

Value Creation by Independent Refiners

The Refiners:

Value Creation 2001- 3Q 2013

University of Houston, C.T. Bauer College of Business

Student Research Project

This report is developed solely for the purpose of class discussion. Cases and reports do not represent endorsements by the faculty or the C.T. Bauer College of Business on effective or ineffective management.

Table of Contents

1. Introduction
2. Summary of Findings
3. Independent Refiners
 - a. HollyFrontier
 - b. Marathon Petroleum
 - c. Phillips 66
 - d. Tesoro
 - e. Valero
4. Conclusions

Value Creation by Independent Refiners

1. Introduction

1.1 Research Objectives

This report documents the findings of a research project undertaken by students in the C.T. Bauer College of Business MBA program at the University of Houston.

The purpose of the project was to understand how Independent Refiners have created value for their shareholders and other stakeholders in the past, and the strategic lessons that can be learned from their successes and failures.

The intent has been to create a vehicle that will integrate the capabilities within the C.T. Bauer School of top tier academic research with experience-based knowledge of the challenges facing energy companies. Through this integration and our long time frame looking back and forward ten years, we hope to provide a set of analyses and commentaries that will complement existing reports available from financial institutions and will be useful both to financial institutions and to the companies studied.

This report is the first report covering a sector outside the upstream. Prior reports have covered the Super-majors, National Oil Companies and Independents. Future classes will address Oilfield Services and Midstream. We hope that these reports will deepen the relationship between the University of Houston and energy companies in Houston and beyond, creating opportunities for mutually beneficial dialogue.

1.2 The Independent Refiners

Historically, most refineries were built and operated by integrated oil companies with the objective of providing outlets for their crude oil production and providing an essential link in an integrated value chain that stretched from oil and gas exploration and production through retail sales. Prior to 1980, significant players included the major oil companies: Exxon, Mobil, Gulf Oil, Texaco, Chevron, Shell and BP (through Sohio); and smaller integrated players such as Amoco, Arco, Cities Service, Conoco, Diamond Shamrock, Sunoco, Getty, Phillips and Unocal. As demand for petroleum products declined during the early 1980s, price controls and subsidies for small refineries were ended by the Reagan administration, and margins collapsed.

The sector was rationalized in the 1980s and early 1990s through closure of many small refineries, acquisition by PDVSA of Champlin Petroleum (a Union Pacific Railroads Subsidiary) and Cities Service Refining, and joint ventures in which Shell and Texaco combines their East and West Coast downstream businesses and brought in Saudi Aramco as a third investor. Further portfolio moves included Arco and Unocal's exit from East and Central U.S. markets, and split of upstream from downstream businesses by Diamond Shamrock and Cities Service. Chevron's sale of the Gulf Alliance Louisiana refinery to BP following Chevron's merger with Gulf Oil was followed by BP's resale of Alliance to Tosco in 1999.

This latter move pointed the way to a more intense reshuffle of the refinery cards from 1998 through 2007 as the majors consolidated through mergers and independent refiners such as Valero

Value Creation by Independent Refiners

(VLO), Tesoro(TSO) and Tosco followed by its successor Premcor (both started by Thomas O’Malley) picked up refinery assets that the Super-majors were obliged to divest for antitrust reasons. Corporate mergers further consolidated the sector, as Phillips Petroleum acquired Tosco in 2001 and merged with Conoco to form ConocoPhillips in 2002, and Valero merged with Diamond Shamrock in 2001 and bought Premcor in 2005. Two smaller, inland refiners, Holly and Frontier, merged in 2011 to form Holly Frontier Corporation (HFC).

The final chapter was the demise of the small integrated model in North America, with the split of upstream from downstream businesses: Marathon Oil from Marathon Petroleum (MPC) in 2011 and Phillips 66 (PSX) from ConocoPhillips in 2012, exit from refining by Murphy Oil and Hess, and substantial reduction in BP’s U.S. refining presence with sales of its Carson, CA refinery to Tesoro and Texas City, TX refinery to Marathon Petroleum.

The resulting architecture of the U.S. downstream business shows the publicly traded independent refiner sector that was the subject of our analysis as having a 39% share of total national distillation capacity, higher than that of the Supermajors (Table 1.1). Of the other larger refiners, PDV America, a subsidiary of PDVSA, and Koch Industries, a private company, publish limited information on their operations; PBF Energy, the third refining company launched by Thomas O’Malley, became a public company in December 2012 and therefore provides a limited history.

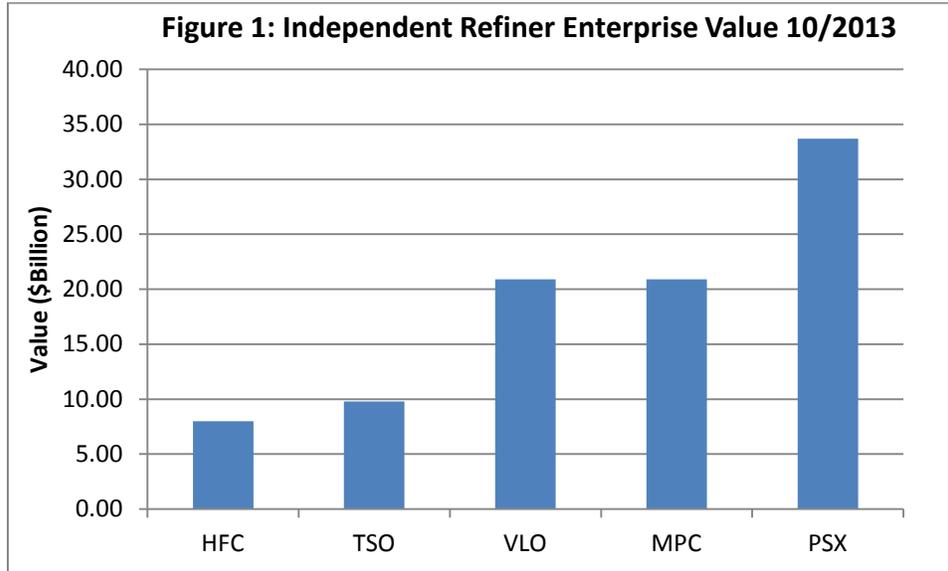
Table 1.1: U.S. Refinery Capacity by Sector¹ (Thousand Barrels per Calendar Day)					
Majors		Independents		Other	
BP (inc BP Husky)	769.5	HollyFrontier	470.4	PDV America	765.3
Chevron	943.3	Marathon Petroleum	1708.2	Koch Industries	684.1
ExxonMobil (inc Chalmette)	2048.1	Phillips66 (inc WRB)	2073.0	PBF Energy	502.2
Shell (inc Motiva and Deer Park)	1822.2	Tesoro	919.8	Other	3028.7
Total Petroleum	225.6	Valero	1863.3		
Total	5808.7		7034.7		4980.3
	33%		39%		28%
				U.S.Total	17823.7

Therefore, this class concentrated on five publicly traded independent refining companies.

¹ 100% of capacity of Joint Ventures noted in parentheses is attributed to the named JV operator

Value Creation by Independent Refiners

The companies under study ranged from \$8 – 33 Billion of enterprise value at the end of October 2013 (Figure 1). The highest, Phillips 66, is not only the largest refiner (Table 1), but also has a 50% interest in CPChem, a petrochemical joint venture with Chevron, and a 50% interest in DCP Midstream, a midstream joint venture with Spectra Energy. The smallest, Holly Frontier, has benefited from discounted prices for inland U.S. crude oils due to the oil shale boom and is notable for its high dividend yield.



As in our previous studies, we start with the premise that shareholder value tracks the expected intrinsic value of the firm. Intrinsic value in turn is shaped by expectations of growth, returns on capital and risk. These are the result of strategic portfolio choices, execution capabilities and the leadership and organizational philosophy that define the firm's human system.

Value Creation by Independent Refiners

2. Summary of Findings

The class studied shareholder value creation in the independent refining sector from 2002-2012 for HollyFrontier (HFC), Tesoro (TSO) and Valero (VLO), and from their Initial Public Offering for Marathon Petroleum (MPC) and Phillips 66 (PSX). The companies' refinery portfolios vary in location, capacity and complexity (Table 2.1). Valero (Pembroke, Wales and Quebec City, Canada) and Phillips 66 (Humber, England, Whitegate, Ireland, Karlsruhe, Germany and Melaka, Malaysia) have some international assets.

Table 2.1: Refiner Assets by Segment

	2012 Assets (\$ Million)				
	HFC	MPC	PSX	TSO	VLO
Refining	6,703	17,052	23,384	8,340	39,490
Midstream	1,426	1,950	2,528	363	---
Retail/ Specialties	---	1,947	10,231	741	2,043
Ethanol	---	---	---	---	929
Petrochemicals	---	---	3,816	---	---
Corporate	2,199	6,274	8,115	1,258	2,015
Total	10,328	27,223	48,073	10,702	44,477
Refining (%)	65%	63%	49%	78%	89%
USGC as % of 2014 Refining EDC	0%	67%	36%	0%	59%

The companies also differ in their concentration on refining. Valero is nearly 90% dependant on refining, while Phillips 66 has less than 50% of its assets in refining (Table 2). Apart from its joint ventures in petrochemicals and Midstream, Phillips 66 has substantial assets in its specialties and marketing business, which includes lubricants, petroleum coke and power generation as well as traditional gasoline, diesel and jet fuel.

Marathon (Speedway) and Valero have networks of company owned and operated retail gasoline stations. Valero spun its retail network out in May 2013 as a separate company CST Brands (formerly Corner Store Holdings), with over 1000 retail sites in the U.S. and 850 in Eastern Canada, which now acts as a branded distributor-marketer for Valero fuel products. With this move, Valero has become even more concentrated in the refining sector.

Within the refining sector, the companies' portfolios differ in their locations and complexity (Table 2.2). HollyFrontier is focused entirely on the central region, with refineries in the mid-continent and

Value Creation by Independent Refiners

Rocky Mountains. Marathon was historically focused on the central region but with the acquisition of the BP Texas City refinery is now the most exposed to Gulf Coast of the five companies, ahead of Valero. Tesoro, after its acquisition of the BP Carson refinery, is largely a West Coast refiner.

Table 2.2 Regional Distribution and Complexity of Refineries

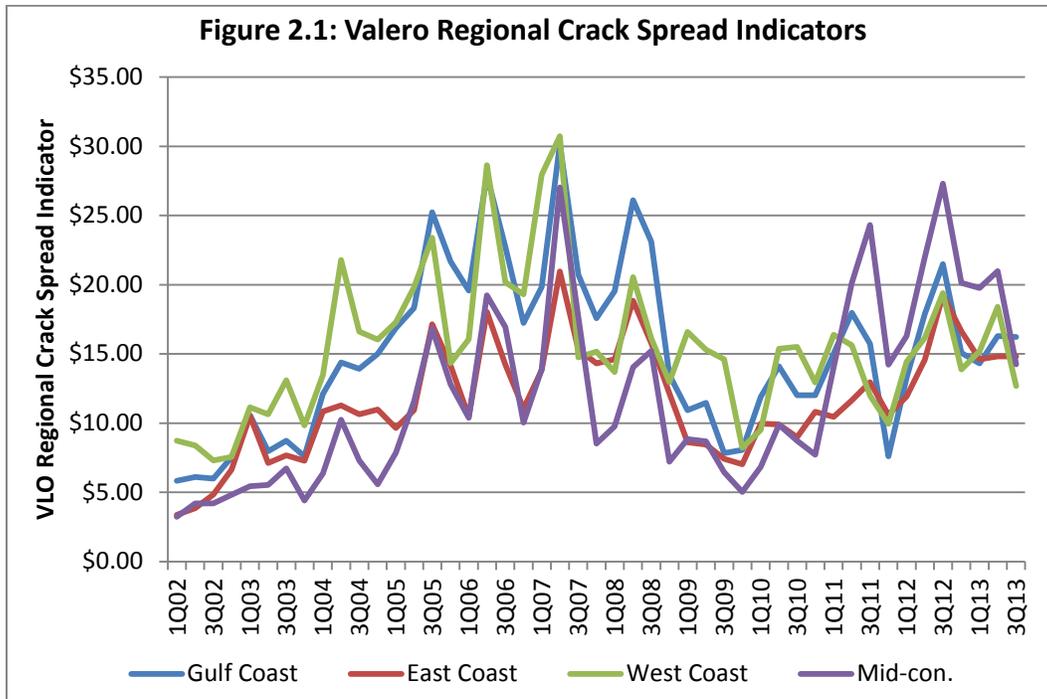
	HFC	MPC	PSX	TSO	VLO
Number of Refineries	5	7	15	7	14
EDC (Complexity)	5374 (12.1)	19,136 (11.3)	24,596 (11.0)	8472 (10.4)	26,330 (11.1)
Gulf Coast	---	12,772 (12.1)	8,869 (12.1)	---	15,601 (12.1)
East Coast*	---	---	5,292 (9.0)	---	2,484 (5.8)
Central	5374 (12.1)	6,364 (9.9)	5,367 (11.3)	785 (6.6)	4,947 (11.4)
West Coast*	---	---	5,060 (11.5)	7,688 (10.8)	3,298 (15.3)

2.1 Drivers of Shareholder Value

The refining industry is highly capital intensive and operates with thin margins between its revenues from refined products and its crude oil feedstock costs. This margin is often displayed as a “crack spread²”. In times when demand is weak or refineries have overbuilt capacity, refiners tend to continue to operate at full capacity until margins fall below cash cost recovery levels. In times when capacity is short, product prices rise to the cost of imports and margins expand. When product prices and refinery margins are high, refiners are tempted to approve capital projects; at the same time consumers reduce miles driven and choose to drive more efficient vehicles, leading to declining refinery margins. This cyclical pattern was seen from 2012-2013 (Figure 2.1) using a slightly more complex crack spread formulation published regularly for each of four regions by Valero on its web site.

² A simple crack spread formulation is a 3:2:1 crack spread, which calculates the value of 2 barrels of gasoline plus one barrel of diesel, less the cost of 3 barrels of light, sweet crude oil

Value Creation by Independent Refiners

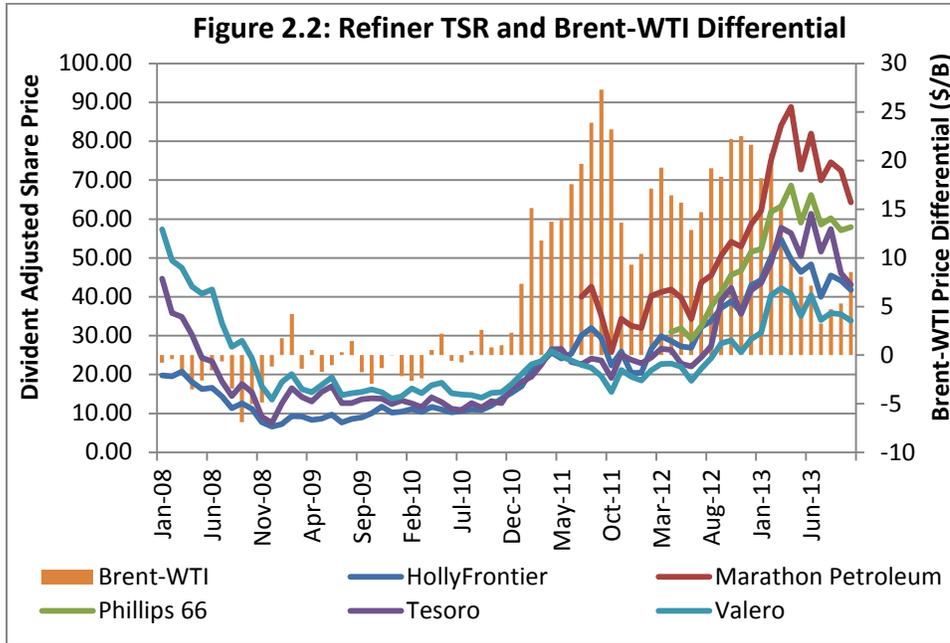


Margins rose strongly from 2002-08, a period that has been called “the golden age of refining” due to strong worldwide growth in demand for transportation-related oil products, which strained global refining capacity. Margins collapsed during the financial crisis as demand for transportation fuels declined at a time when new expansion projects were being commissioned by Valero, Marathon, Phillips 66, BP and Motiva (a Shell-Saudi Aramco joint venture).

From 2011-13, U.S. margins recovered mainly due to expansion of crude oil production from oil shales, which caused U.S. crude oil prices to fall below international levels. Share prices and shareholder returns rose with refiner margins as the Brent-WTI price differential widened and fell as the differential contracted (Figure 2.2):

- Brent crude oil provides the cost basis for Atlantic Basin (including U.S.) product prices as Europe continues to export gasoline to the USA
- WTI provides the cost basis for inland US refiners
- U.S. inland refineries have a cost basis influenced by WTI and a product revenue basis influenced by Brent, so margins rise and fall with the Brent-WTI price differential

Value Creation by Independent Refiners



In 2011 and 2012, the large spread between WTI and Brent prices was caused primarily by logistical constraints between Cushing, OK, where WTI prices are set, and the U.S. Gulf Coast, the largest global center for crude oil demand for oil refining and petrochemicals. These constraints are being resolved with the reversal and expansion of the Seaway pipeline and addition of the southern leg of the Keystone XL pipeline. However, with adequate logistics, there is now a surplus of light sweet crude oil on the Gulf Coast, where most of the refineries are configured to run heavy sour crude oils.

Unless crude oil exports are permitted, WTI prices will remain below Gulf Coast prices by approximately the \$5/Barrel pipeline transportation tariff from Cushing to the Gulf Coast. Gulf Coast prices for light sweet crude oil will be further discounted compared to international crude oils by an amount sufficient to persuade Gulf Coast refiners to run light sweet crude oils that do not match the configuration of their refineries and export the products to South America, Europe, Africa and even Asia. This will be the first time that U.S. crude oil prices have been below international levels since the 1950s, with the exception of Alaskan crude oil until its export ban was lifted.

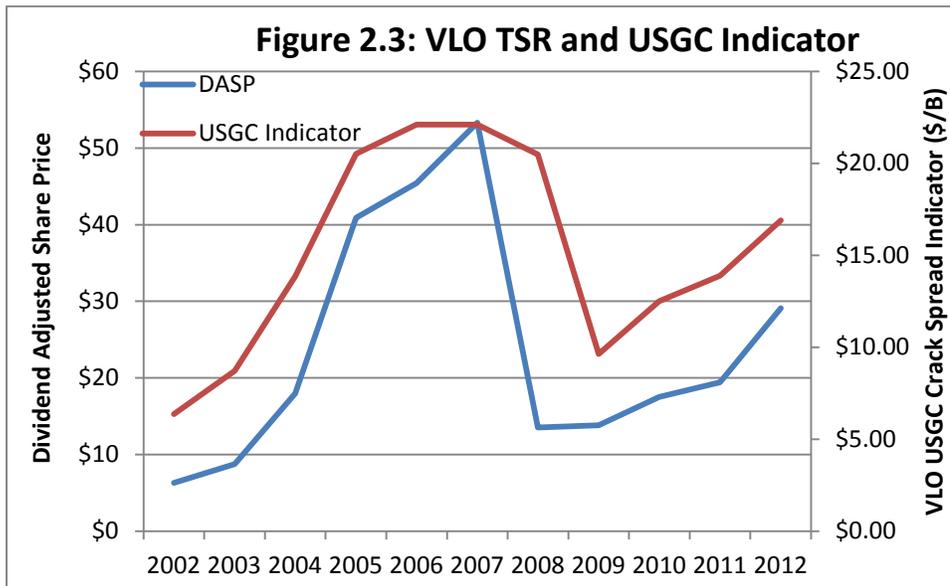
The expansion of crude oil production, primarily in North Dakota and inland Texas has resulted in significant secular changes in relative regional margins:

- West Coast margins were highest among the regions in the early 2000s, but have recently been weakest due to declining demand, resulting overcapacity and unfavorable California State policies.
- Mid-Continent margins were weakest in the early 2000s, but have become strongest due to expansion of domestic oil shale production and discounted crude oil prices for North American inland crude oil production.

Value Creation by Independent Refiners

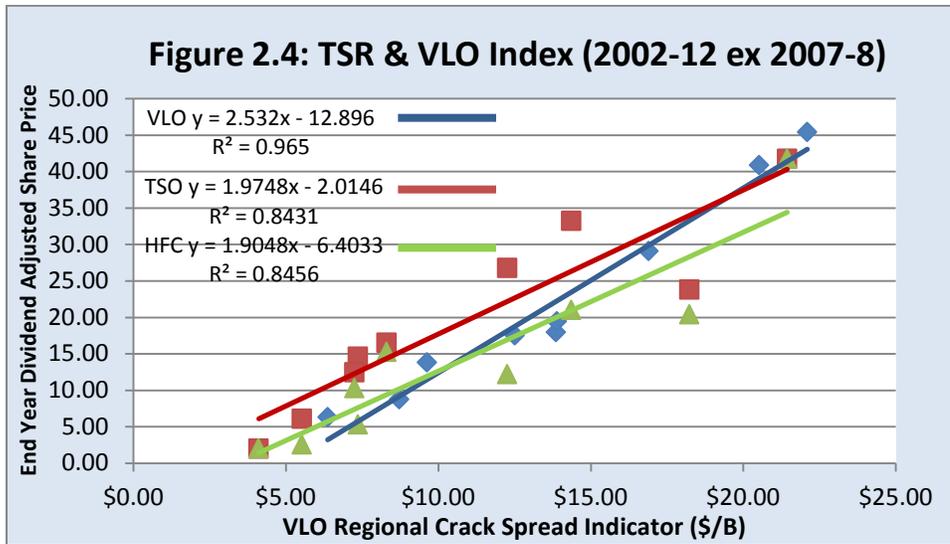
- Gulf Coast margins have benefited from expansion of exports as low crude oil and natural gas prices improved the region’s competitive position over international refinery sources
- East Coast margins have remained weak, exposed to product imports from Europe and India, and far from the oil shale production areas.

Refiner dividend adjusted share prices rose strongly from October 2011 through March 2013, lagging the Brent-WTI differential as it climbed from early 2011 through December 2012. The connection between shareholder returns and underlying crack spread margins for Valero is evident (Figure 2.3), except during the financial crisis of 2008 and 2009.



Eliminating those tumultuous years, there is a strong relationship between the shareholder returns of each of the three companies publicly traded from 2002-2013 (HollyFrontier, Tesoro and Valero) and the crack spread margins available in their primary region (Figure 2.4), Gulf Coast for Valero, Central for HollyFrontier and West Coast for Tesoro. Similar analyses back to 2002 could not be developed for the other two companies since stock prices are only available from the date of their IPO, July 2011 for Marathon and April 2012 for Phillips 66.

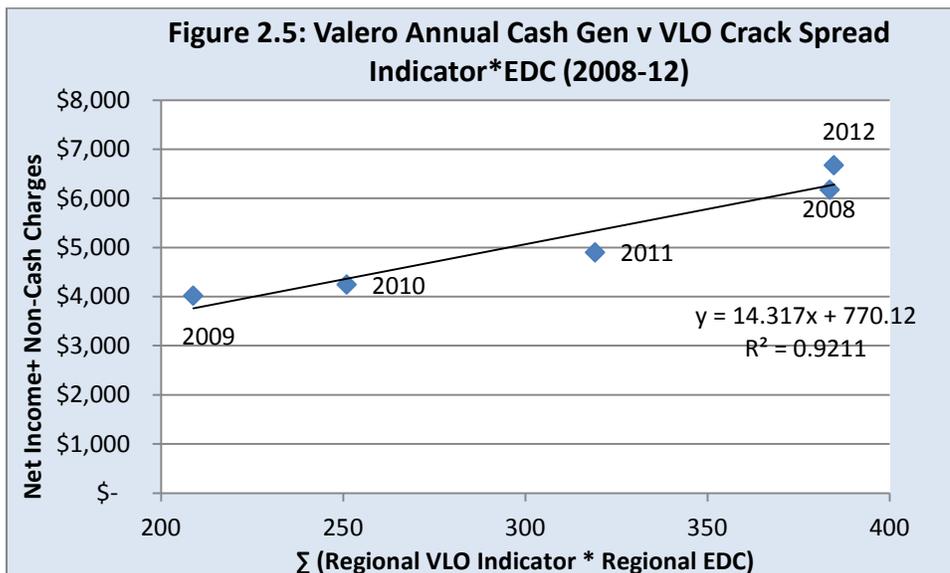
Value Creation by Independent Refiners



The slope of the correlation for VLO is steeper than for HFC and TSO, consistent with Valero’s higher exposure to refining (Table 2) and particularly to Gulf Coast refining: Valero shareholder returns are more highly leveraged to the commodity crack spread margins than its rivals. By contrast, all of HFC’s refineries are in the central region and Tesoro is heavily weighted to the West Coast.

2.2 Refiner Valuation

Our methodology was grounded on Refiner Cash Generation, defined as net income after taxes at 35% plus depreciation, amortization and other non-cash charges (e.g., impairments, gains/losses on asset sales). Our analysis found that over the period 2008 through 2012, cash generation by each company followed closely the sum product of the gross margin available (regional crack spread indicator published by VLO), multiplied by the Equivalent Distillation Capacity (EDC) for each region. An example for Valero is shown as Figure 2.5.



Value Creation by Independent Refiners

Leveraging this finding, a cash flow model was built for each refiner and used to establish scenarios of future cash flow. Intrinsic value was calculated for refining and marketing as the net present value of future cash flows, discounted at the corporate WACC.

2.2.1 Cash Flows

We recognize that there may be substantial head winds for refiners:

- Future gasoline demand may decline due to improving fuel efficiency, increasing penetration of hybrids and higher gasoline prices caused by low carbon fuel standards; diesel prices will be higher, but U.S. refiners are configured to maximize gasoline production.
- There will likely be continued pressure on refiners to invest to meet ever lower emissions standards
- Midstream build-out may gradually reduce discounts on prices for inland shale oil and oil sands

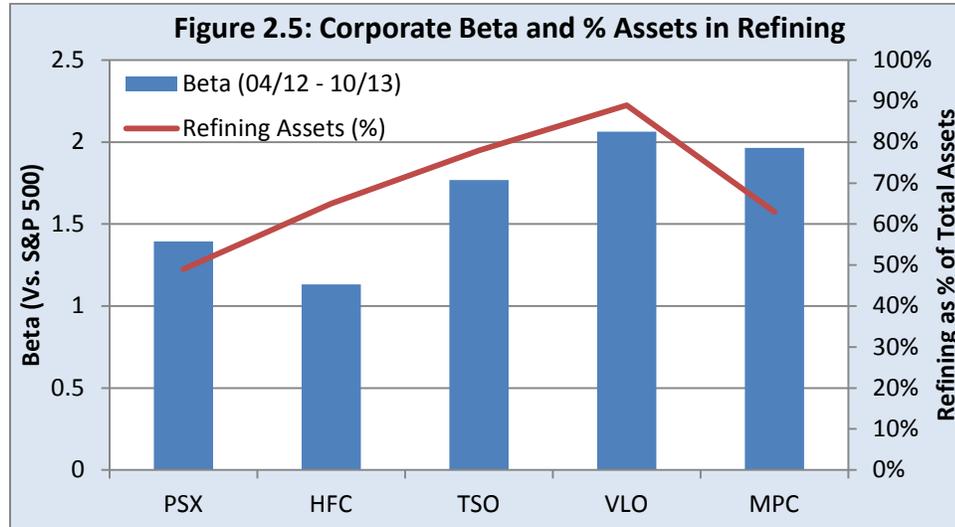
Notwithstanding, USGC refiners are enjoying a comparative advantage on feedstock and energy costs compared to international refiners allowing them to be competitive in export markets and less liable to destructive competition in domestic markets. We assumed future U.S. Gulf Coast VLO indicator crack spreads would be constant at the average levels for 2009-12. These are similar for the average over the prior cycle 2002-2008. We assumed further that Gulf Coast, Central and West Coast indicators will converge by 2015; East Coast indicators will remain \$2/B lower than the other regions.

Recent levels of annual capital expenditures are assumed to be those required to continue the historical level of capture of the regional crack spread indicators, so were held constant going forward. No M&A activity was assumed. Working capital was assumed to remain constant and no non-cash charges were taken on earnings other than depreciation and amortization

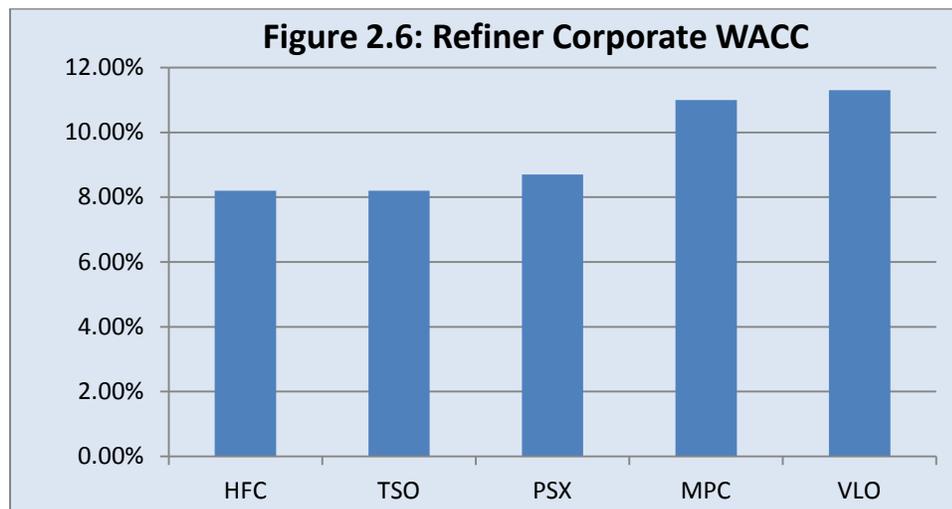
2.2.2 Cost of Capital

As would be expected for a sector exposed to volatile commodity margins, the refiners all showed Betas greater than 1.0, compared to the S&P500. The companies with least diversification from refining and greatest exposure to Gulf Coast refining showed highest betas (Figure 2.5).

Value Creation by Independent Refiners



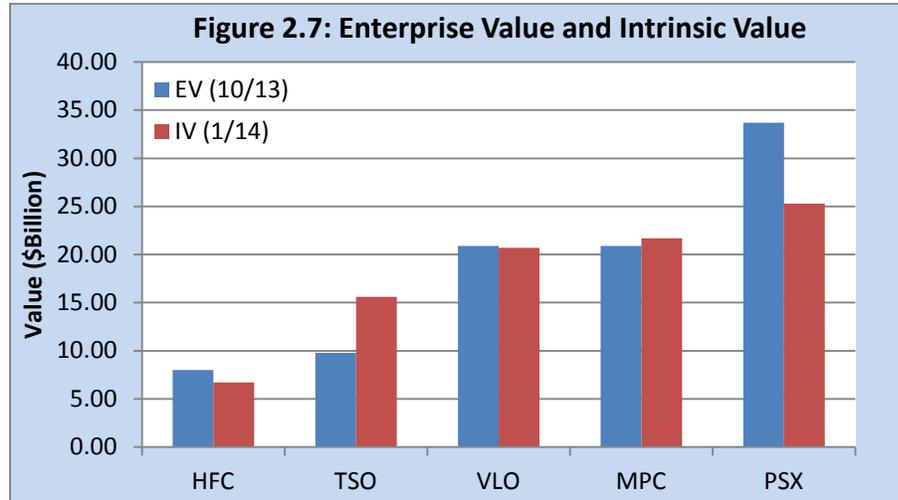
Corporate Weighted Average Cost of Capital (WACC) was calculated using a risk free interest rate of 3.5% p.a. and a market premium for stocks of 5% p.a. Debt interest rates were calculated as the weighted average rates of actual long term debt incurred. MPC and VLO have highest WACC due to high concentration in refining and high weighting to USGC (Figure 2.6).



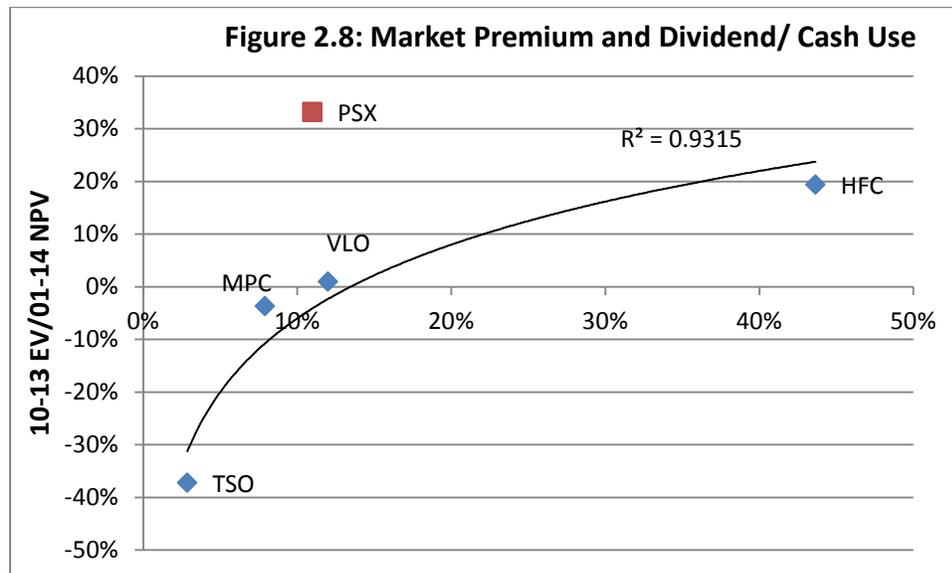
2.2.3 Intrinsic Value

Intrinsic value was calculated as the net present value of future cash flows discounted at the corporate WACC, based on the assumptions described above, including a residual value of 5 * the final year cash flow. Ownership in a midstream MLP was valued in a separate cash flow model using the MLP cash flow, (lower) WACC and the general partner's ownership share.

Value Creation by Independent Refiners



Intrinsic value (IV) broadly tracks enterprise value (EV) for each company (Figure 2.7), but the differences were potentially interesting and possible explanations were studied. The most persuasive was dividend payments, which suggested a logarithmic relationship between the market premium and the proportion of available cash³ that was returned to shareholders as dividends for four of the five companies studied (Figure 2.8). In the refining sector, it appears that investors prefer companies to favor cash distribution over reinvestment in growth or improvements. Stock buybacks, however, did not appear to explain the market premium or discount of EV compared to IV.



Phillips 66 is an outlier: its enterprise value is considerably higher than our calculated intrinsic value, which values its midstream and chemicals businesses at multiples typical

³ Dividends as a percent of cash used for capital expenditures, acquisitions, debt repayment Dividends and stock repurchases.

Value Creation by Independent Refiners

for the respective sectors. It may be that investors are valuing cash flow generated by the refining sector at the higher multiples of the chemicals and midstream businesses, since the company's avowed strategy is to do just that: to reinvest refinery cash flow into chemicals and midstream growth opportunities.

2.3 Governance

Independent refiners are subject to agency temptations. The companies are generally run or strongly influenced by engineers, who have a natural bias towards new capital projects. This requires a strong governance system to find the right balance between allocating cash to new process investments and returning the cash to shareholders.

In integrated companies, management generally has a bias in favor of the upstream sector, which historically has provided more opportunities for growth at higher returns than the downstream. As a result, the downstream refining sector's projects tend to be less well received than those of the upstream. Arguably, the integrated companies may under invest in refining. The challenge for the independent companies is to choose a Board of Directors whose members have the knowledge and experience to challenge the capital budget proposed by the executives. This would ideally include a cohort of former executives of downstream companies who understand the technology and the temptations and can ask awkward questions on whether there are commercial solutions for the problems for which capital projects are proposed.

We find that Tesoro and Phillips 66 have strong Boards on these criteria (Table 2.3), while the Valero Board appears weak.

Table 2.3: Board Governance Rankings

	Downstream & Midstream	Energy Related	Finance ; Other Industry	HSE	Politicians & Lawyers	Other	Score	Score per Director
Points	3	2	1	1	0	0	-	-
HFC	2	3	3	0	2	1	15	1.4
MPC	1	5	5	0	1	0	18	1.5
PSX	3	0	4	1	0	0	14	1.8
TSO	4	2	4	0	0	0	20	2.0
VLO	1	0	7	0	4	1	10	0.8
							Average	1.5

Value Creation by Independent Refiners

2.4 Conclusions

We draw five tentative strategic conclusions:

- The primary driver of refiner shareholder value is Intrinsic Value – the net present value of future cash flows discounted at the corporate cost of capital. Consequently refiners need to maximize free cash flow, and pay attention to stability of cash flow to lower their beta value relative to the S&P. Both these attributes require safe, reliable operations with high capacity utilization
- Dividend yield is important. Dividend yield explained why HollyFrontier (44% of cash generation returned to shareholders as dividends) enjoyed a premium of enterprise value over intrinsic value while Tesoro's (3% of cash generation returned to shareholders as dividends) enterprise value was lower than its intrinsic value. Investors favor distribution of cash to shareholders as dividends over reinvestment in refinery projects.
- Inland refineries are favored over Gulf Coast refineries at the present time. However, low feedstock and energy costs are allowing coastal refineries to compete successfully with foreign refineries in export markets for refined products. A key future success factor will be to lock in ratable demand in export markets.
- Midstream MLPs have been used by all companies to access a pool of capital seeking tax advantaged yields such that their midstream cash flows are being discounted at a lower (~6% WACC) cost of capital than their refining assets (~10% WACC). By remaining as General Partner, refiners have maintained control over midstream operations.
- Phillips 66 has the highest market premium of enterprise value over intrinsic value, validating its strategy of reinvesting refinery cash flow into growth opportunities in petrochemicals and in its new Midstream MLP (on top of DCP). Essentially, Phillips 66 refinery cash flow is being valued at the higher multiples of the chemicals and midstream sectors. The implication is that refiner cash flow is most valuable when invested outside the refining business into sectors with more profitable growth opportunities.

The conclusions are, of course, a product of the current context, in which investors are challenged by very low interest rates and there is natural skepticism on the value of further investment in the North American refining sector. Lower oil prices could stimulate demand for transportation fuels and open up reinvestment opportunities while reducing domestic crude oil production and midstream growth; higher interest rates could reshape the risk/ return curve for dividend yields. However, refiner leaders should probably build strategy on the assumption that the current conditions will persist, and look for commercial innovation, investment in related growth businesses and dividend payments to provide value to shareholders.

Value Creation by Independent Refiners

3. The Independent Refiners

In this section, we review the five companies studied in more detail. In broad terms:

- HollyFrontier is a small niche refiner that has created value by assembling a portfolio of inland refineries that are benefiting from favorable crude oil prices due to expanding domestic production of light crude oil from oil shales and distributing cash to shareholders through a high dividend yield.
- Marathon Petroleum, split from Marathon Oil in 2011, has historically created value through optimization of its Midwestern refining, midstream and marketing network. With the acquisition of BP's Texas City (renamed Galveston Bay) refinery, it is now highly leveraged to Gulf Coast margins.
- Phillips 66, split from ConocoPhillips in 2012, is the most diversified of the independent refiners, with significant joint venture businesses in midstream (with Spectra) and chemicals (with Chevron) as well as operating the largest refinery portfolio in the USA. It is generating value by reinvesting refinery cash flow into growth of its non-refining businesses.
- Tesoro, with its acquisition of BP's Carson refinery and related midstream and marketing assets, has become heavily weighted to the West Coast. California in particular has adopted policies designed to reduce consumption of fossil fuels which are reducing forcing consolidation of the refining sector. In turn, this is reducing the competitive intensity within the sector to the advantage of the incumbents. Tesoro has value upside if it can increase its dividend to match its rivals.
- Valero was the largest independent refiner in the USA until Phillips 66 was reinvented as an independent refiner. Valero grew by acquisition of large coastal refineries with heavy crude oil processing capabilities and created substantial value through 2008. However, the market forces that have favored HollyFrontier have been unfavorable for Valero.

For each company, we start with a brief history, describe its current asset base, review the value created for shareholders and discuss the calculation of the firm's intrinsic value.

3.1 HollyFrontier

Holly Corporation was originally incorporated in 1947 under the name General Appliance Corporation and changed its name in 1952; Frontier Oil Corporation was originally incorporated under the name Wainoco Oil Corporation, which was primarily an oil and gas exploration company with production in Canada and the U.S.

In 1969 Holly Corporation purchased the Navajo Refining Company in Artesia, NM from Continental Oil Company. The company purchased ConocoPhillips' Wood Cross, UT refinery in 2003 and the Sunoco and Sinclair Tulsa, OK refineries in 2009. Holly formed Holly Energy Partners and an MLP in 2004. In 1991 Wainoco purchased Frontier Oil Corporation, whose primary asset was a crude oil refinery located in Cheyenne, WY, and changed its name to Frontier Oil Corporation in 1998. The company purchased a second refinery in El Dorado, KS from the Shell-Texaco joint venture Equilon in 1999. Holly and Frontier completed a merger of equals and changed name to HollyFrontier Corporation (NYSE: HFC). The new company

Value Creation by Independent Refiners

purchased crude oil, fluid catalytic cracking and polymerization units in Bloomfield, NM from Western Refining, Inc.

HollyFrontier, headquartered out of Dallas, TX, has a portfolio of five refineries, as well as 44% ownership in Holly Energy Partners (HEP). In aggregate, the refineries have a throughput capacity of 443,000 bpd and a 12.1 complexity factor on the Nelson Index (Figure 3.1).

Figure 3.1: Holly Frontier Asset Map

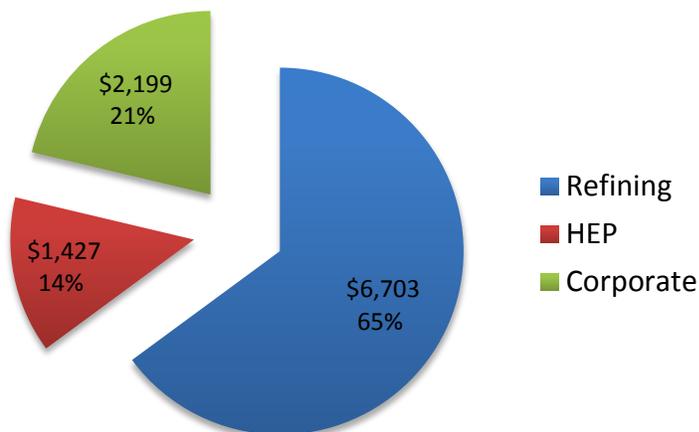


HFC's primary assets are in refining and midstream with the midstream relatively large

Value Creation by Independent Refiners

compared to the other independent refiners (see Table 2.1).

Figure 3.2: End 2012 Assets of HollyFrontiers' Business Units (Millions USD)



HFC refineries are of moderate size and complexity measured by the Nelson Complexity Indicator (Table 3.1).

Table 3.1: HFC Refineries

Refinery	Location	Capacity	NCI	EDC
Tulsa	Tulsa, OK	125,000	14.0	1,750,000
El Dorado	El Dorado, KS	135,000	11.8	1,593,000
Navajo	Artesia, NM	100,000	11.8	1,180,000
Woods Cross	Woods Cross, UT	31,000	12.5	387,500
Cheyenne	Cheyenne, WY	52,000	8.9	462,800
TOTAL HFC		443,000	12.1	5,373,300

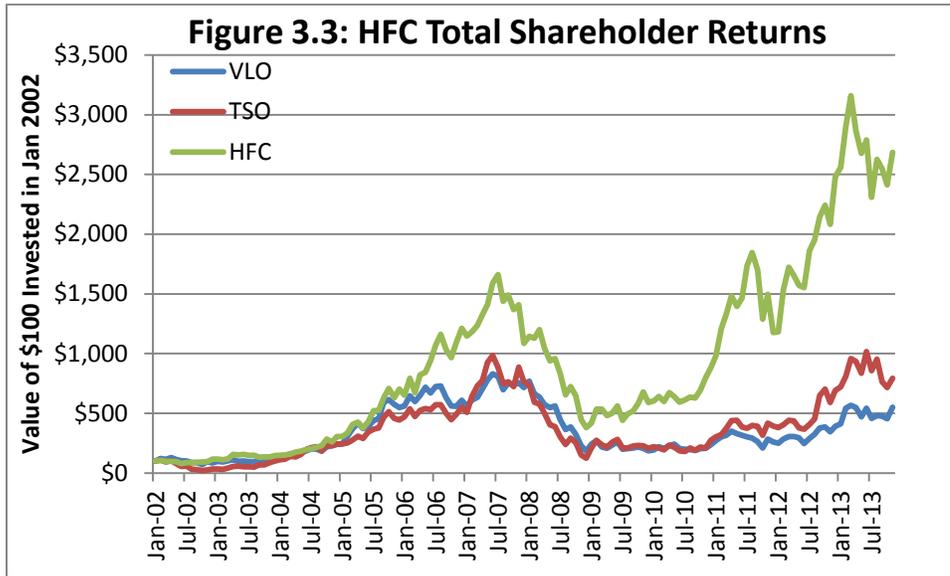
Each refinery benefits from access to discounted crude oils. Tulsa, Artesia and El Dorado from increasing production in the Permian Basin and mid-continent; Woods Cross from local Utah waxy crude; and Cheyenne from Canadian Heavy and Bakken shale light crude oils.

Holly Energy Partners (HEP) owns and operates over 2500 miles of pipelines, which transport crude, intermediate feedstocks and refined products. HEP also owns 28 different terminals and loading rack facilities and has 12 million barrels of storage capacity. HEP operates much of the

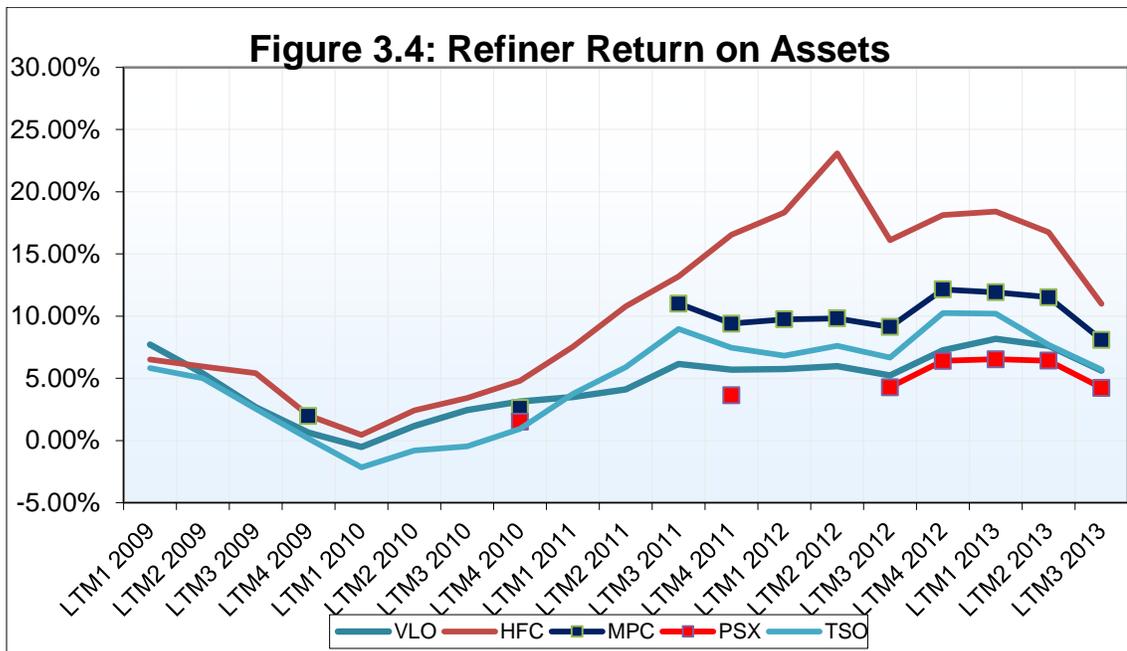
Value Creation by Independent Refiners

supporting infrastructure for HFC refineries and has 25% interest in SLC Pipeline, LLC and 75% interest in UNEV Pipeline, LLC..

HollyFrontier has provided exceptional returns to its shareholders over the past ten years (Figure 3.3), outperforming its larger rivals, Valero and Tesoro.

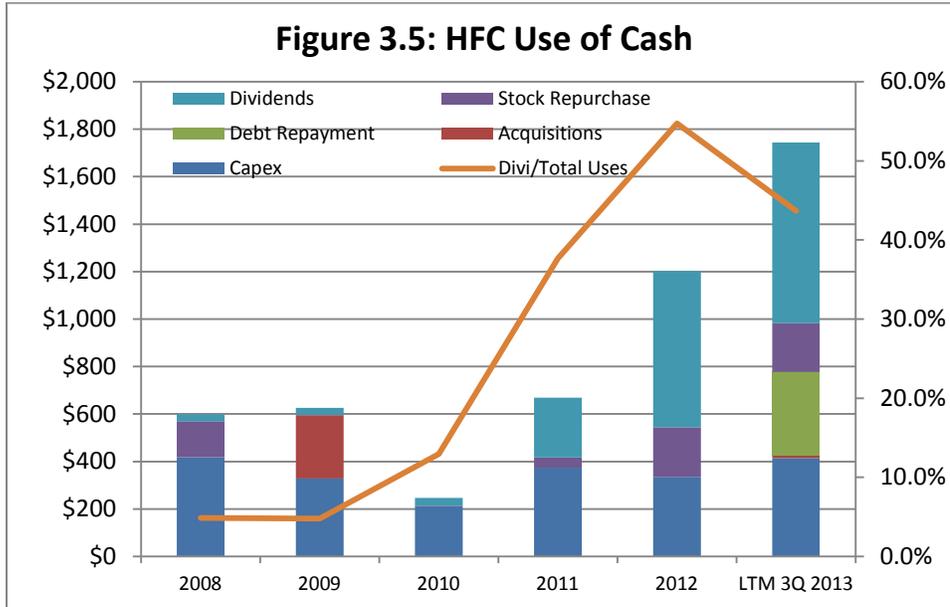


It has done well by acquiring refineries at low prices. According to data given in a 2012 HFC presentation, they have acquired assets at a cost of \$59 / complexity barrel compared with the industry average of \$1,186 / complexity barrel over the past five years. With low capital employed, HFC returns are superior (Figure 3.4).



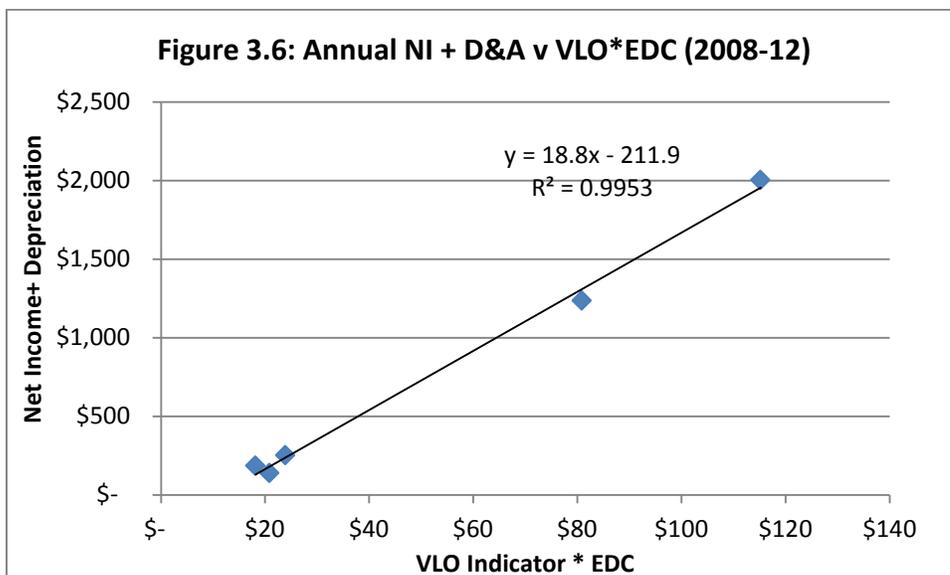
Value Creation by Independent Refiners

Since Holly and Frontier merged in mid 2011, the company has pursued a strategy of returning cash to investors as the company increased regular dividends per share by 300% through mid 2013. HFC has also been repurchasing stock since the merger but there appears to have been a shift in strategy since the merger in favor of returning cash to shareholders through dividend payments rather than stock repurchases while maintaining discipline in capital expenditures (Figure 3.5).



As noted previously, refiners' cash generation is closely related to the commodity margins available in their local markets as recorded in Valero's regional crack spread indicators. In the case of HFC, all their refinery capacity is in the central region and their cash generation has grown with their refinery capability measured by the Equivalent Distillation Capacity (EDC), measured as the sum product of capacity and Nelson Complexity Factor for each process unit. The correlation is particularly strong for HFC (Figure 3.6).

Value Creation by Independent Refiners



Using the methodology and assumptions described in Section 2.2 of this report, the intrinsic value of HFC refineries is \$5.6 Billion, with its 39% share in its HEP midstream MLP adding a further \$1.1 Billion for a total corporate intrinsic value of \$6.7 Billion. HFC's end October 2013 enterprise value was \$8.0 Billion representing a 19% premium over calculated intrinsic value, which we believe is due primarily to its high dividend yield.

3.2 Marathon Petroleum

Marathon began as The Ohio Oil Company in 1887. In 1889, it was purchased by John D. Rockefeller's Standard Oil Trust. It remained a part of Standard Oil until the trust was broken in 1911. In 1930, Ohio Oil bought the Transcontinental Oil Company, giving it the "Marathon" brand name. In 1962, the company changed its name to "Marathon Oil Company" after its main brand. Mobil wanted to buy the company in 1981. The residents of Findlay, Ohio, the corporation's home town, worried that the Findlay jobs would be lost so Marathon looked for a white knight. They found one in 1982 when United States Steel bought the company.

The headquarters moved to Houston in 1990 but the company maintained downstream operations in Findlay (which are now Marathon Petroleum). In 1998, Marathon and Ashland, Inc. formed Marathon Ashland Petroleum LLC to refine, market and transport crude oil and petroleum products, primarily in the Midwest, the upper Great Plains and southeastern United States. In 2001, USX, the holding company that owned United States Steel and Marathon, spun off the steel business and Marathon Oil was again publicly traded (NYSE: MRO).

Marathon Oil Corporation completed acquisition of Ashland Inc.'s 38 percent interest in Marathon Ashland Petroleum LLC (MAP), as well as two complementary businesses, in a transaction valued at approximately \$3.730 billion in September 1, 2005. In 2006, construction of a \$3.2 billion major expansion project at the Garyville, Louisiana refinery began, increasing the plant's capacity by 180,000 barrels per day and adding 7.5 million gallons per day of clean transportation fuels to the market. The project was completed in late 2009. In December 2010,

Value Creation by Independent Refiners

the St. Paul Park refinery and Speedway Super America assets in Minnesota were sold to Northern Tier Energy.

On July 1, 2011 Marathon Oil spun off Marathon Petroleum (NYSE: MPC). In October 2012, the newly independent MPC formed MPLX, LP as a Master Limited Partnership owning and operating the company's pipeline and terminal assets. On February 1, 2013, MPC closed its purchase from BP of the Texas City Refinery for approximately \$600M. In addition to the refinery, the transaction included a 1 cogeneration facility, four light product terminals located in the Southeast, retail marketing contract assignments for approximately 1,200 branded sites with 61,000 barrels per day (bpd) of gasoline sales, three operating intrastate natural gas liquids pipelines and a 50,000 bpd allocation of BP's Colonial Pipeline Company shipper history.

Marathon Petroleum Company is now the fourth largest refiner in the U.S. with four refineries in the Midwest and three on the Gulf Coast. The three Gulf Coast refineries (Garyville, Texas City and Galveston Bay) are of world class scale, while the Midwest refineries are smaller. MPC Refineries are of average complexity (Table 3.2).

Table 3.2: MPC Refinery Configuration

Unit Capacity (BPCD)	NCF	Garyville	Galveston Bay	Catlettsburg	Robinson	Detroit	Texas City	Canton
Crude Distillation	1.0	522,700	451,000	240,000	206,000	120,000	80,000	80,000
Vacuum Distillation	1.0	265,000	225,000	115,400	67,900	69,800		33,300
Coking	5.5	82,700	29,700		27,600	28,000		
Catalytic Cracking	6.0	131,100	163,800	98,800	51,800	33,300	55,600	24,700
Catalytic Reforming	5.0	119,700	124,200	49,900	76,000	20,400	10,500	20,400
Catalytic Hydrocracking	6.0	88,400	117,000		27,100			
Catalytic Hydrotreating								
NHT	1.7	98,300	102,600	50,300	63,200	31,400		28,500
DHT	2.0	140,200	53,100	73,600	75,100	35,600		20,900
KHT	2.0	67,900	71,100	29,500		6,700		12,800
GOHT	4.0	100,700	94,500	101,700		37,100		25,700
GDU	4.0	104,500	50,800		39,400			
ARDS	7.0	-	36,900	2,900				
Alkylation	11.0	29,500	33,300	20,000	11,900	5,700	13,800	7,100
Polymerization	9.0	-						1,000
Aromatics	20.0	-	85,500	3,100	6,100		2,800	
Lubricants	58.0							
Isomerization	15.0	46,600		17,100	15,200			
Cumene	15.0							
Coke (ST/D)		5,822			1,427	1,971		
Sulfur (LT/D)				380	171	390	34	88
Asphalt	1.0	28,500		33,600		21,800		14,100
EDC & NCI								
EDC (Kbcd)		5614.2	6483.8	2488.6	2175.2	1016.5	673.9	683.4
NCI (Calculated)		10.7	14.4	10.4	10.6	8.5	8.4	8.5
NCI per MPC		10.8	15.3	10.3	10.6	9.9	8.4	9.0

Value Creation by Independent Refiners

MPC refineries produce 1.4 Mbd of products and the company buys a further 0.3 Mbd of products for resale. It markets gasoline through a network of 1,460 company owned and operated Speedway branded retail outlets and 5,000 independently owned and operated Marathon branded outlets. These outlets account for approximately 29% of total saleable products. The company also sells approximately 58% of its total products as gasoline and distillates into wholesale markets. It is one of the largest asphalt producers, which with other specialty products account for about 13% of sales.

MPC controls a large portfolio of logistics assets including ownership or leased interests in 8,300 miles of pipelines of which 2,900 miles are held by MPLX, LP, a Master Limited Partnership whose General Partner is MPC. MPC has one of the largest inland petroleum products barge fleets which ships crude oil, petroleum products and intermediates to optimize MPC's overall refining and supply network. The company also maintains 1,970 rail cars and 146 company owned trucks. MPC Midwest region is operated as an integrated network. The overall Midwest region imports products from the East and Gulf Coasts and provides higher margins than are available in exporting regions. MPC's strong logistics presence provides a competitive advantage in its Midwest region (Figure 3.7).

However, the major expansion of Garyville and acquisition of Galveston Bay refinery has changed the character of MPC from a tightly integrated Midwest refiner-marketer with high profitability to a large Gulf Coast merchant refiner with a smaller Midwest integrated division (Figure 3.8).

Figure 3.7: MPC Integrated Network

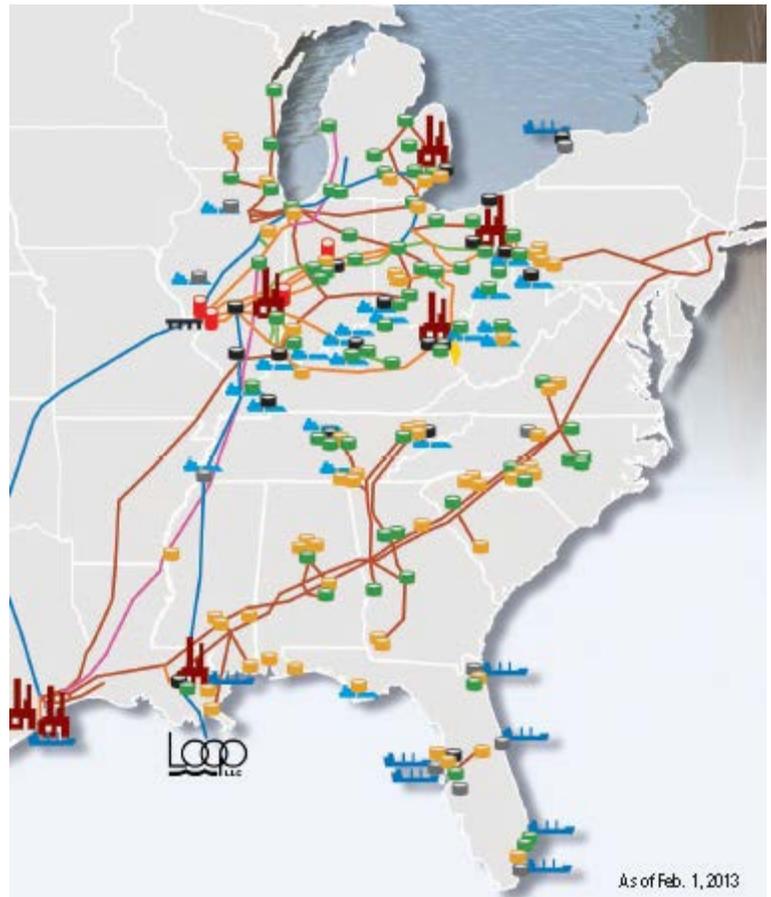
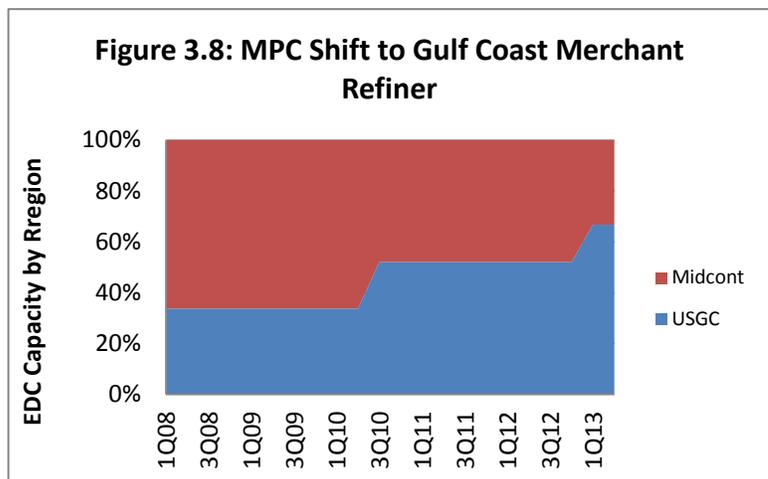
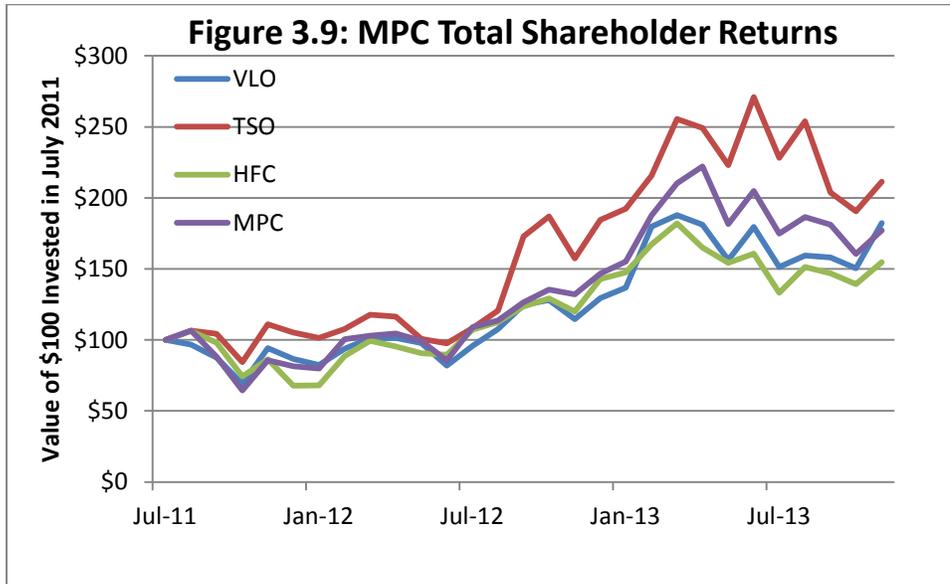


Figure 3.8: MPC Shift to Gulf Coast Merchant Refiner



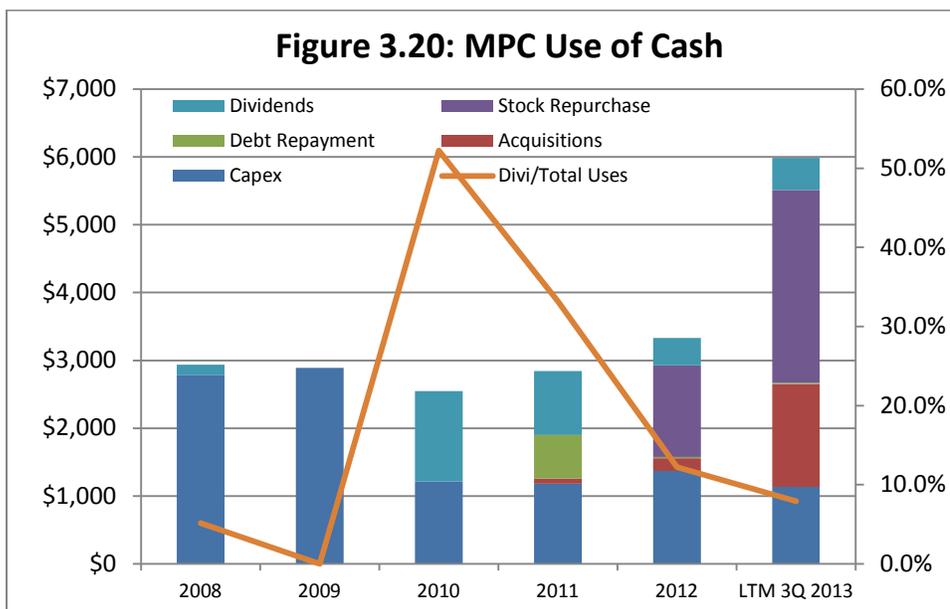
Value Creation by Independent Refiners

Since its IPO, Marathon Petroleum has provided good returns for its shareholders, second only to Tesoro (Figure 3.9) among the study group.



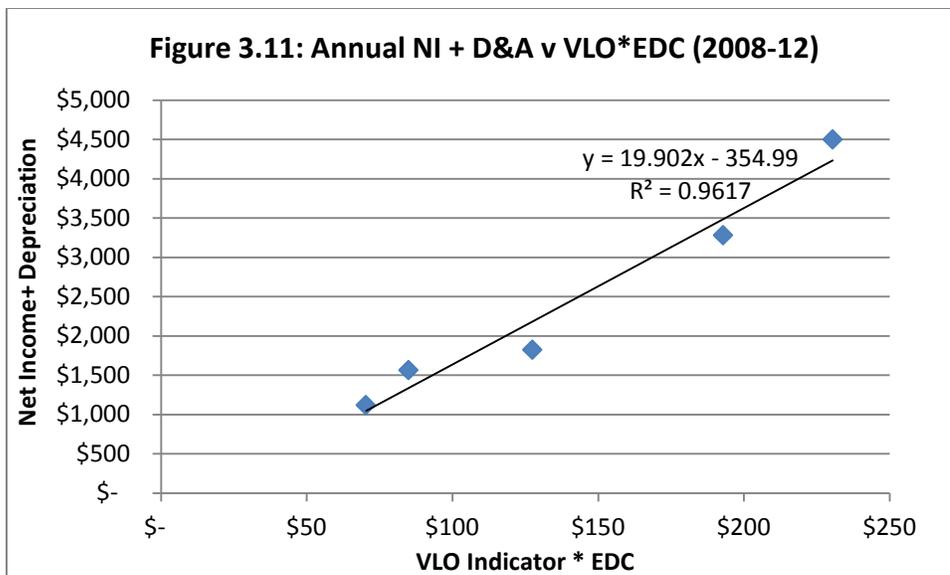
MPC return on assets is high compared to its large rivals reflecting its traditional strength in the Midwest. With its low acquisition cost for Galveston Bay refinery of approximately \$90 per complexity barrel, MPC should be able to sustain a high return on assets (see Figure 3.4).

With completion of its major projects at Garyville at the end of 2009 and Detroit at the end of 2012, MPC has returned cash to shareholders primarily through stock buybacks rather than dividends (Figure 3.10). Our analysis suggests that investors might favor a higher dividend yield.



Value Creation by Independent Refiners

MPC capacity is on the Gulf Coast and in the central region and their cash generation is tightly related to the sum product of EDC and available crack spread margin in each region (Figure 3.11).



Using the methodology and assumptions described in Section 2.2 of this report, the intrinsic value of MPC refineries is \$19.6 Billion, with its 68% share in its MPLX midstream MLP adding a further \$2.1 Billion for a total corporate intrinsic value of \$21.7 Billion. MPC's end October 2013 enterprise value was \$8.0 Billion representing a 4% discount from calculated intrinsic value, which we believe could be improved with higher dividend payments.

3.3 Phillips 66

Continental Oil & Transportation Company was founded by Isaac Blake in 1875. Continental was one of the first petroleum marketers in the west and was formed in order to capitalize on the hypothesis that if kerosene were imported from Eastern refineries by railroad tank cars and sold in bulk, then prices would drop and demand would increase. From 1875-1913, Continental became the top marketer of petroleum products in the Rocky Mountain Region. Much of its output was refined into gasoline, as automobiles grew in popularity. In 1885, Standard Oil took control of Continental and in 1913 upon order by the US Supreme Court, Standard Oil relinquished control of Continental.

In 1929 JP Morgan Jr. oversaw the merger of Marland Oil Co. and Continental Oil & Transportation Co., which became Continental Oil Co. (Conoco). Conoco was based in Ponca City and owned an aggregate of about 3,000 wells and thousands of retail outlets in 30 states. The stock market crashed one month after Conoco first traded publicly on the New York Stock Exchange (NYSE). The company was salvaged as a result of divestitures and major spending cuts in salaries and exploration plays. Funds were used to expand refining capacity, build the Great Lakes pipeline (which connected Ponca City to Chicago), and fund projects such as the creation of a lubricant to reduce engine friction (Conoco's Germ Processed Motor Oil).

Value Creation by Independent Refiners

In 1905 two brothers, Frank and L.E. Phillips, struck oil in Oklahoma on the first well out of 81 consecutive successful wells that they drilled and in 1917 they founded Phillips Petroleum Company, which was headquartered in Bartlesville, Oklahoma. The brothers also opened the first natural gasoline plant, which extracted liquid byproducts from natural gas to be used in motor fuels. In 1924, the first patent for creating a process to recover natural gasoline from natural gas was awarded to Phillips Petroleum Company.

In 1930, Phillips acquired Independent Oil and Gas Company, which increased its refining and retailing capabilities. In the late 1930s Phillips developed new processes for producing two ingredients in synthetic rubber, butadiene and carbon black, and granted a license to a foreign company to use its copper sweetening process in gasoline refining. In 1940, the HF Alkylation process was invented by Phillips, which made high-octane gasoline possible and in 1944 Phillips was the first to produce “cold” synthetic rubber.

In 1981 Conoco became vulnerable to a takeover by Seagram. In defense, Conoco merged with Dupont, who acquired 100% of Conoco stock, making Conoco a subsidiary. In 1998, Conoco and Dupont split and became separate companies again. The Conoco IPO was the largest in history at the time at \$4.4 billion.

Between 1980 and 1985, Phillips acquired General American Oil Company for \$1.1 billion, then Aminoil, Inc. and Geysers Geothermal Company for \$1.7 billion. Shortly after, Phillips avoided two unfriendly takeover attempts, one of which was led by T. Boone Pickens. The defense included an increase in debt and payment of a special dividend, followed by asset sales and staff reductions. The company was financially constrained for more than a decade.

In 2000, Phillips CEO Jim Mulva began a series of transactions that transformed the company: Phillips’ gas processing and marketing (GPM) operations were combined with Duke Energy’s midstream operations in a joint venture, which became Duke Energy Field Services (DEFS). Phillips purchased ARCO Alaska for \$7 billion, the largest acquisition in its company history. The company then combined its chemicals and plastics operations with Chevron’s, which became Chevron Phillips Chemical Company (CP Chem). In 2001, Phillips acquired U.S. refiner and marketer Tosco Corporation, and on 8/30/2002, Conoco and Phillips merged and became ConocoPhillips Company (COP), the third largest publicly traded oil company in the U.S. and the sixth largest in the world.

On 4/30/2012, ConocoPhillips spun off its downstream businesses into a new company, Phillips 66. ConocoPhillips became the largest independent upstream oil and gas company and Phillips 66 became the largest independent refiner.

Phillips 66 is an energy manufacturing and logistics company. It is the only integrated downstream company to combine midstream, chemicals, refining, and marketing and specialties businesses. With this broad portfolio, Phillips 66 can develop options deriving from the changing energy landscape.

Value Creation by Independent Refiners

- The Midstream segment includes Phillips 66's transportation business, including operations of Phillips 66 Partners LP, its master limited partnership which conducted an initial public offering in July 2013; a 50 percent interest (formerly DEFS, now a joint venture with Spectra) in DCP Midstream, LLC ; and natural gas liquids (NGL) operations. DCP Midstream is the largest NGL producer and one of the largest natural gas gatherers and processors in the United States, with 63,000 miles of pipeline, 62 plants and 12 NGL fractionators.
- The Chemicals business is a 50 percent interest in Chevron Phillips Chemical Company LLC (CPChem), one of the world's top producers of olefins and polyolefins.
- Phillips 66 Refining operations include 15 refineries with a net crude oil capacity of 2.2 million barrels per day (Table 3.3). The Marketing and Specialties business includes 10,000 owned or supplied outlets, lubricants marketing in more than 70 countries, and other specialty products including petroleum coke, waxes, solvents and pipeline flow improvers (recently sold to Warren Buffett).

Table 3.3: Phillips 66 Refineries

2011 Refinery Capacity							
Region	Location	Crude Capacity (MBD)	Gasoline	Distillate	NCF	Clean Product Yield	EDC (MBD)
Western/ Pacific	Ferndale	100	55	30	7	75%	700
	Los Angeles	139	80	65	14.1	87%	1959.9
	San Francisco	120	55	55	13.5	83%	1620
	Melaka	76	20	50	9.3	80%	706.8
Central	Billings	58	35	25	14.4	89%	835.2
	Ponca City	187	105	80	9.8	91%	1832.6
	Borger	73	50	25	12.3	89%	897.9
	Wood River	153	83	45	12.5	80%	1912.5
Gulf Coast	Alliance	247	125	120	12.5	86%	3087.5
	Lake Charles	239	90	115	11.2	69%	2676.8
	Sweeney	247	130	120	13.2	87%	3260.4
Eastern/ Europe	Bayway	238	145	115	8.4	90%	1999.2
	Whitegate	71	15	30	3.8	65%	269.8
	Humber	221	85	115	11.6	81%	2563.6
	MRO	58	25	25	7.9	85%	458.2

2012 Regional Capacity					2011 Regional Capacities				
Region	Crude Capacity (MBD)	Average NCF	Average Clean Product Yield	Regional EDC	Region	Crude Capacity (MBD)	Average NCF	Average Clean Product Yield	Regional EDC
Western/ Pacific	440	11.5	83%	5060	Western/ Pacific	435	11.5	82%	4986.7
Central	475	11.3	88%	5367.5	Central	471	11.6	87%	5478.2
Gulf Coast	733	12.1	81%	8869.3	Gulf Coast	733	12.3	81%	9024.7
Eastern/ Europe	588	9.0	84%	5292	Eastern/ Europe	588	9.0	83%	5290.8
World Wide	2236	11.0	84%	24596	World Wide	2227	11.1	83%	24780.4

Twelve of the refineries are located across the USA, one is in Malaysia, and the company has interests in three European refineries. WRB Refining LLC is a joint venture between Cenovus, a

Value Creation by Independent Refiners

Canadian Oil Sands producer formerly part of Encana and Phillips 66, which operates the refineries.

In the United States, Phillips 66 markets gasoline, diesel and aviation fuel. Most marketing outlets are owned and operated by independent dealers and wholesale marketers. In Europe, Phillips 66 markets motor fuels under JET® through company-owned outlets in Germany and Austria and dealer-owned outlets in the United Kingdom. Phillips 66 also manufactures and markets specialty products, including petroleum coke products, waxes, solvents, polypropylene and pipeline flow improvers.

Phillips 66's Chemicals segment comprises a 50 percent equity investment in Chevron Phillips Chemical Company LLC (CPChem), a joint venture with Chevron U.S.A. Inc.

Figure 3.12: International and Domestic Chemical Facilities



Now in its 13th year of operations, CPChem had approximately 4,700 employees worldwide and approximately \$9.4 billion in assets, as of Dec. 31, 2012.

Headquartered in The Woodlands, Texas, CPChem's business is structured around two primary operating segments: Olefins and Polyolefins (O&P) and Specialties, Aromatics and Styrenics (SA&S). The O&P segment produces and markets ethylene, propylene and other olefins products. The majority of the ethylene is consumed within the O&P segment for the production of polyethylene, normal alpha olefins and polyethylene pipe. The SA&S segment manufactures and markets aromatics products, such as benzene, styrene, paraxylene and cyclohexane, as well as polystyrene and styrene-butadiene copolymers. SA&S also manufactures and markets a variety of specialty chemical products, including organosulfur chemicals, solvents, drilling chemicals, mining chemicals, and high-performance engineering plastics and compounds.

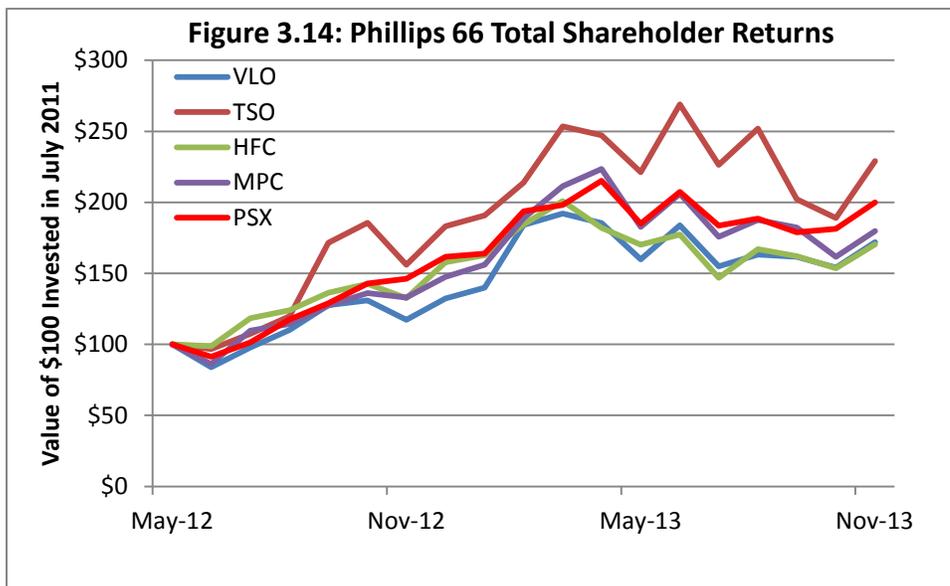
Value Creation by Independent Refiners

Phillips 66's Midstream segment consists of Phillips 66's Transportation business, including operations of Phillips 66 Partners LP, its master limited partnership which conducted an initial public offering in July 2013; DCP Midstream, its 50/50 joint venture with Spectra Energy Corp.; and NGL Operations.

Figure 3.13: Domestic Midstream Assets



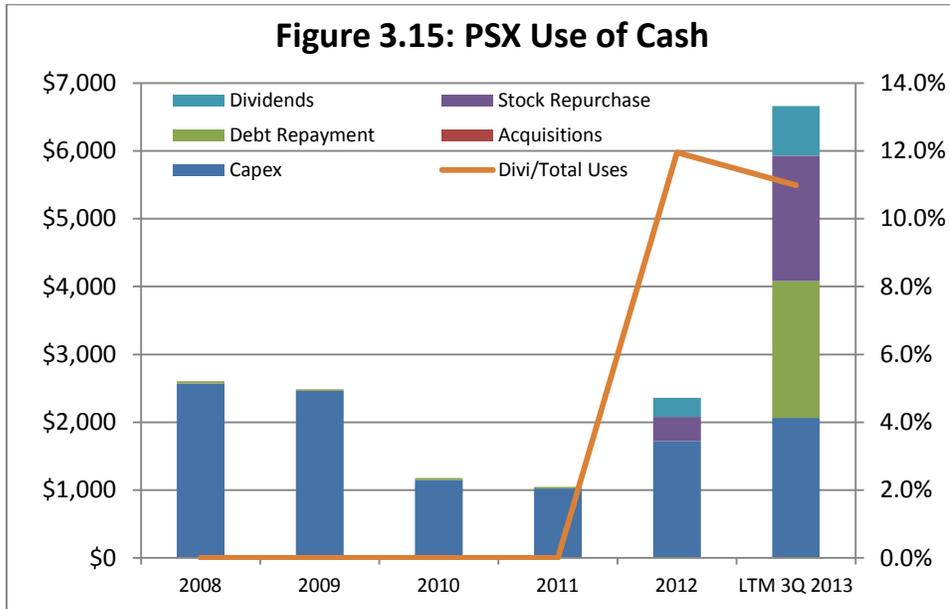
Phillips 66 (NYSE: PSX) has performed well for its shareholders since its IPO (Figure 3.14), providing higher returns than its sector rivals except for Tesoro.



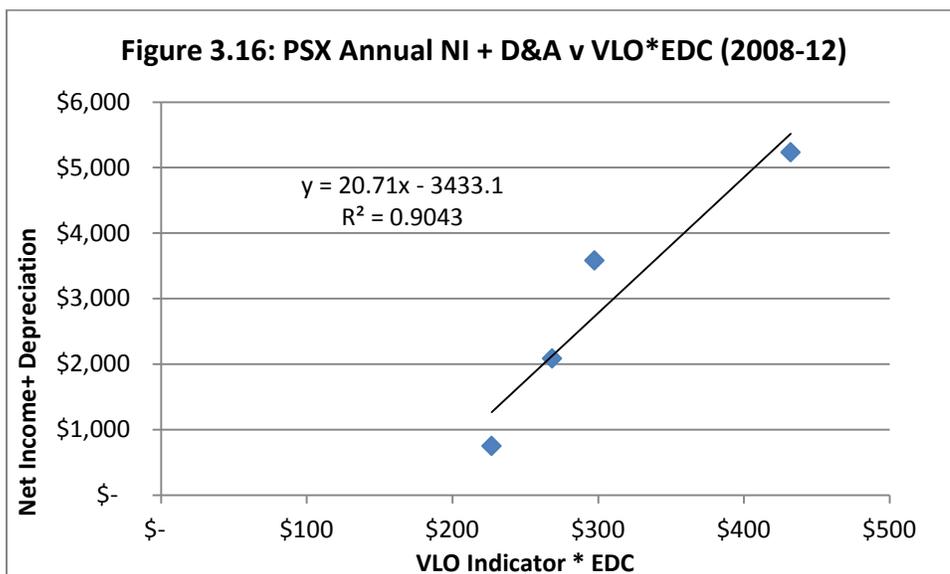
Value Creation by Independent Refiners

Phillips 66 strong shareholder returns have not been driven by high returns on assets, which have been lower than its rivals since, unlike HFC and MPC, its refineries have not been acquired at discounted prices (see Figure 3.4).

PSX has been steadily increasing its quarterly dividend payments but has opted to deploy more of its free cash flow to repurchase stock (Figure 3.15). Our analysis suggests that investors prefer dividends over stock repurchases.



PSX capacity is spread among all regions of the USA as well as in Asia and Europe. Nevertheless, their cash generation can be related to the sum product of EDC and available crack spread margin in each region (Figure 3.16), including Europe in the Eastern region and Malaysia in the Western region.



Value Creation by Independent Refiners

Using the methodology and assumptions described in Section 2.2 of this report, the intrinsic value of PSX refineries is \$17.4 Billion, with its interest in CP Chem adding \$5.0 Billion at prevailing chemicals companies' multiples and the midstream businesses adding a further \$2.9 Billion for a total corporate intrinsic value of \$25.3 Billion. MPC's end October 2013 enterprise value was \$33.7 Billion representing a 33% premium over calculated intrinsic value, which is not explained by high dividend payments (see Figure 2.8).

Investors appear to have bought into the company's strategy of reinvesting refinery cash flow into growth opportunities in its Chemicals business stemming from low U.S. natural gas and gas liquids prices and in its Midstream businesses deriving from the need to provide infrastructure to process and transport new production of natural gas, gas liquids and crude oil to refining and chemicals processing centers. Essentially, the company appears to have successfully persuaded the market to revalue its refining cash flow as an enabler of profitable chemicals and midstream growth, as well as a source of dividend payments and stock repurchases.

3.4 Tesoro

Tesoro Corporation was founded in 1968 with operations primarily in petroleum exploration and production. Tesoro began operating its first refinery near Kenai, Alaska in 1969.

In 1998, Tesoro changed direction to focus on refining and acquired a refinery in Kapolei, Hawaii from BHP Billiton for \$225 million and then Shell's Anacortes refinery in Washington State for \$276.60 million. The company sold its domestic exploration and production business to EEX Corporation for \$215 million and Bolivia Petroleum Company to BG International Limited for \$100 million in 1999. In 2001, Tesoro acquired refineries in Mandan, North Dakota and Salt Lake City, Utah from BP for a combined \$677 million as well as a North Dakota carrier system.

In 2002, Tesoro acquired Golden Eagle refinery in the San Francisco Bay area city of Martinez, California for \$945 million from Valero, which had purchased the adjacent Benecia refinery from ExxonMobil. Tesoro followed by divesting its Northern Great Plains Products System to Kaneb Pipe Line Partners L.P. for \$100 million.

In 2007 Tesoro acquired its Wilmington, California refinery and 250 southern California Shell-branded retail site from Equilon Enterprises LLC for \$1,547 million and in 2011 bought wholesale supply contracts for 300 convenience stores from Shell. Tesoro followed in 2012 with the purchase of 49 fuel centers in California, Nevada, Oregon, Utah, Washington, Wyoming and Idaho from New Albertson's, Inc. for \$34 million.

In 2013 Tesoro purchased the Carson, California refinery and related logistics and marketing assets from ARCO, Atlantic Richfield Co., BP West Coast Products LLC, CH-Twenty, Inc., Energy Global Investments (USA), Inc., and Products Cogeneration Company for \$1,075 million. Tesoro sold Tesoro Hawaii, LLC and its Kapolei refinery to Hawaii Pacific Energy, LLC, a subsidiary of Par Petroleum Corporation, for \$115 million in 2013.

Value Creation by Independent Refiners

Tesoro Logistics, a master limited partnership (NYSE: TLLP), was formed in 2011 to own, operate, develop and acquire crude oil and refined products logistics assets. In 2013, Tesoro Logistics acquired terminal assets from Northwest Terminalling Company for \$85 million and Northwest Products Pipeline System from Chevron Pipe Line Company for \$270 million.

Tesoro is headquartered in San Antonio, Texas and at the end of 2012 operated seven refineries⁴ in the Western United States (PADD 2, 4 and 5) with a combined rated crude oil capacity of approximately 845,000 barrels per day (Table 3.4).

Table 3.4: Tesoro Refineries (end 2012)

Unit Capacity (BPCD)	NCF	Carson	Golden Eagle	Anacortes	Wilmington	Kenai	Salt Lake	Mandan
Crude Distillation	1	264,500	161,000	113,300	100,000	72,000	60,000	58,000
Vacuum Distillation	1	140,000	144,000	47,200	62,000	19,000		
Coking	5.5	70,500	42,000		40,000			
Catalytic Cracking	6	102,000	66,500	44,800	36,000		23,000	25,700
Catalytic Reforming	5	52,000	42,000	26,500	32,500	12,000	12,000	11,500
Cat. Hydrocracking	6	45,000	32,000		32,000	12,500		
Cat. Hydrotreating								
NHT	1.7	46,000	23,000	36,000	35,750	12,500	12,000	12,000
DHT	2	24,000	32,000	18,500			11,000	
KHT	2	20,000			15,000			
GOHT	4	95,000	62,000	7,100	38,000			
GDU	4		27,000					
ARDS	7							
Alkylation	11	15,500	14,000	11,000	12,000		6,000	4,200
Polymerization	9							1,100
Aromatics	20							
Lubricants	58							
Isomerization	15	31,300		3,400	8,000	4,000		4,800
Cumene	15							
Coke (ST/D)		1,029						
Sulfur (LT/D)		140	140	48	265	19	15	15
Asphalt	1			1,000		1,000		
EDC & NCI								
EDC (Kbcd)		3120.5	1950.1	861.4	1447.3	308.25	366.4	418.2
NCI (Calculated)		11.8	12.1	7.6	14.5	4.28	6.1	7.2

⁴ Now six refineries as Kenai refinery was sold in 2013.

Value Creation by Independent Refiners

Tesoro's retail-marketing system includes over 2,200 branded retail gas stations, of which more than 595 are company-operated under the Tesoro, Shell, ARCO, and USA Gasoline brands.

Tesoro's commercial marketing system includes sales of jet and marine fuels to the marine and aviation industries that serve trans-Pacific and trans-polar transportation routes, linking Asia, North America and Europe. Tesoro is also a major producer of distillates in the Western United States, and also markets wholesale motor fuels to unbranded dealers. Tesoro's supply and distribution operations include bulk terminals that serve commercial customers in the Pacific market. They are located in Anchorage, Alaska; Stockton, California; Port Angeles, Washington; Vancouver, Washington; Boise, Idaho, Burley, Idaho; and Salt Lake City, Utah.

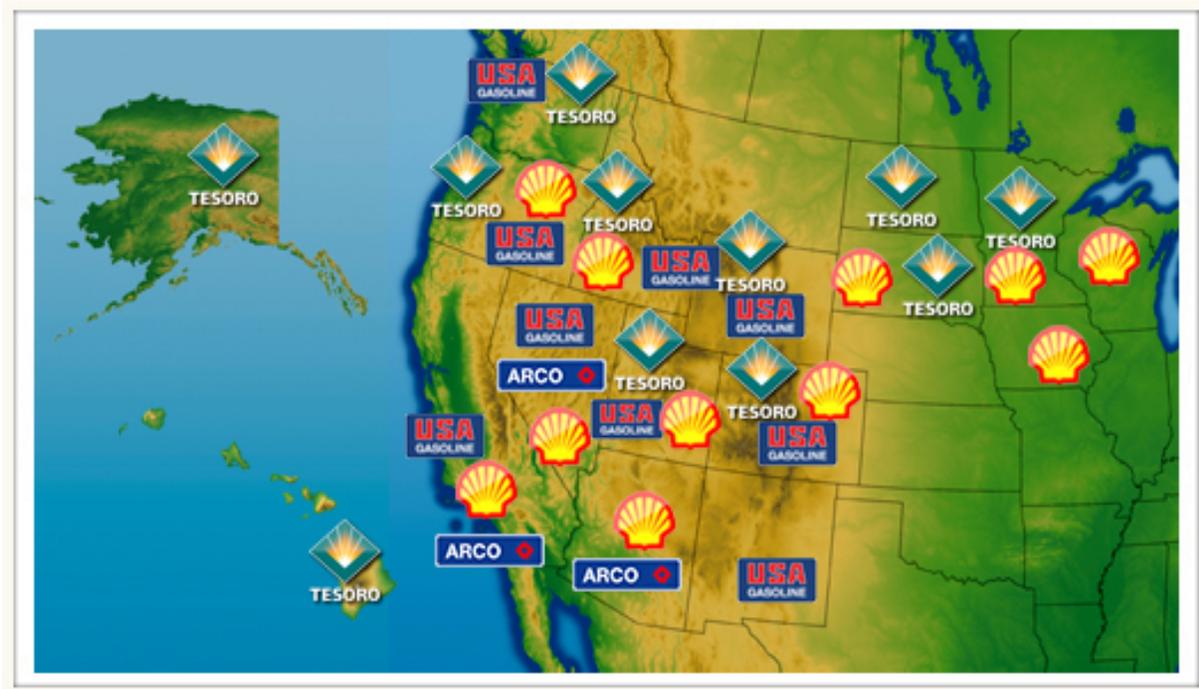
Tesoro Logistics LP (TLLP) operates in the United States and acquires, owns, operates and develops crude oil and refined products logistics assets. Tesoro Logistics LP is a MLP of Tesoro Corporation and is a publicly traded limited partnership. Tesoro's midstream operation owns a crude oil gathering system, refined products terminals, crude oil and refined products storage facilities, and short-haul pipelines. It provides Martinez, Wilmington, Washington, Alaska, North Dakota and Utah refineries with various pipeline transportation, trucking, terminal distribution and storage services under long-term, fee-based commercial agreements. Each of these agreements, with the exception of the storage and transportation services agreement, contains minimum volume commitments.

Tesoro's bulk terminals serve a variety of commercial, shipping and industrial customers throughout the Western United States. Tesoro owns or operates 14 bulk product terminals in Alaska, Hawaii, California, Washington, Idaho and Utah. It also distributes products through third-party terminals in the Western and Midwestern U.S. These products are supplied by Tesoro's refineries and through purchases and exchange arrangements with other refining and marketing companies.

Tesoro's retail-marketing system includes over 2,200 retail stations under the Tesoro, Shell, ARCO, and USA Gasoline(TM) brands, of which 595 are company operated (Figure 3.17). Tesoro sells gasoline and diesel fuel in the western United States through these stations and third-party branded dealers and distributors. The retail network provides a committed outlet for a portion of the transportation fuels produced by Tesoro's refineries. Many of the company-operated retail stations include convenience stores that sell a wide variety of merchandise items.

Value Creation by Independent Refiners

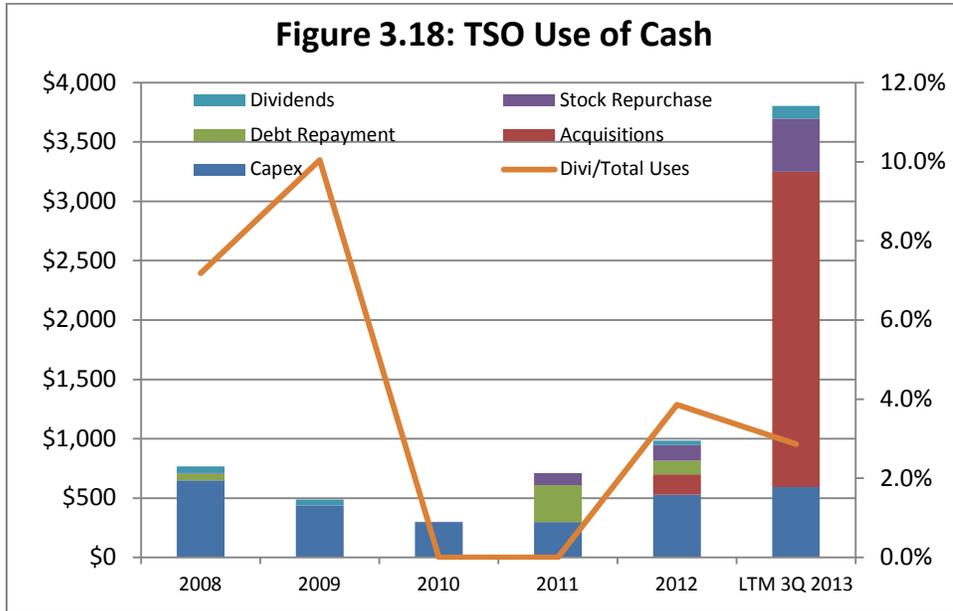
Figure 3.17: Tesoro Retail Marketing System



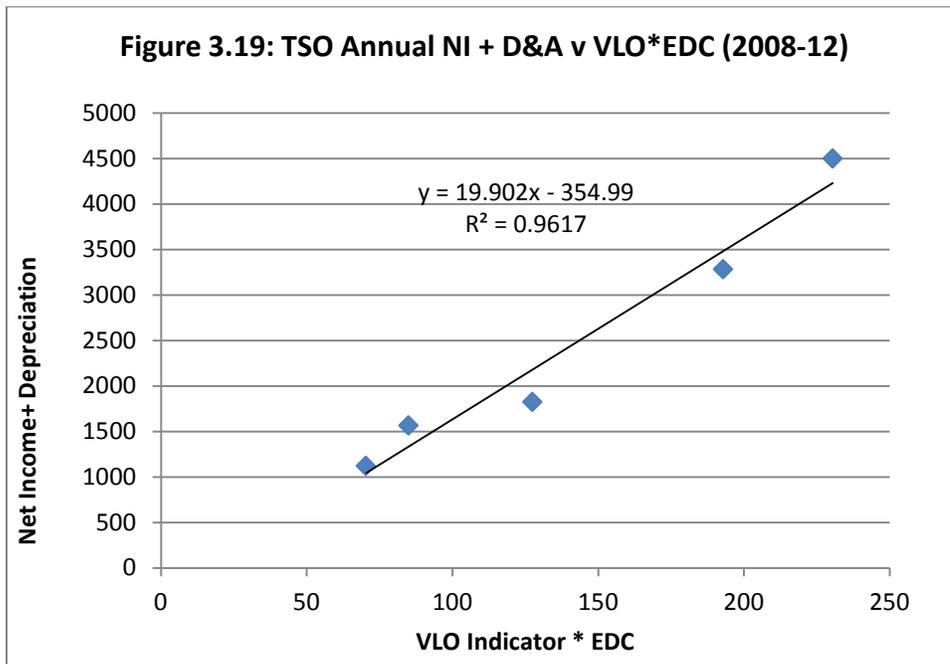
Tesoro returns to shareholders tracked those of Valero from 2002 through 2010 (Figure 3.3), but have improved since Greg Goff was appointed CEO in May 2010. From 2011, Tesoro has provided the highest returns to shareholders among the independent refiners studied (Figures 3.9 and 3.14).

Tesoro's return on assets has been above that delivered by Valero and Phillips 66, but below that of HollyFrontier and Marathon (Figure 3.18) and its dividend yield has been lowest among its rivals.

Value Creation by Independent Refiners



TSO capacity is heavily weighted to the West Coast of the USA. As for the rival companies, their cash generation can be related to the sum product of EDC and available crack spread margin in each region (Figure 3.19).



Using the methodology and assumptions described in Section 2.2 of this report, the intrinsic value of PSX refineries is \$14.3 Billion, with its interest in its TLLP midstream MLP adding a further \$1.3 Billion for a total corporate intrinsic value of \$15.6 Billion. MPC's end October 2013 enterprise value was \$9.8 Billion representing a 37% discount from calculated intrinsic value, which may be explained in part by low dividend payments (see Figure 2.8).

Value Creation by Independent Refiners

Its strong shareholder value performance in recent times has most likely stemmed from the depressed value of the company following an explosion in its Anacortes refinery in 2010 which killed seven people. The rise in value since 2011 has restored some of the lost value and may reflect investors' confidence in the new CEO, who has taken decisive action:

- Tesoro Logistics was formed in 2011 and has become a growth engine for TSO, which has acquired midstream assets from third parties as well as contributing its already owned pipelines and terminals. By dropping its midstream assets into the MLP, TSO raises the valuation of the assets due to the higher multiple accorded to MLPs.
- The acquisition of BP's Carson refinery in 2013 at an attractive price further strengthens TSO's position on the West Coast, opens up opportunities for synergies with its Wilmington refinery and provides midstream assets to drop into Tesoro Logistics.
- The BP acquisition also contributes a network of retail gasoline outlets. TSO has also acquired access to a further 350 stations from Shell and New Albertson's improving its "security of demand".

There would appear to be further upside for investors if TSO successfully integrates the Carson refinery, continues to grow TLLP and improved cash flow allows the company to increase dividends.

3.5 Valero

Valero was founded in 1980 as a spinoff from Coastal States Gas Company and entered refining in 1981 when it purchased a small Corpus Christi refinery. The company invested significant capital into Corpus Christi refinery over the next several years and struggled under capital constraints for the following decade.

In 1987 Valero spun off its natural gas operations into Valero Natural Gas Partners LP in which it held a 49% stake and in 1994 it purchased the 51% of Valero Natural Gas Partners that it didn't own. In 1997 Valero sold Valero Natural Gas Partners to PG&E to focus on its refining business and made its first large acquisition by buying Basis Petroleum and its three Gulf Coast refineries from Phibro. The two refineries acquired in this transaction were at Houston and Texas City, Texas and led to a sequence of further acquisitions as Valero grew to become the largest independent refiner, focusing mainly on coastal refineries with the capability to process heavy crude oils and feedstocks:

- In 1998 Valero bought the Paulsboro, NJ refinery from Mobil Corporation.
- In 2000 Valero bought the ExxonMobil Benecia, CA refinery, along with 350 gas stations.
- In 2001 Valero completed the purchase of Ultramar Diamond Shamrock for 6.1 Billion dollars. Refineries acquired in this purchase were Ardmore, OK, Wilmington, CA, Three Rivers, TX, McKee, TX and Quebec City, Canada. To gain regulatory approval for the UDS acquisition, Valero had to sell UDS's Golden Eagle refinery located in the San Francisco area along with 70 northern California service stations. These assets were sold to Tesoro Petroleum in 2002 for \$945 million.

Value Creation by Independent Refiners

- In 2003 Valero acquired a refinery in St Charles, LA from Orion Refining.
- In 2004 Valero acquired El Paso's Aruba refinery, which is currently mothballed.
- In 2005 Valero bought Premcor for 6.9 Billion dollars. Refineries acquired in this purchase were Port Arthur, TX, Memphis, TN, Lima, OH, Hartford, IL and Delaware City, DE. Valero sold the Lima, OH facility in 2007 to Husky and the Delaware City refinery in 2010 to PBF Energy. The Hartford, IL facility is now a terminal.
- In 2011 Valero purchased the Meraux LA refinery from Murphy Oil for 585 Million; they also gained a 20 percent interest in the Collins Product Pipeline and 3.2 percent interest in the Louisiana offshore oil port (LOOP).
- Also in 2011 Valero purchased a refinery in Pembroke, Wales from Chevron along with pipelines, terminals and 1000 Texaco branded gas stations.

Valero now owns seven refineries on the Gulf Coast, three in the central region, two in the West and two in the East (Quebec City, Canada and Pembroke, UK) and is second only to Phillips 66 with over 4 Million Barrels/day overall refining capacity (Table 3.5).

Table 3.5: Valero Regional Refining Capacity

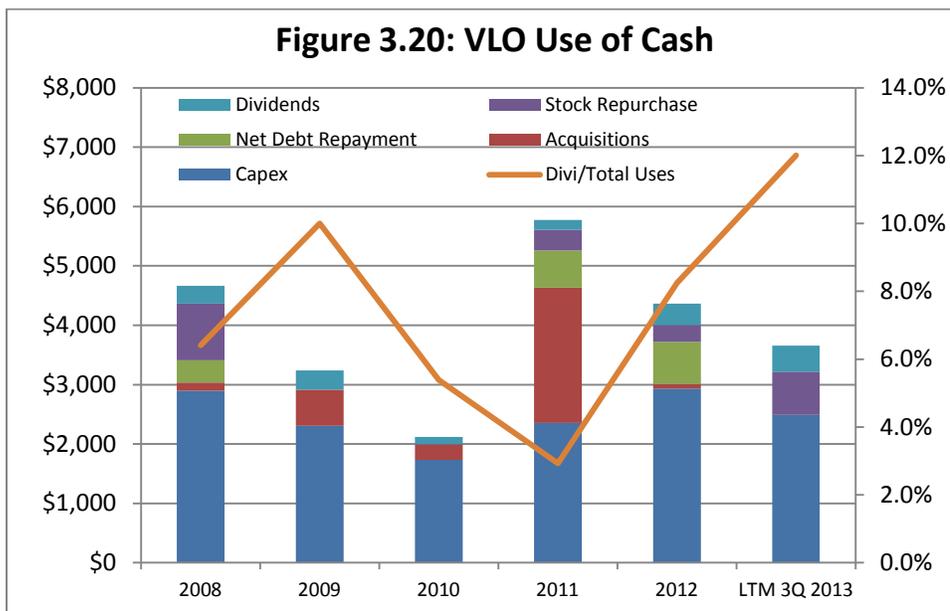
Unit Capacity (BPCD)	NCF	Gulf Coast	Central	West	East	Total
Crude Distillation	1	1,388,000	973,000	1,023,000	978,000	4,362,000
Vacuum Distillation	1	742,500	523,500	463,500	416,500	2,146,000
Coking	5.5	285,440	153,500	153,500	136,500	728,940
Catalytic Cracking	6	483,500	408,500	440,500	402,500	1,735,000
Catalytic Reforming	5	215,600	160,600	164,600	162,600	703,400
Catalytic Hydrocracking	6	288,300	186,300	174,800	152,300	801,700
Catalytic Hydrotreating		0	0	0	0	0
NHT (Naptha)	1.7	240,000	190,000	202,000	181,000	813,000
DHT (diesel)	2	375,000	271,000	264,000	254,000	1,164,000
KHT (jet)	2	133,400	100,400	84,000	73,000	390,800
GOHT (GASOIL)	4	145,000	83,000	69,000	41,000	338,000
GDU (gasoline)	4	295,800	211,800	250,800	230,400	988,800
ARDS (atmospheric)	7	80,500	80,500	80,500	6,500	248,000
Alkylation	11	100,500	81,500	86,200	74,700	342,900
Polymerization	9	0	0	0	0	0
Aromatics	20	26,300	26,300	55,300	39,800	147,700
Lubricants	58	1,900	1,900	1,900	1,900	7,600
Isomerization	15	38,500	38,500	38,500	59,500	175,000
Cumene	15	0	0	0	0	0
Coke (ST/D)		0	0	0	0	0
Sulfur (LT/D)		1,490	0	0	0	1,490
Asphalt	1	121,500	121,500	99,500	88,000	430,500
EDC (Kbcd)		15,601	11,753	12,569	11,088	51,011
NCI (Calculated)		11.24	12.08	12.29	11.34	11.69

Value Creation by Independent Refiners

In addition to its refineries, Valero operates ten ethanol plants in the Midwest with a total capacity of approximately 80,000 Barrels/day.

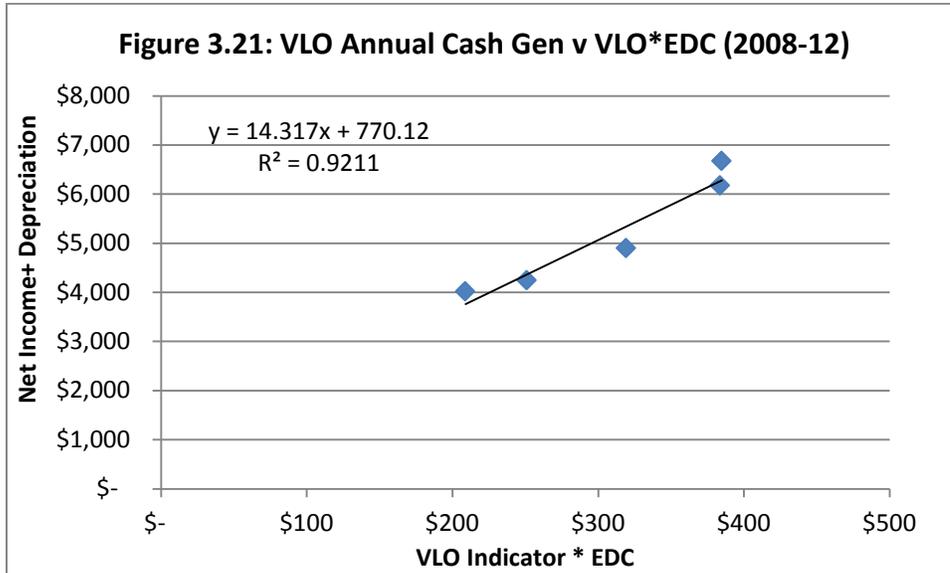
Valero created a midstream MLP in 2003 but spun it off in 2007 as NuStar Energy (NYSE: NS). Valero has since invested in other midstream assets and folded these into a new MLP, Valero Energy Partners (NYSE: VLP) in December 2013. In May 2013 Valero had previously created another MLP, CST Brands (NYSE: CST) to hold its gasoline retail sales assets. CST has nearly 1,900 locations in the Southwestern United States and Eastern Canada. Valero's branded presence covers the entire U.S. Lower 48 except for ND, MT and UT.

Valero, like Phillips 66 delivers low returns on assets, reflecting the high prices it paid for acquisitions (see Figure 3.4). The company delivers a moderate share of its cash as dividend payments (Figure 3.20) and sustains the highest capital budget of the rivals studied.



Valero capacity is heavily weighted to the Gulf Coast of the USA. As for the rival companies, their cash generation can be related to the sum product of EDC and available crack spread margin in each region (Figure 3.21).

Value Creation by Independent Refiners



Using the methodology and assumptions described in Section 2.2 of this report, the intrinsic value of VLO refineries is \$20.7 Billion. VLO's end October 2013 enterprise value was \$20.9 Billion representing a 1% premium over calculated intrinsic value (see Figure 2.8). VLO appears to be fairly priced, though the new midstream MLP may provide a small boost to value.

4. Conclusions

We draw five tentative strategic conclusions:

- The primary driver of refiner shareholder value is Intrinsic Value – the net present value of future cash flows discounted at the corporate cost of capital. Consequently refiners need to maximize free cash flow, and pay attention to stability of cash flow to lower their beta value relative to the S&P. Both these attributes require safe, reliable operations with high capacity utilization
- Dividend yield is important. Dividend yield explained why HollyFrontier (44% of cash generation returned to shareholders as dividends) enjoyed a premium of enterprise value over intrinsic value while Tesoro's (3% of cash generation returned to shareholders as dividends) enterprise value was lower than its intrinsic value. Investors favor distribution of cash to shareholders over reinvestment in refinery projects.
- Inland refineries are favored over Gulf Coast refineries at the present time. However, low feedstock and energy costs are allowing coastal refineries to compete successfully with foreign refineries in export markets for refined products. A key future success factor will be to lock in ratable demand in export markets.
- Midstream MLPs have been used by all companies to access a pool of capital seeking tax advantaged yields such that their midstream cash flows are being discounted at a lower

Value Creation by Independent Refiners

(~6% WACC) cost of capital than their refining assets (~10% WACC). By remaining as General Partner, refiners have maintained control over midstream operations.

- Phillips 66 has the highest market premium of enterprise value over intrinsic value, validating its strategy of reinvesting refinery cash flow into growth opportunities in petrochemicals and in its new Midstream MLP (on top of DCP). Essentially, Phillips 66 refinery cash flow is being valued at the higher multiples of the chemicals and midstream sectors. The implication is that refiner cash flow is most valuable when invested outside the refining business into sectors with more profitable growth opportunities.

The conclusions are, of course, a product of the current context, in which investors are challenged by very low interest rates and there is natural skepticism on the value of further investment in the North American refining sector. Lower oil prices could stimulate demand for transportation fuels and open up reinvestment opportunities while reducing domestic crude oil production and midstream growth; higher interest rates could reshape the risk/ return curve for dividend yields. However, refiner leaders should probably build strategy on the assumption that the current conditions will persist, and look for commercial innovation, investment in related growth businesses and high dividend payments rather than capital projects to increase profitability and provide value to shareholders.