

Assessment of the relationship between oil prices and US oil stocks

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Abstract

This paper qualitatively and quantitatively analyzes the relationship between US monthly ending oil stocks position with that of West Texas Intermediate (WTI) oil prices from February 1995 to July 2004. The paper concludes if other things are held constant, WTI is inversely related to the petroleum products (PPP), combined petroleum products and crude oil (CPPP), crude oil alone (Crude), total oil stocks including petroleum products, crude oil and strategic petroleum reserves SPR (Total), total gasoline (TGO), total distillate (TDO). It could not establish a statistically significant and negative relationship with SPR when run alone. One percent increase (decrease) in CPPP, PPP, Crude, Total, TGO and TDO leads to decrease (increase) in WTI, respectively, by 0.70, 0.43, 0.37, 0.97, 0.26 and 0.21 percent. Oil prices are largely influenced by total crude and Crude and PPP inventories levels while modestly with variations in gasoline and distillate stocks levels. Despite a healthy increase of over 22 percent in SPR from January 2001 to April 2004, it did not result in easing of oil prices. Primarily because SPR are meant for security of supply concern and are only released under extreme conditions by the President of United States, they are neither meant for the purposes of balancing supply–demand gap nor for the stability of oil prices. The aggressive SPR buildup in recent years is related to international terrorism, geopolitical situation in the Middle East, particularly in Iraq, that encourages US government to enhance its SPR to meet any short-term eventuality. The analyst must keep a close eye on CPPP and the total oil stocks variation to forecast WTI in the short run whilst gasoline and distillate influence oil prices modestly in the short run. SPR, on the other hand, are expected to play a pivotal role in balancing oil prices and in providing a critical resource for the economy in case of any major shortfall in the long run.

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1. Introduction

In the past, the world has witnessed abrupt low and high oil prices on account of factors such as excess supply compared to demand, political upheavals, wars, extreme weather conditions, stocks, economic compulsions, competition from other sources of energy, growing environmental concerns, etc. For example, in the late 1950s, oil prices dropped as a result of excess supply vis-a-vis to demand. In contrast, in the early 1970s, oil prices increased significantly due to nationalization process, oil embargo, increased taxes and

royalties. In 1980, OPEC's oil production declined by 3.3 million barrels daily (MMBD) owing to the Iranian Revolution and the fall of the Shah resulting in cessation of Iran oil production. OPEC hung on to its formal price structure leading to restricting its supplies, while non-OPEC did not have the capacity to offset this shortfall at least in the short run (Fig. 1).² As OPEC oil supply shrank, world oil prices jumped from \$ 14 to 35 per barrel during 1979–1981—an increase of 150 percent—triggering widespread energy conservation programs and switching to other sources of energy.³ In the first half of the 1980s, OPEC lost a significant percentage of its market share due to injection of

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¹The views expressed in this paper are those of the author and do not necessarily represent views of the organization.

²Production ceiling to OPEC was introduced in 1983.

³World oil prices are defined as US refiners acquisition of imported crude oil as defined by the Energy Information Agency (EIA).

Norwegian and British oil and marginal increase in global oil demand. Eventually, OPEC abandoned its formal price structure and increased production in an effort to regain its market share. Prices plummeted as low as \$ 10 per barrel before settling in the range \$ 18–20 in the late 1980s. The oil price spiked again in 1990 with the uncertainty associated with the Iraq invasion of Kuwait while in 1997–98 it tumbled down due to Asian financial crisis.

2. Short-term price movements

Fig. 2 demonstrates short-term fluctuations in oil prices due to various incidents that surfaced during the last four years. For example, oil prices abruptly declined after 11 September 2001 while strikes in Venezuela, Nigeria and the war in Iraq destabilized the supply side in the short-term keeping the oil prices on the higher side. Earlier, towards the end of 2000, oil prices significantly increased on account of excess demand, lowest level of stocks in the USA since 1976, increase in tension between Iraq and Kuwait and the incident of USS Cole in Yemeni port. Since late 2003, oil prices remained exceptionally on the higher side—staying well over \$ 30 per barrel range. The reasons for this

abnormal high oil prices are low stocks, high demand, OPEC production quota, terrorist attacks, prolonged aggravated situation in Iraq, future shortages, etc. This paper attempts to analyze the relationship between oil prices and US oil stocks movements assuming other things held constant. Is the high oil price due to restricted OPEC production quota? Or is it due to the declining total oil stocks position in the USA?

3. Relationship between OPEC production and production quota

Fig. 3 demonstrates the historical relationship between OPEC production, production quota (10 excluding Iraq) and West Texas Intermediate (WTI). OPEC generally adjusts its production quotas based on the global demand and supply balances to ensure price stability. For example, it increased its production quota progressively starting in 1 January 2003 from 21.7 to 24.5 MMB/D and further increased to 25.4 MMB/D in June 2003 to meet the seasonal demand growth during summer driving seasons. Subsequently, production quota was reduced to 24.5 MMB/D with effect from 1 November 2003 and was not altered till the peak winter season was over in March 2004. With effect from 1 April

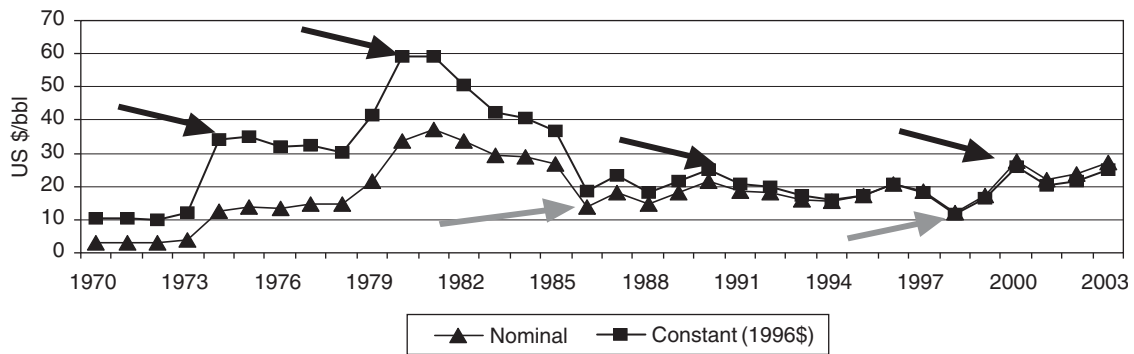


Fig. 1. Historical trends of world oil prices.

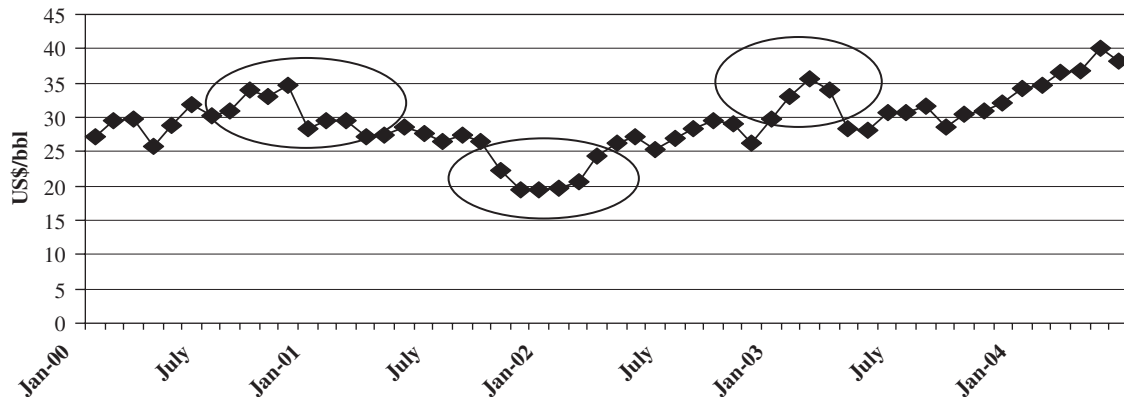


Fig. 2. Short-term WTI trends.

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