

THE INCIDENCE OF AN OIL GLUT:

WHO BENEFITS FROM CHEAP CRUDE OIL IN THE
MIDWEST?

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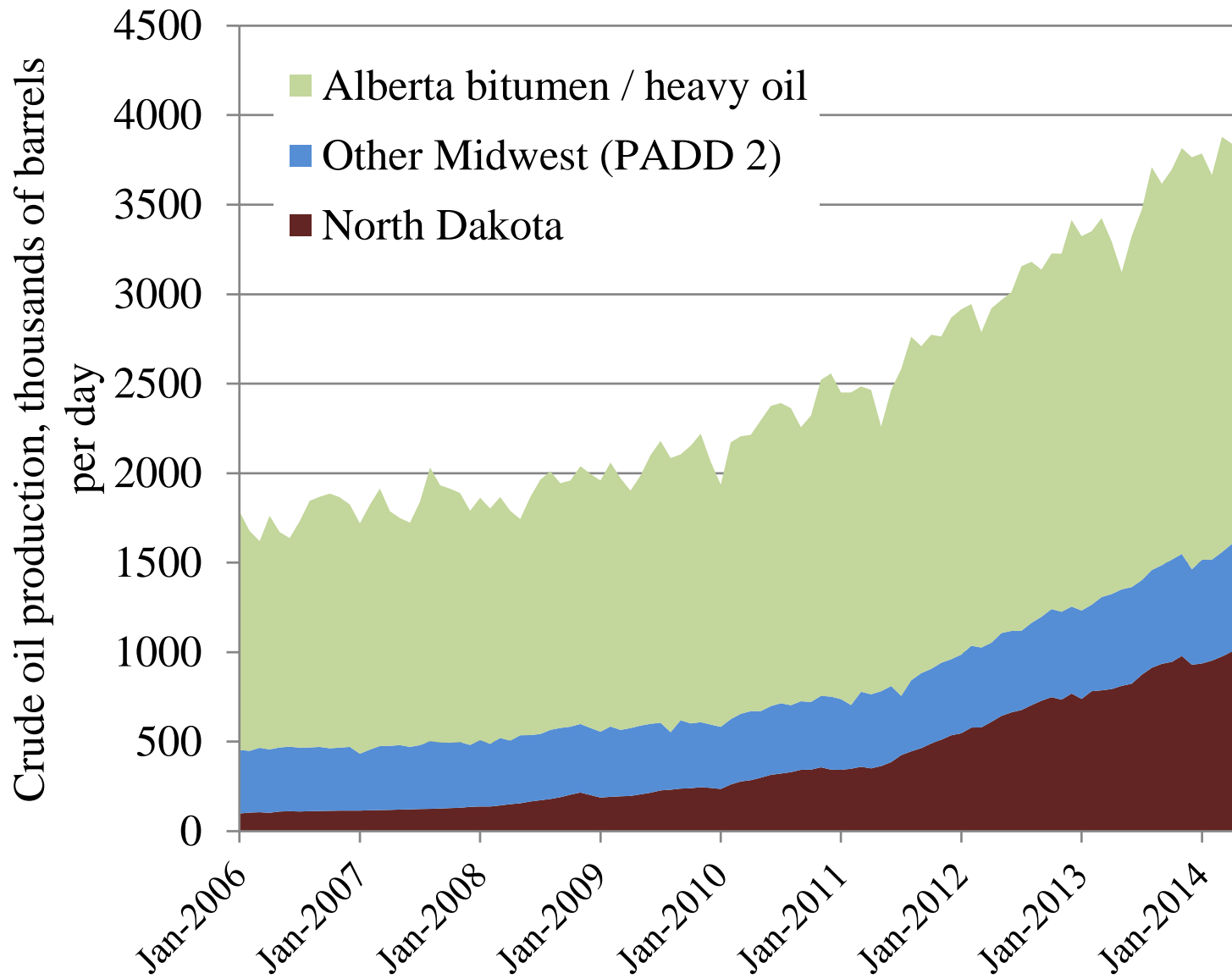
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The Midwest oil glut has changed old views about integration of world oil markets

- Common statement, pre-2011: “*It’s a world oil market*”
- Increased oil production in Canadian tar sands and North Dakota Bakken field changed the Midwest from crude importing to exporting

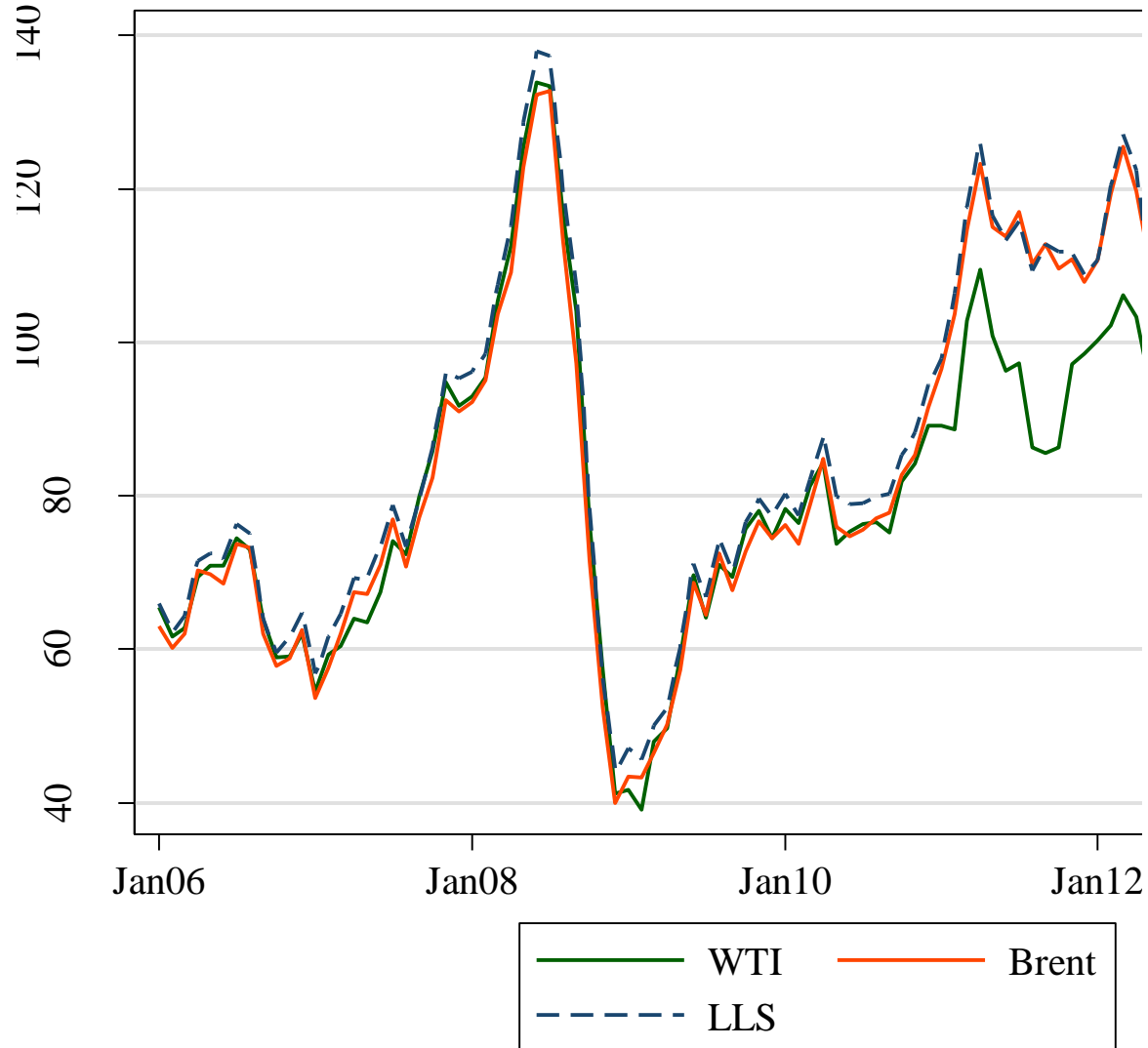
Midwest and Canadian tar sands oil production



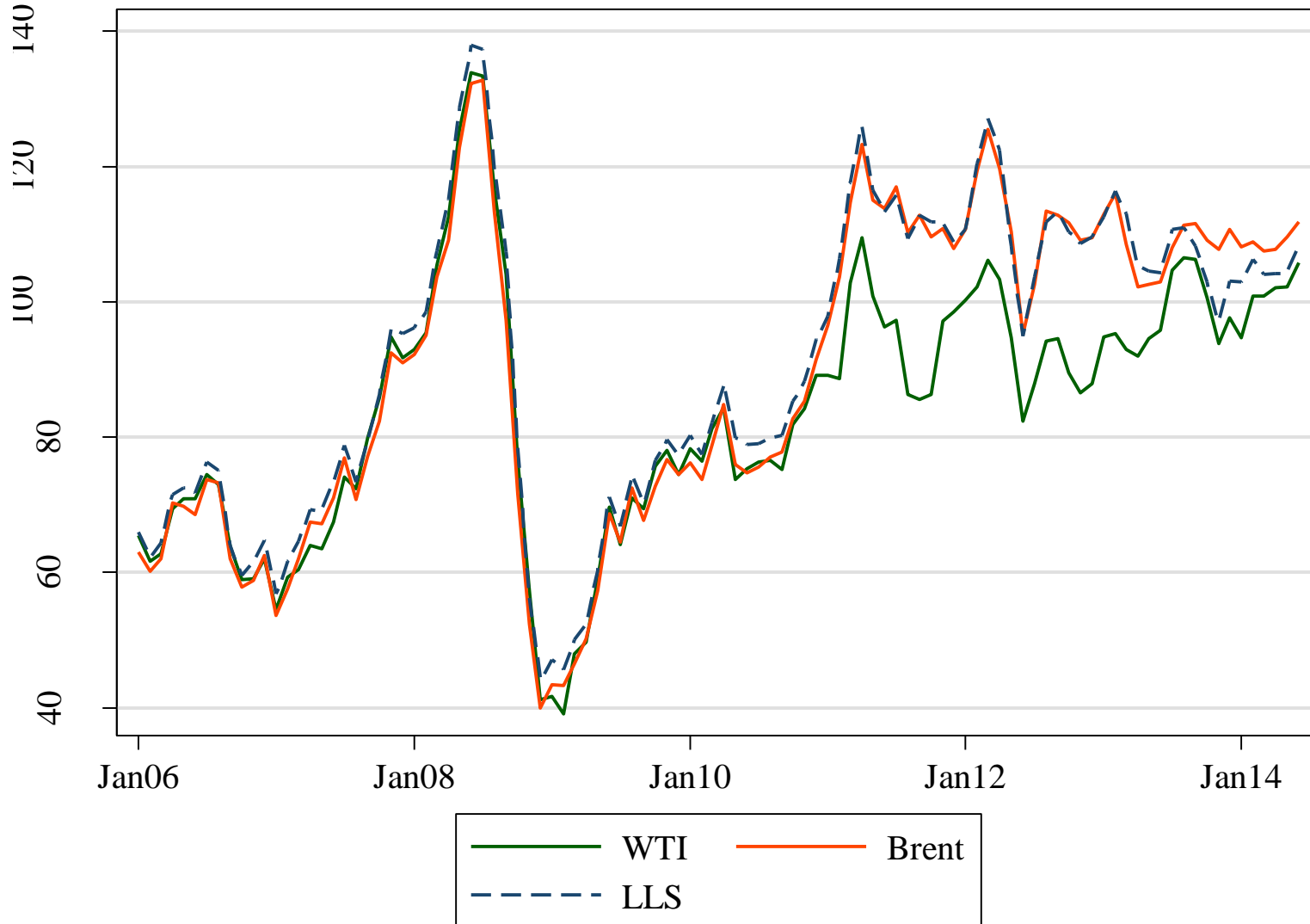
The Midwest oil glut has changed old views about integration of world oil markets

- Common statement, pre-2011: *“It’s a world oil market”*
- Pipelines were configured to bring crude *TO* the Midwest.
 - Costly and time consuming to reverse them
- In 2011, ability to move crude out of the Midwest hit capacity constraints
 - Rail movement also appears to have been capacity constrained
- Result of Midwest crude export capacity constraint: large crude price differential between Midwest and rest of world (including U.S. Gulf Coast)

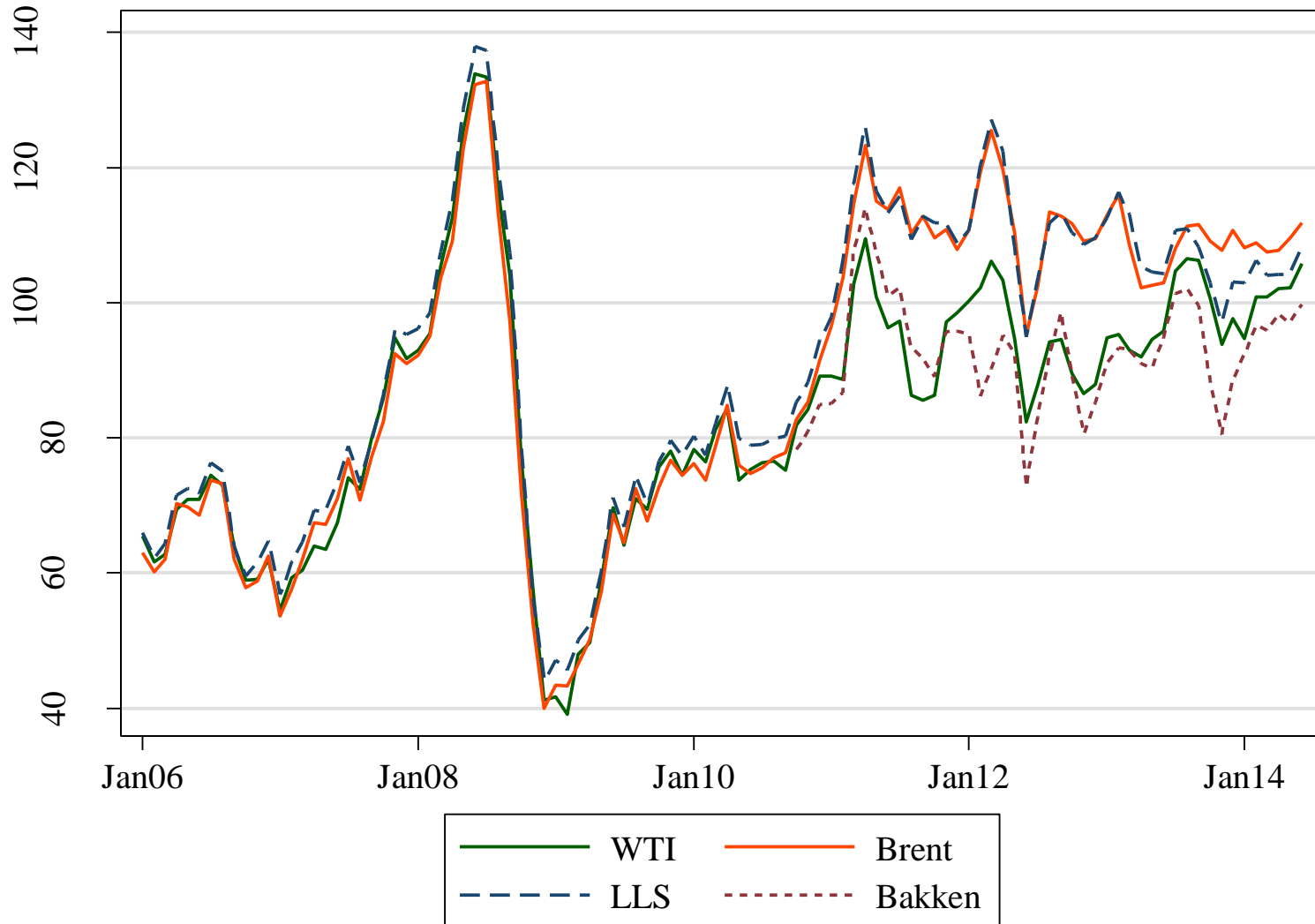
Brent, West TX Intermediate (WTI), and Louisiana Light Sweet (LLS) spot prices through 2011



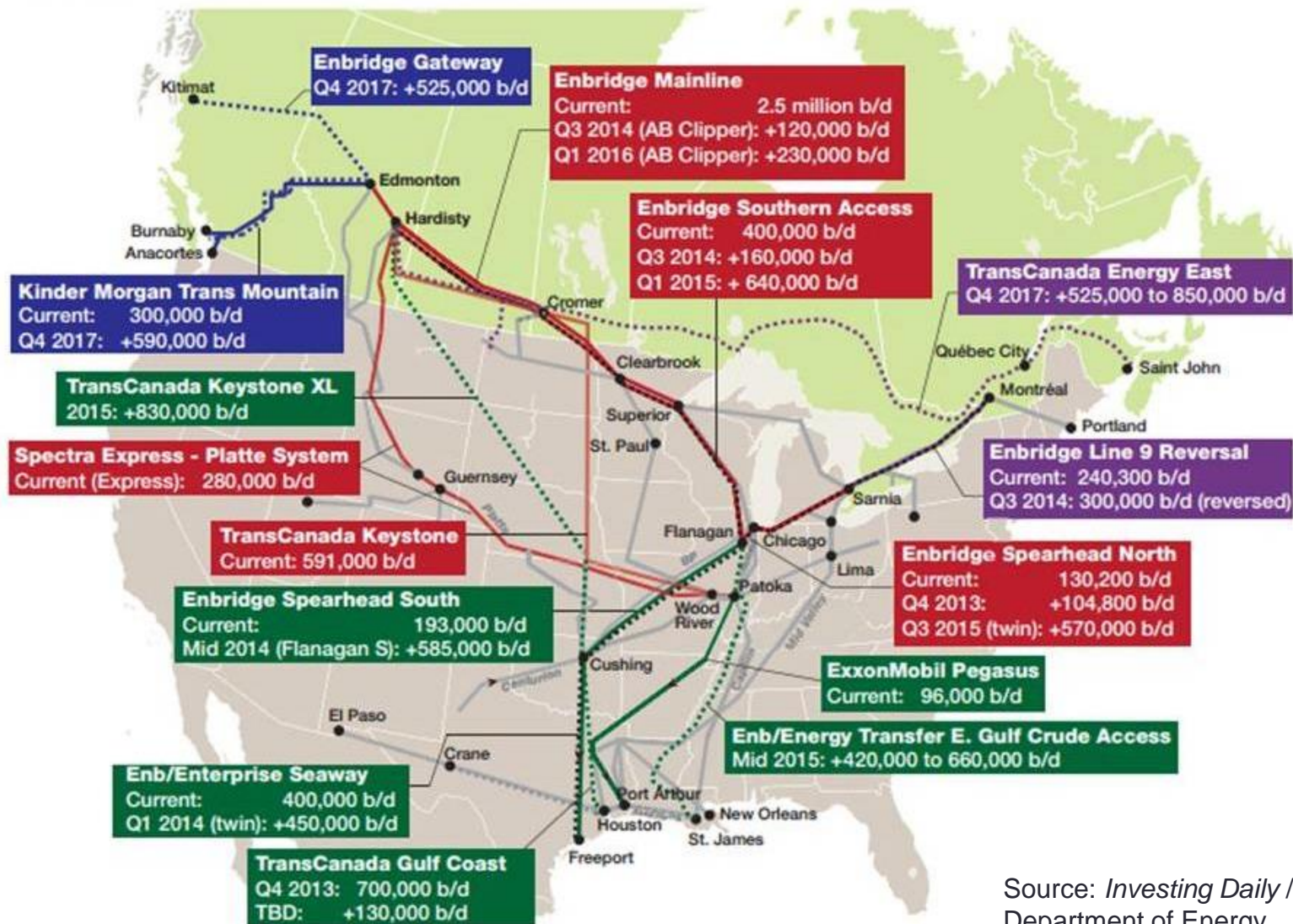
Brent, West TX Intermediate (WTI), and Louisiana Light Sweet (LLS) spot prices through mid-2014



Bakken crude sometimes trades at a discount to WTI



Many crude pipelines are proposed / under construction

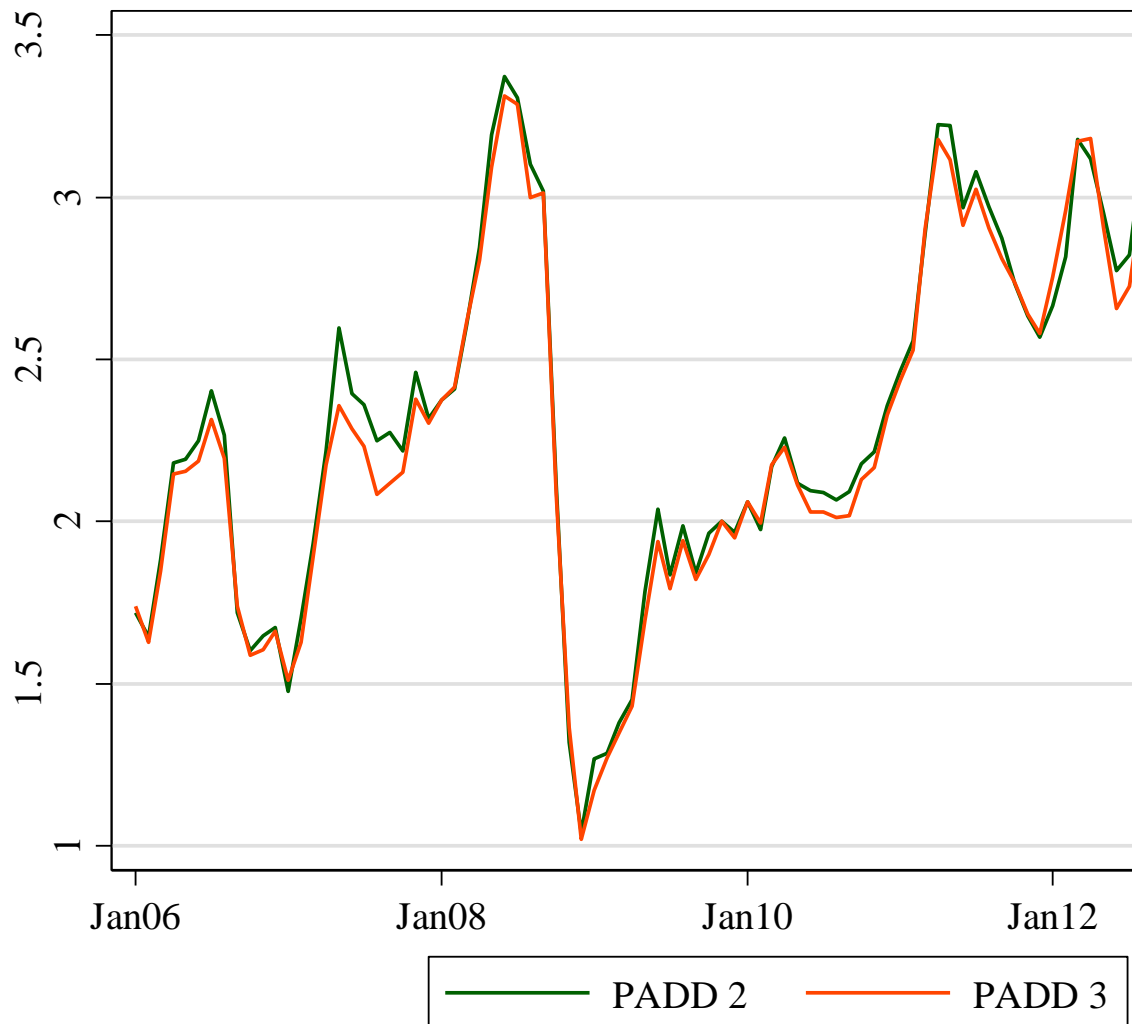


Source: *Investing Daily* / Alberta Department of Energy

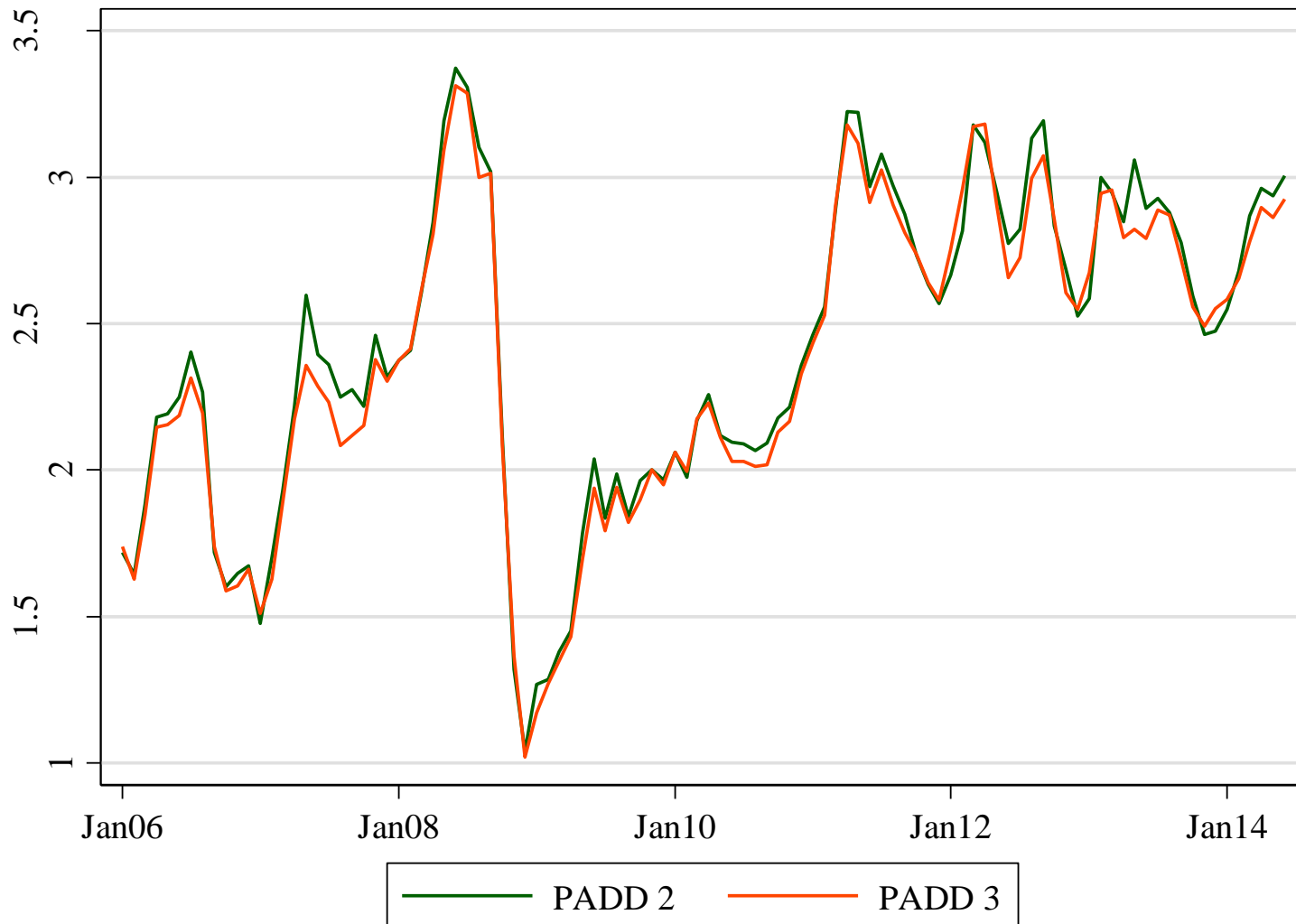
Who wins and who loses from the oil transportation constraint?

- Midwest and Canadian crude producers => losers
- Owners of rights on existing pipelines=> winners
- Rest of world oil producers => slight winners
- Rest of world oil consumers => slight losers
- Midwest refineries and Midwest consumers=> winners in aggregate, but how have the benefits have been shared?
- Relevance to fight over Keystone XL: some opponents have argued it would raise gas prices in the Midwest

Gasoline price data suggests little to no pass through of crude price differential



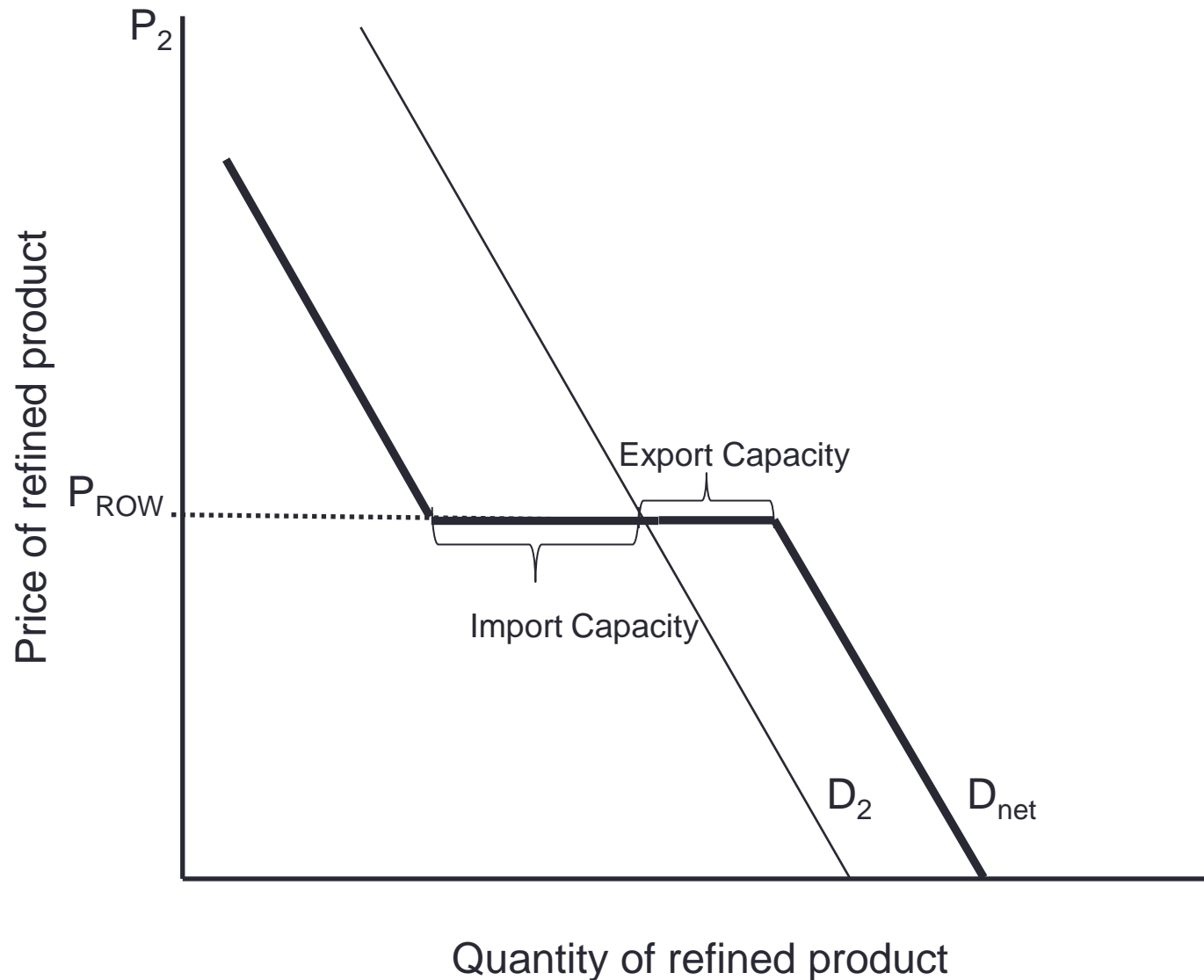
Gasoline price story unchanged if we include data through 2014



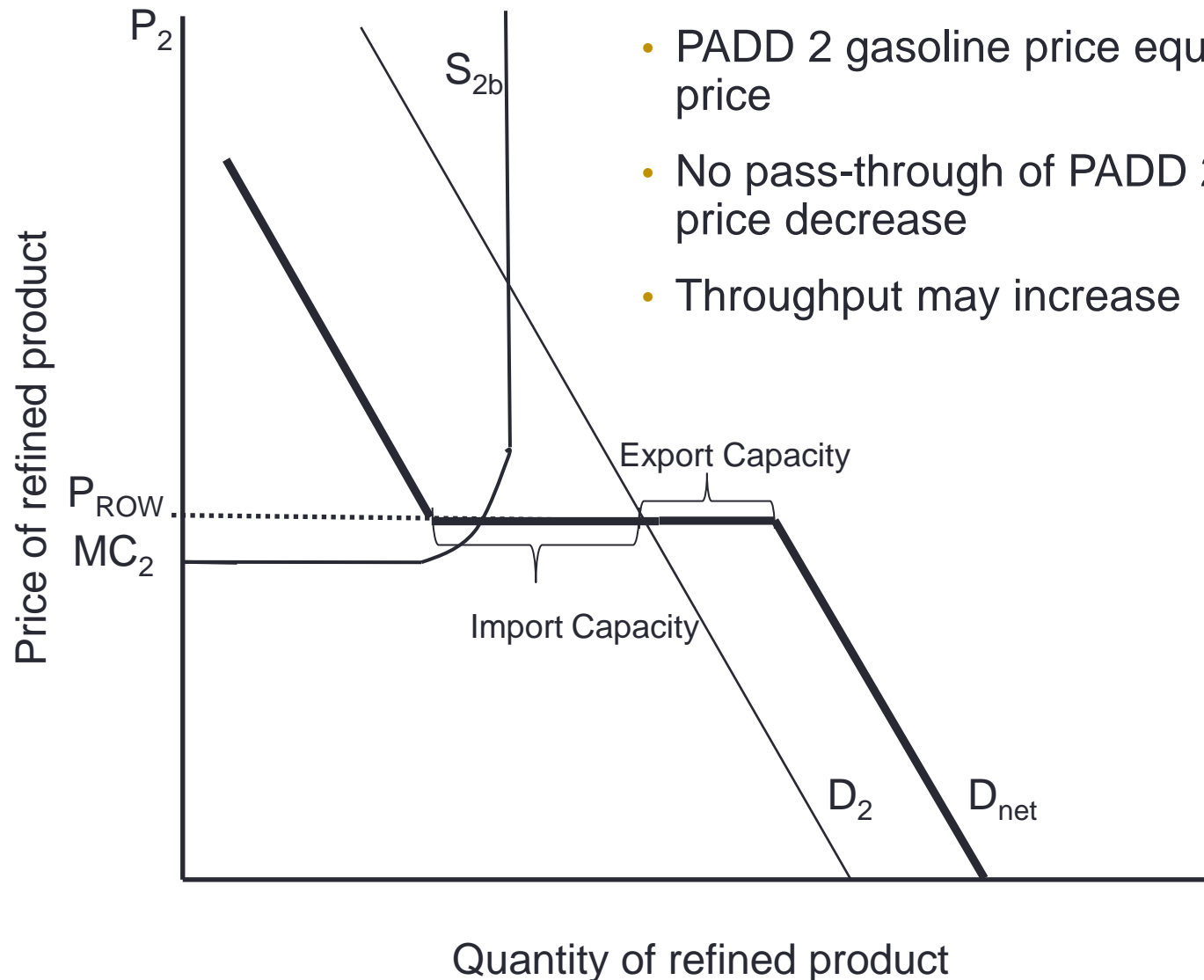
We build a simple model to illustrate potential outcomes for product markets

- Two regions: PADD 2 and ROW
- ROW is very large, so that PADD 2 shocks cannot affect ROW prices, even with unconstrained pipelines
- Competitive oil producers and refiners
- Transportation technology: constant marginal cost up to capacity constraint
- Refinery technology: constant marginal cost well below capacity constraint, transitioning to vertical at constraint

PADD 2 native demand is D_2 ; demand net of exports / imports is D_{net}



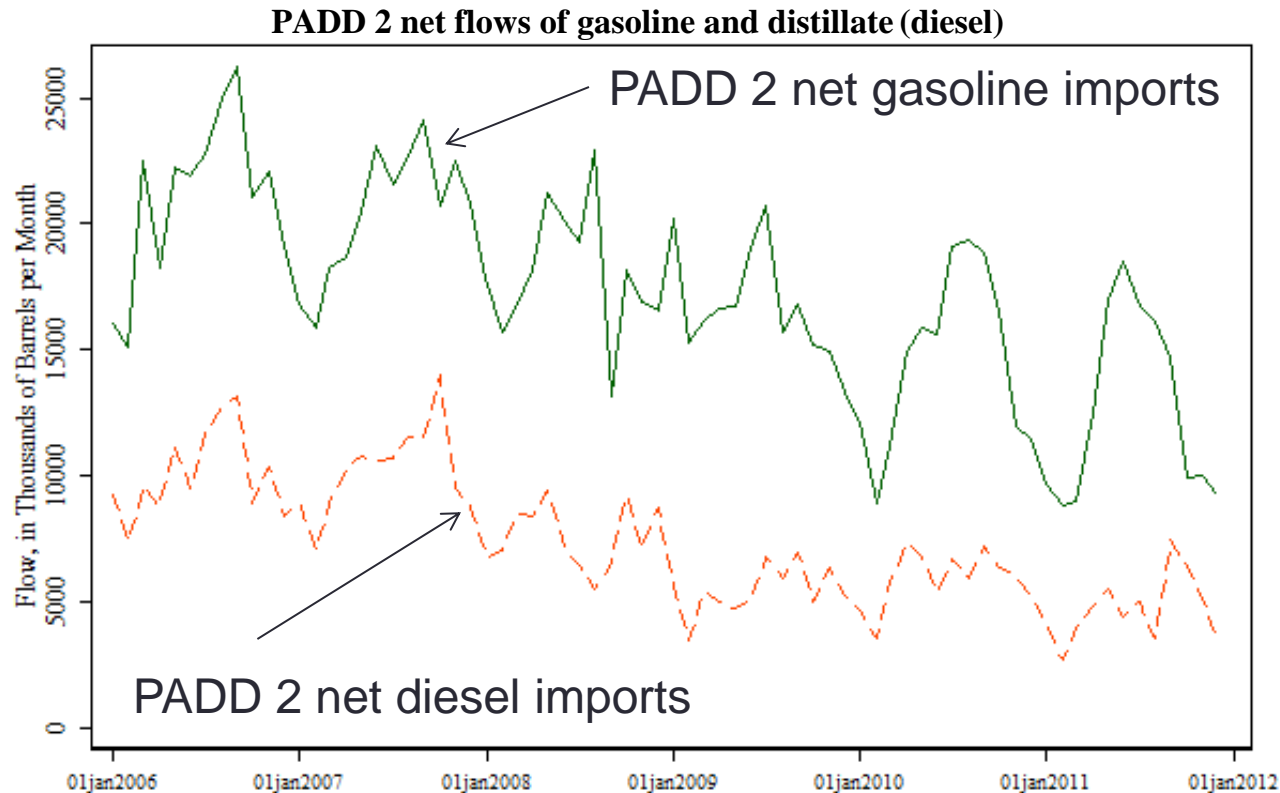
Our argument: Refining capacity such that PADD 2 is an unconstrained importer of gasoline



- PADD 2 gasoline price equals ROW price
- No pass-through of PADD 2 crude price decrease
- Throughput may increase

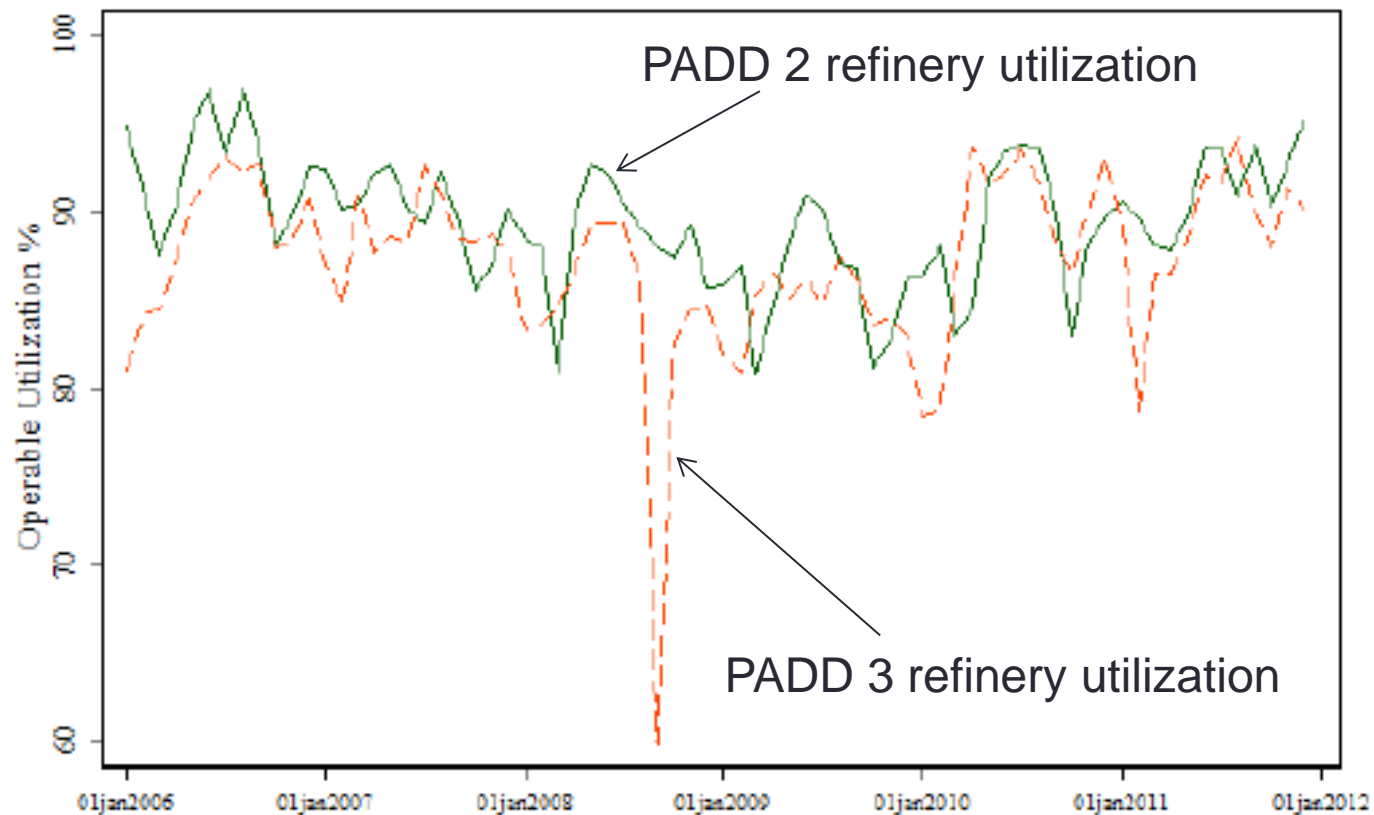
Why no pass-through? Arbitrage

- In fact, PADD 2 has been a **net importer** of refined product and is now a slightly smaller importer
- Marginal barrel of crude in PADD 2 is imported



Some evidence of an increase in refinery utilization

- Consistent with reduction in PADD 2 net imports



Conclusion: Simple micro wins the day

- Transport constraint has caused large price differential in crude oil
- But no transport constraint in refined product, so any price differential quickly arbitrated
- No implication about market power
- Strong implication about ending the Midwest crude glut
 - Won't drive up Midwest gasoline/diesel prices

Epilogue: pipeline / railroad expansion has shifted the constraint to the Gulf Coast

- Gulf Coast refineries benefit by exporting refined products
- Economics of relaxing crude oil export ban?
 - Midwest and Gulf Coast crude prices will rise, but this won't pass through to product markets
 - May see modest decrease in overall U.S. product prices (Brown *et al.* RFF report, 2014):
 - World crude price will decline slightly
 - Re-shuffling of crude grades will improve refinery efficiency

Regression confirms initial graph: no pass through

- Cross-Section: How do contemporaneous crude price differences between PADDs 2 and 3 drive refined product prices?
- Estimating equation: $G_{2t} - G_{3t} = \beta_0 + \beta_1(C_{2t} - C_{3t}) + \varepsilon_t$

	I Gasoline price differences		III Diesel price differences	
	PADD 2 minus PADD 3	Oklahoma minus Louisiana	PADD 2 minus PADD 3	Oklahoma minus Louisiana
Coefficient on covariate:				
WTI crude price minus LLS crude price	-0.003 (0.026)	-0.047 (0.041)	0.027 (0.026)	0.048 (0.057)
Constant	0.043 (0.010)	0.012 (0.017)	0.063 (0.011)	0.069 (0.026)
R ²	0.0001	0.012	0.009	0.011
N	72	72	72	72

Additional confirmation of no pass-through

- Time Series: Is the first-difference in gasoline prices in PADD 2 affected by the crude price differential between PADDs 2 and 3 after controlling for PADD 3 crude?
- Estimating Equation: $\Delta G_{2t} = \beta_0 + \beta_1 \Delta C_{3t} + \beta_2 \Delta(C_{2t} - C_{3t}) + \varepsilon_{2t}$

Coefficient on covariate:	I $\Delta(\text{Gasoline price})$	II $\Delta(\text{Diesel price})$
$\Delta(\text{LLS crude price})$	1.074 (0.106)	1.048 (0.058)
$\Delta(\text{WTI crude price minus LLS crude price})$	-0.178 (0.204)	0.180 (0.209)
R^2	0.714	0.820
N	1063	1065