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Market structure and price adjustment in the U.S. wholesale gasoline markets[☆]

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Abstract

The issue of sticky prices in U.S. wholesale gasoline market is re-examined allowing for the effect of market structure due to increased market concentration caused by mergers, acquisitions and joint ventures which started in the late 1990s in the U.S. oil industry. I investigate the effects of market structure on the pattern of price adjustment based on the notion that increased market concentration leads to downward price stickiness and asymmetric short run price adjustment in the transmission of crude price changes to wholesale gasoline price.

I find that market concentration has an insignificant asymmetric effect on the speed of price adjustment but a significant asymmetric effect on short run price adjustments in the response of wholesale gasoline prices to crude price shocks in three U.S. wholesale markets. Furthermore, the signs on the coefficients of market concentration effects on price dynamics in the models support the assertion that increased market concentration leads to downward price stickiness in only one of the three markets examined. Overall, the results indicate that market structure does not have a strong effect on the dynamics of price adjustment.

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1. Introduction

This paper examines how the pattern of price adjustment in U.S. wholesale gasoline market is affected by changes in market concentration in the late 1990s.¹ This period was characterized by series of major mergers, acquisitions and joint ventures (hereafter, mergers) that led to the consolidation of the downstream operations of some of the big oil companies in the U.S. This is the first study to investigate the effects of the recent changes in the U.S refining industry on the dynamics of wholesale gasoline price adjustment.

I examine the effects of market structure, measured by market concentration, on price adjustment based on the notion that increased market concentration leads to downward price stickiness and asymmetric short run adjustment by asking the questions: "How does market concentration affect the speed of price adjustment?" and "How does market concentration affect short run price adjustment?" The speed of price adjustment deals with the comparison of how quickly gasoline prices adjust back to long run equilibrium when crude oil price changes, while short run adjustment deals with the magnitude of immediate gasoline price changes to crude oil price changes. This study isolates the response pattern of wholesale gasoline price changes to crude oil price changes as a result of market structure, measured directly by market concentration and indirectly by the potential use of refining capacity utilization by firms. I use an asymmetric error correction model that incorporates the Herfindahl–Hirschman Index (HHI) and refinery capacity utilization, to measure the effect of market structure on price adjustment.²

Gasoline price changes may reflect changes in various factors including crude oil price changes, changes in the degree of market concentration (level of competition in the market), firms' inventory management, refinery adjustment costs and costs of adjusting supply, refinery capacity utilization and a host of other factors that are not easily observable. These factors notwithstanding, the sharp increases and possible asymmetric adjustment in wholesale gasoline prices have mostly been attributed to refiners wielding their market power. The Connecticut attorney general, was quoted in the December 7, 1998 *Washington Post* as saying the Exxon–Mobil merger will face scrutiny from regulators because "gas prices go up a lot faster than they go down."³ The Chairman of the Permanent Subcommittee on Investigations, Senator Carl Levin, in June 2001, directed the Majority Staff of the Subcommittee to investigate the reasons for price increases, and, in particular, whether the increased concentration within the refining industry has contributed to price spikes and price increases in the Midwest gasoline market.⁴ In 2003, Senator Carl Levin, the Ranking Minority Member, Permanent Subcommittee on Investigations, Senate Committee on Governmental Affairs, asked the United States Government Accountability Office (hereafter, GAO) to examine the effect of the wave of mergers that occurred in the U.S. petroleum industry in the 1990s.

The [GAO \(2004\)](#) notes that market concentration, as measured by HHI, has increased substantially in the downstream segment of the U.S. petroleum industry since the 1990s. Market concentration in the wholesale gasoline refining industry increased substantially from the mid-1990s which by 2002, some petroleum refining states had become moderately concentrated in wholesale gasoline markets. The [GAO \(2004\)](#) concludes that mergers and increased market

¹ I use wholesale gasoline market to also mean gasoline refining industry. They are used interchangeably in this paper.

² The HHI is a convex function of firms' market shares and is calculated by summing the squares of the market shares of all the firms within a given market. It is sensitive to unequal market shares.

³ See [U.S. DOE EIA publication "Price Changes in the Gasoline Market: Are Midwestern Gasoline Prices Downward Sticky?" \(1999\)](#).

⁴ See the [U.S. Senate Permanent Subcommittee on Investigations Report \(April 2002\)](#).

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