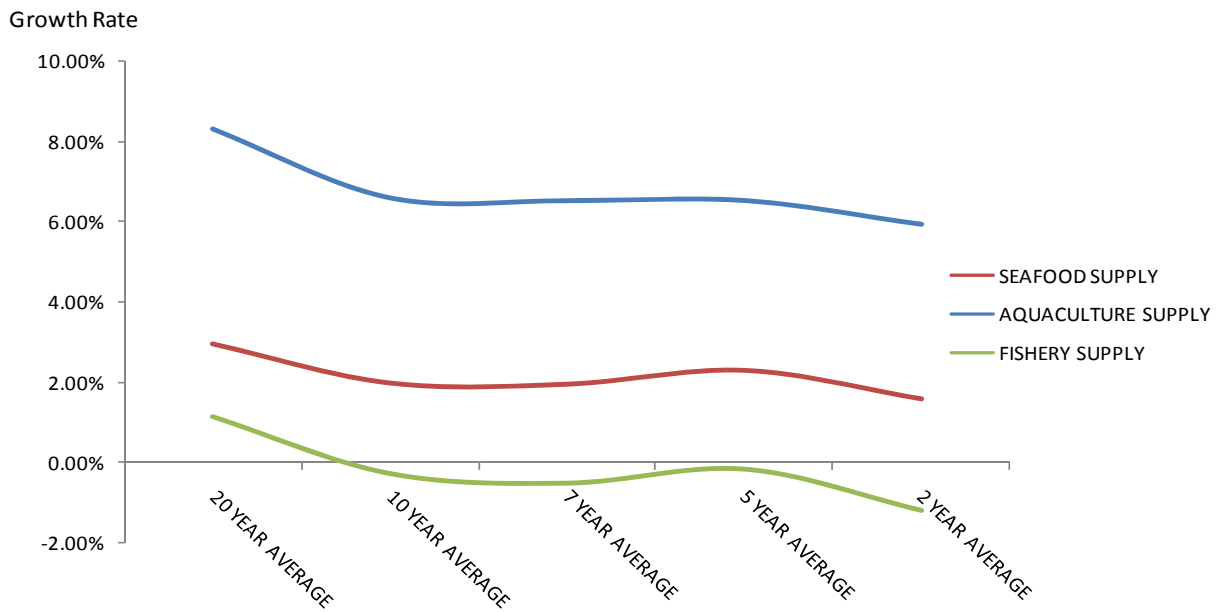
For seafood specifically, the effect of buying power should be seen in price. As Figure 2 shows, the strong increase in GDP lifts seafood prices quickly, as would be expected in an efficient market. Even more dramatic is the close correlation between seafood price growth rates and per capita GDP growth rates.

The essential conclusion is that seafood demand growth is highly and increasingly correlated to GDP per capita growth and that seafood is relatively price inelastic, an important phenomenon in understanding fish meal price behavior. Simply put, because consumers are willing to pay more for seafood, aquaculture producers can pass on fish meal price increases on to consumers.

SEAFOOD AND FISH MEAL

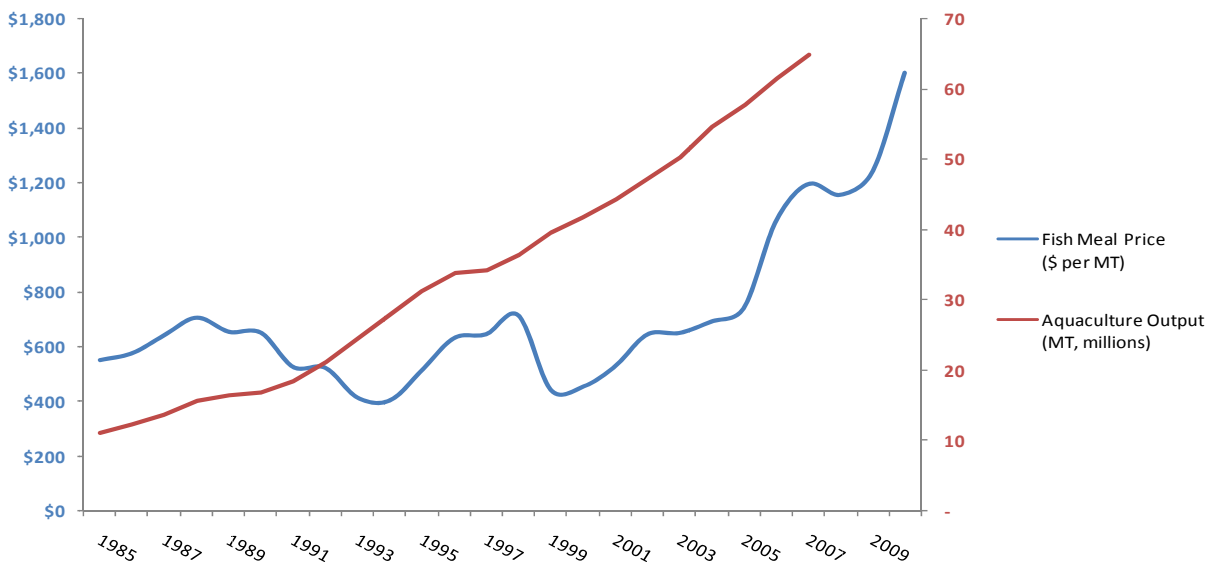
For the last decade, wild fishery production throughout the world has declined as the oceans struggle to replenish themselves in the face of growing demand, lax quotas and illegal harvesting. As illustrated in Figure 3, the aquaculture industry has grown robustly becoming a critical part of the global seafood supply. Assuming the price inelasticity of seafood, the declining output of wild fisheries, and the growth of world population and GDP, it can be assumed that aquaculture output will continue to rise well into the future.

FIGURE 3 – SEAFOOD SUPPLY



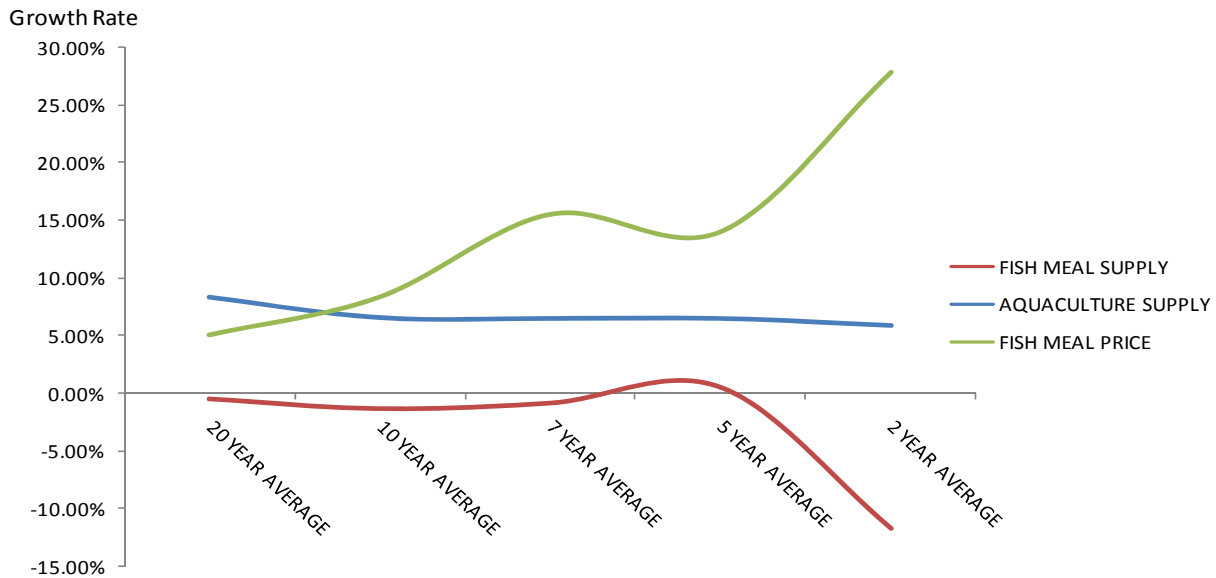
But what implications do these factors have for fish meal prices in the future? In 2010, fish meal prices escalated to a spring high of \$1,900 per ton settling at \$1,600 per ton by the fall, compared to \$1,200 per ton in 2007. Is this price growth sustainable? Figure 4 describes the price trajectory over the last decades compared to aquaculture output.

FIGURE 4 – FISHMEAL PRICES



Even more relevant than the demand driver is fish meal supply. Figure 5 illustrates the relationship between supply and price for fish meal. Over the last 20+ years, fish meal supply has remained constant in the face of increasing demand from aquaculture. The result has been an accelerating growth of fish meal prices with a highly sensitive inverse relationship to supply. Any disruption in supply immediately impacts price, as can be seen in the 2 year average, during which time fish meal supply decreased. Conversely, no degree of fish meal price escalation has spurred additional supply because it is just unavailable.

FIGURE 5 – FISHMEAL PRICE AND SUPPLY



While it is unlikely that 25% annual price growth in fish meal can be sustained, the long term forecast clearly predicts price stability at these levels. Expected continued global GDP and population growth, growing seafood demand, seafood price inelasticity, negative supply growth from wild capture and limited fishmeal supply all point to a high probability that fish meal prices will remain at high levels, compared to the last decade, the foreseeable future.

The only way to slow the growth of or reduce the rate of increase for fish meal pricing will be through the introduction of substitutes that to date have been unviable as nutrition sources. New feed technologies involving algae, protein rich plant feeds, or other animal-protein based feeds have shown some promise, but still have yet to produce at economically scalable levels. In contrast, Oberon FMR’s technology can be implemented today with equivalent nutritional effect and at quantities that will not effect supply demand dynamics for the fish meal market. Given this examination of the market, the ultimate conclusion remains that the opportunity to create value is enormous, and the associated risk from a product pricing perspective is small.