Energy Prices and the Texas Economy

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Introduction

- Long history of oil and gas production in Texas
- Energy is important for Texas economy
- Importance of sector has varied over time
  - Employment share between 1.3 and 4.3
  - GDP share between 4.2 to 19 percent
- Region has greatly benefited from shale boom

Introduction

Our question of interest:

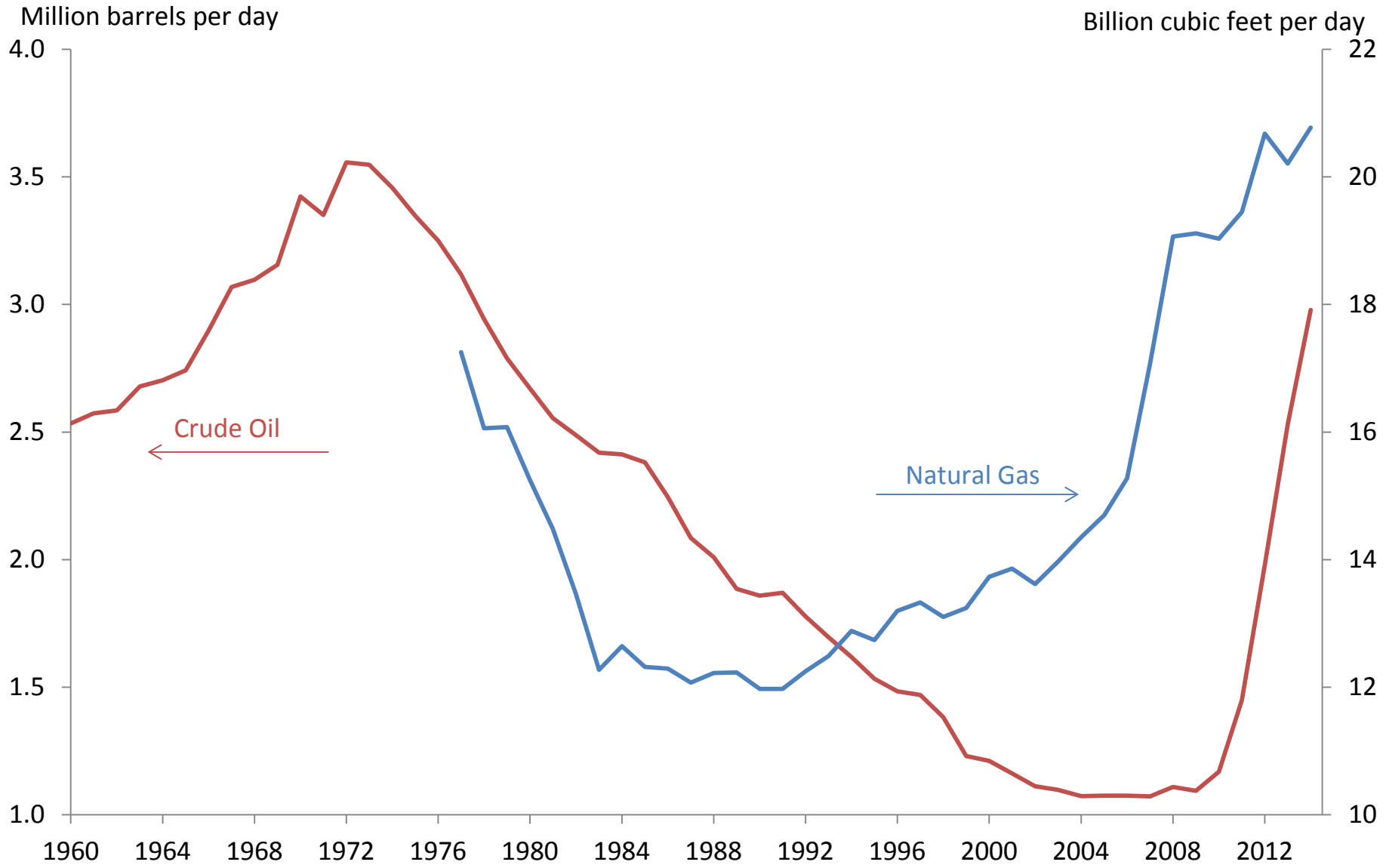
How do changes in oil and gas prices affect the Texas economy?

- Total effects could vary over time
- Price increases benefit oil and gas sector
- Price increases may hurt other sectors
- Impacts could vary across localities

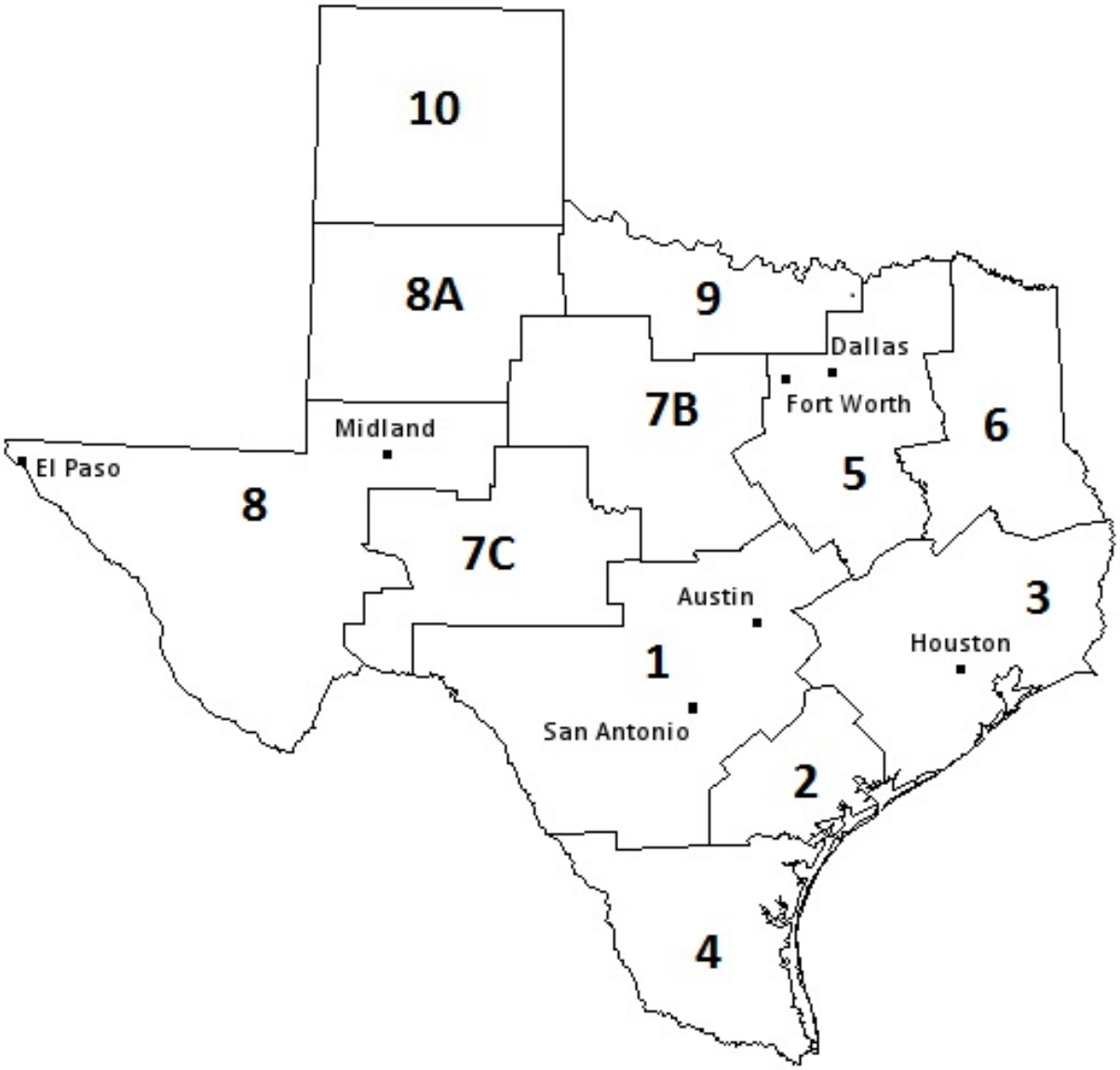
Roadmap

- Historical background
  - Production data
  - Prices
- Model and results
- Conclusions

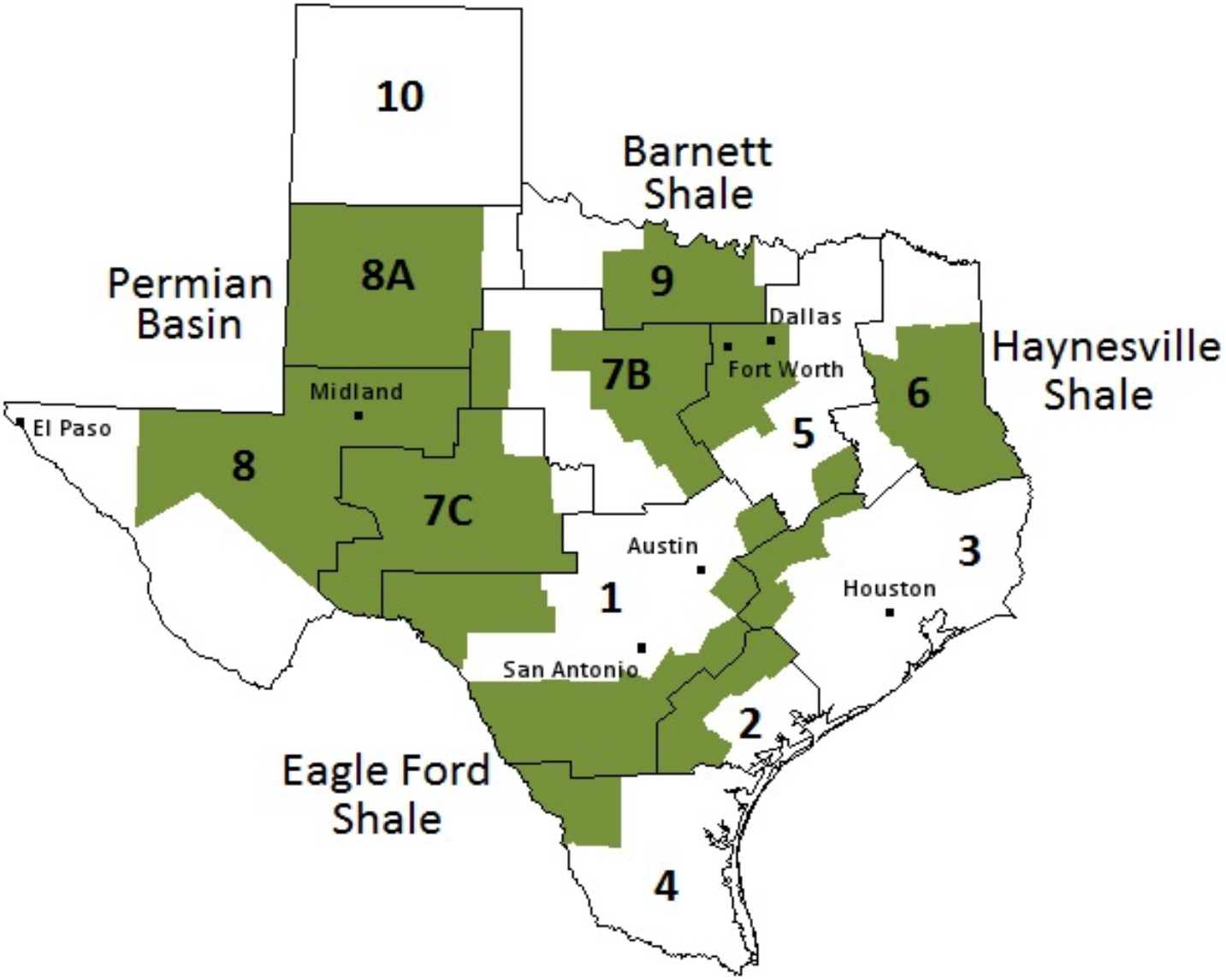
Historical look at Texas production



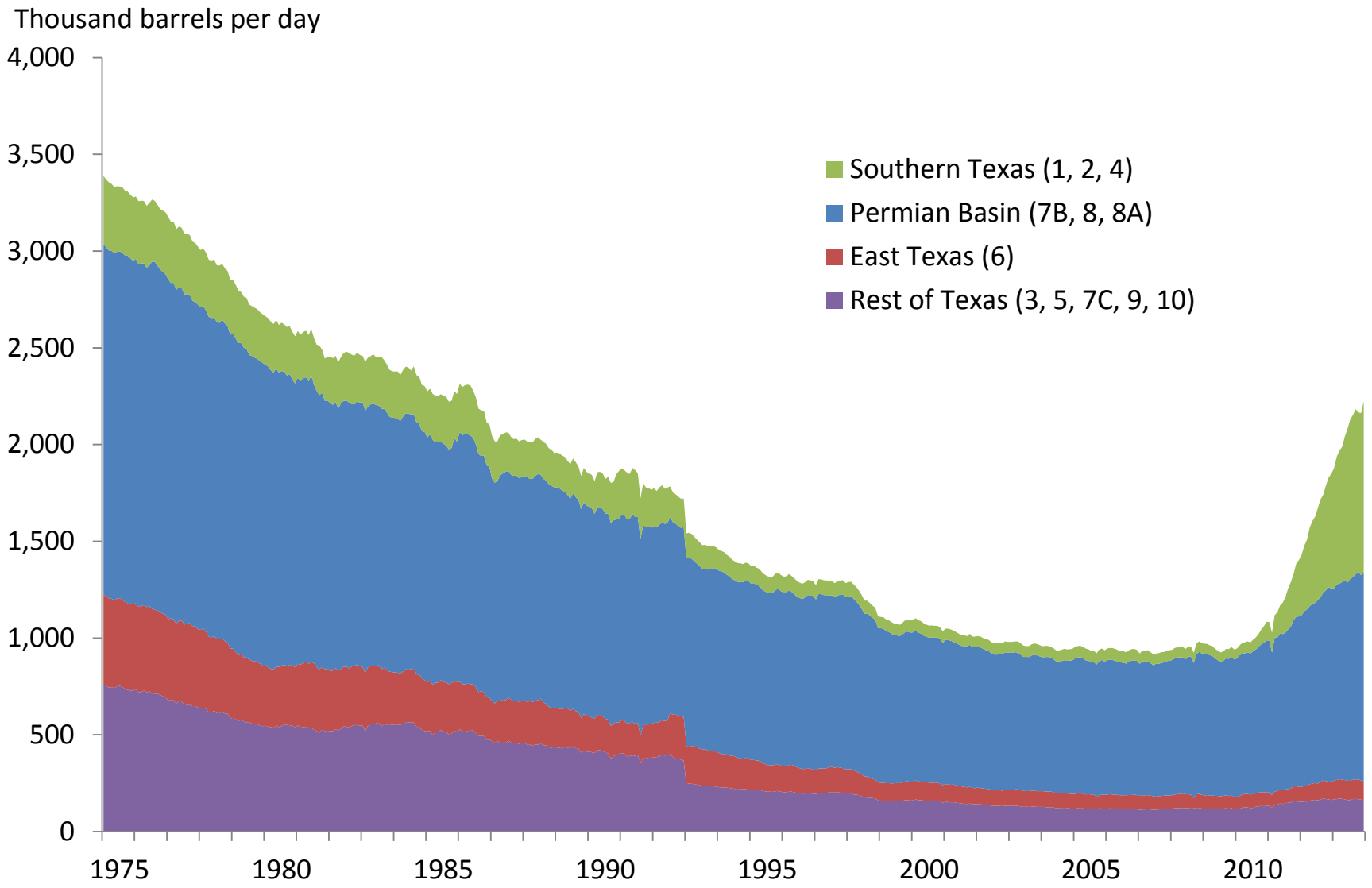
RRC Districts in Texas



Shale formation locations

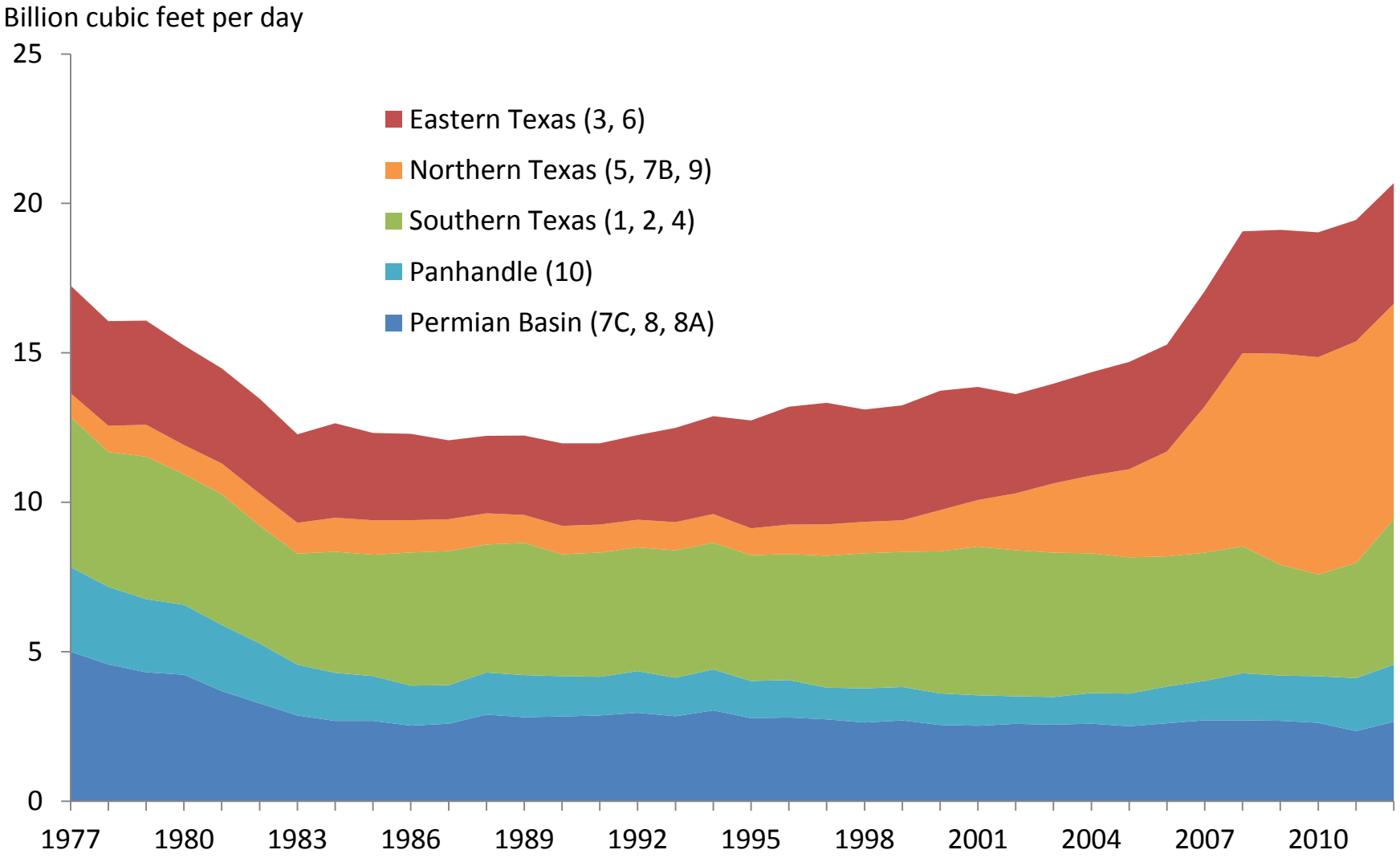


Oil production reverses downward trend



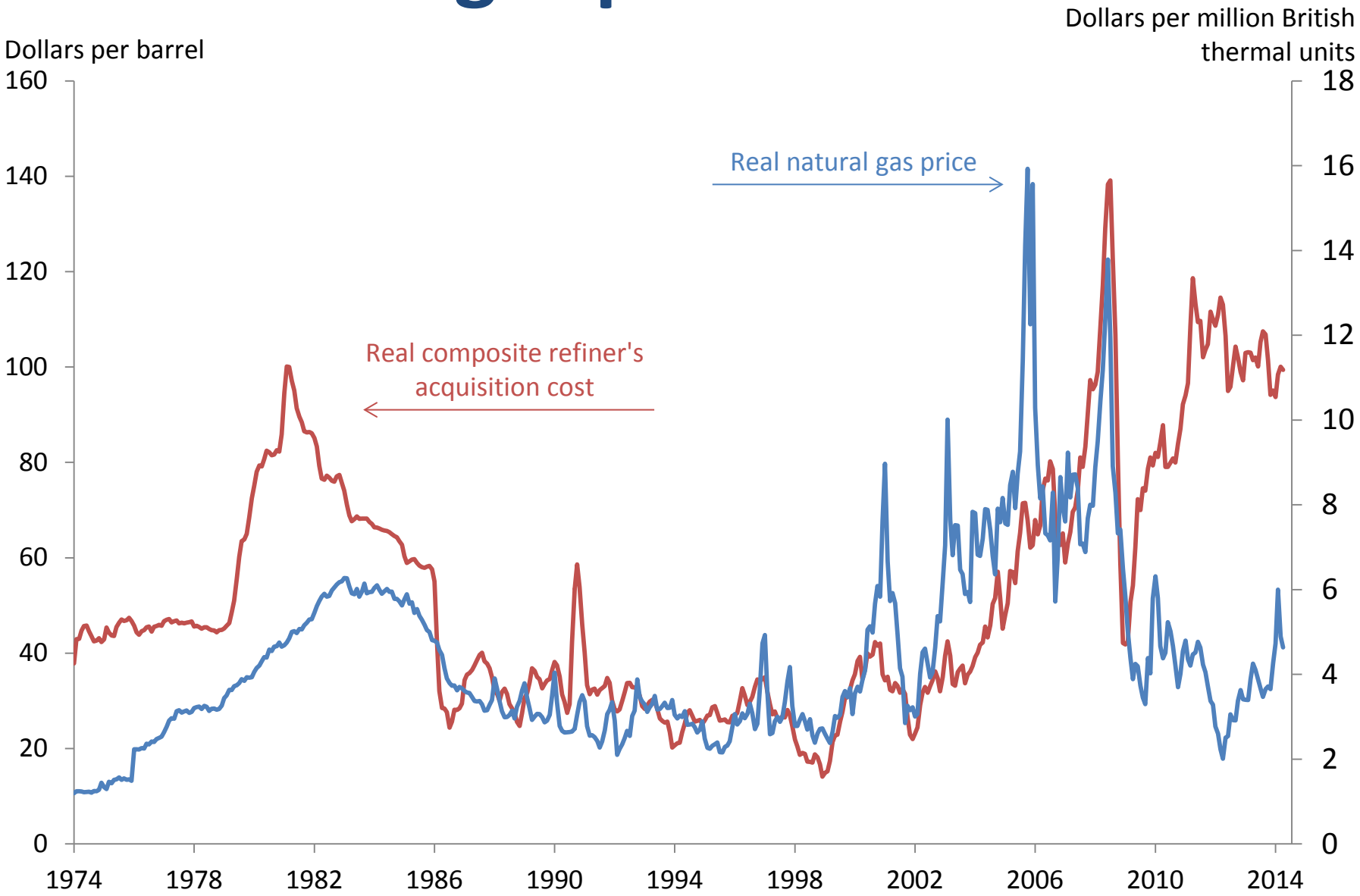
NOTE: Numbers in parenthesis indicate which RRC Districts are included in the region.

New technology impacts Texas natural gas production

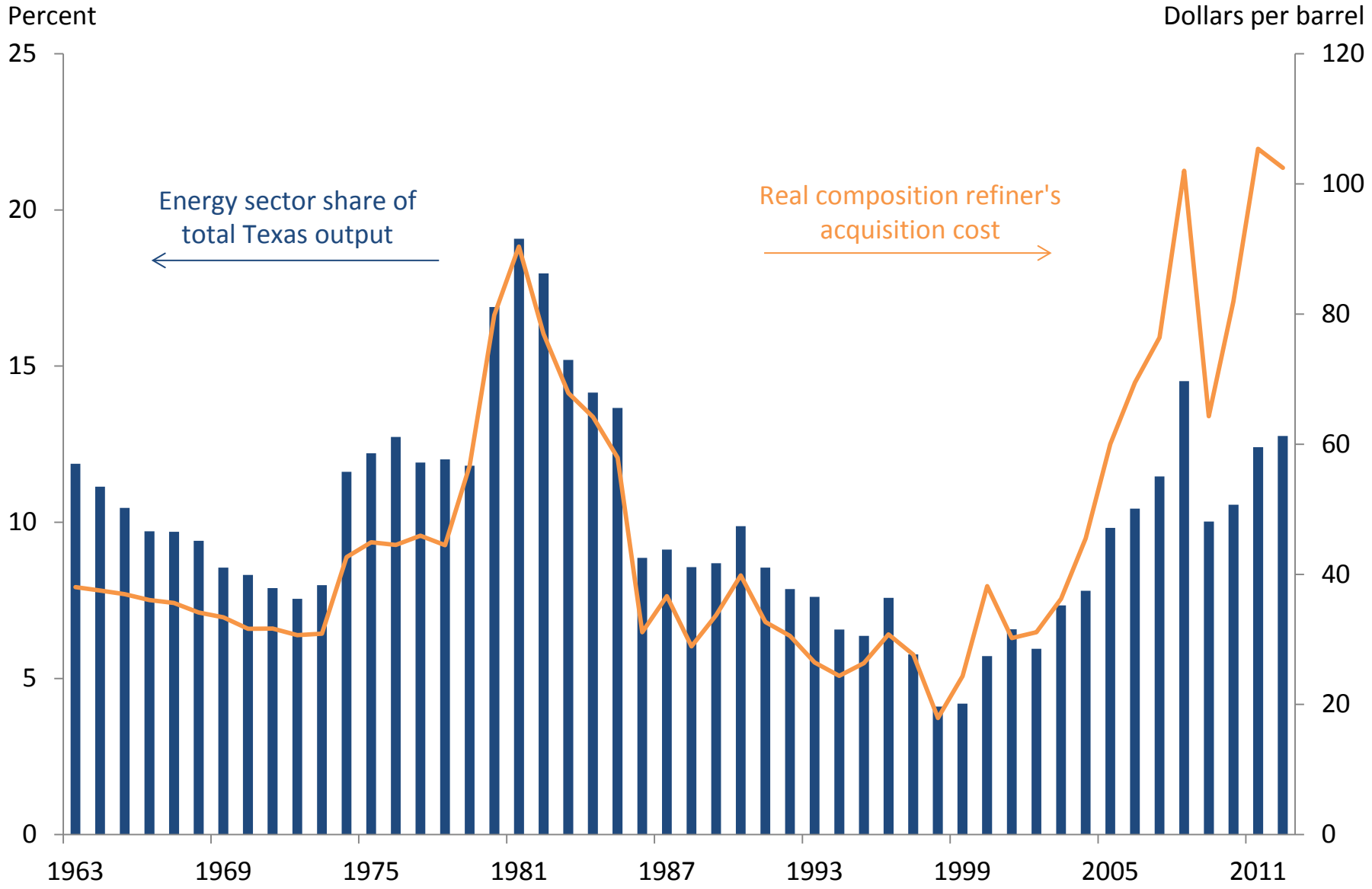


NOTE: Numbers in parenthesis indicate which RRC Districts are included in the region.

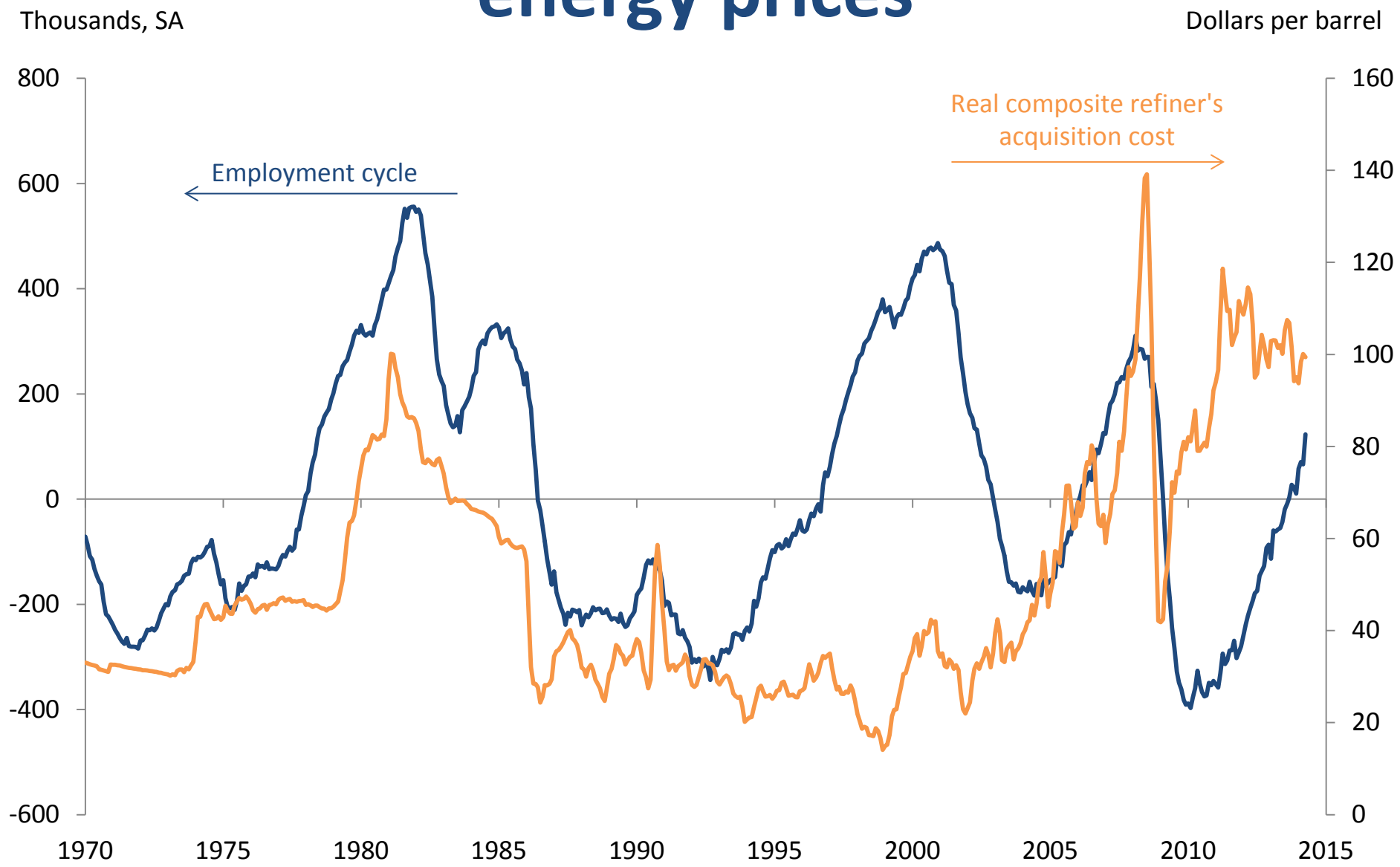
Oil and gas prices over time



Energy output share mirrors oil prices



Texas employment cycle follows energy prices



Methodology

- We use a VAR to estimate effect of unexpected changes in energy prices on employment (state and RRC district)
- Analyze oil and gas prices separately
- Consider several different time periods
  - 1970s - 87, 1987 - 97, 1997 - 05, 2005 - 13

Oil and Gas Sector Employment response to a 10 - percent increase in oil prices

	Full Sample[a]	Period 1[b]	Period 2[c]	Period 3[d]	Period 4[e]
Texas Statewide	10.7%	10.5%	1.1%	2.0%	1.9%
District 1	7.8%	8.2%	No effect	No effect	No effect
District 2	6.0%	No effect	No effect	No effect	5.0%
District 3	3.6%	3.5%	No effect	1.1%	1.9%
District 4	4.2%	4.6%	No effect	1.8%	4.5%
District 5	3.7%	4.0%	1.1%	No effect	1.7%
District 6	10.0%	10.8%	No effect	5.5%	2.3%
District 7B	12.8%	12.8%	-5.2%	5.7%	3.0%
District 7C	5.7%	5.9%	-1.6%	2.8%	3.1%
District 8	6.5%	22.2%	2.7%	No effect	No effect
District 8A	5.0%	No effect	No effect	No effect	4.2%
District 9	10.0%	12.7%	No effect	8.1%	2.9%
District 10	5.4%	10.0%	No effect	No effect	3.5%

[a] Full sample: statewide Jan. 1974 - Apr. 2014, district Jan. 1975 - Dec. 2013

[b] Period 1: statewide Jan. 1974 - Nov. 1987, district Jan. 1975 - Nov. 1987

[c] Period 2: statewide & district Dec. 1987 - Mar. 1997

[d] Period 3: statewide & district Apr. 1997 - May 2005

[e] Period 4: statewide Jun. 2005 - Apr. 2014, district Jun. 2005 - Dec. 2013

Texas and District employment responses to a 10 - percent increase in oil prices

	Full Sample[a]	Period 1[b]	Period 2[c]	Period 3[d]	Period 4[e]
Texas Statewide	1.3%	1.3%	-0.3%	0.2%	No effect
District 1	0.1%	1.1%	No effect	No effect	0.3%
District 2	No effect	2.0%	No effect	No effect	0.8%
District 3	0.8%	0.9%	No effect	0.3%	0.7%
District 4	0.6%	1.8%	No effect	No effect	0.4%
District 5	0.2%	0.5%	-0.2%	No effect	0.5%
District 6	0.3%	No effect	No effect	0.3%	0.4%
District 7B	0.9%	0.9%	No effect	No effect	0.4%
District 7C	0.5%	1.5%	No effect	No effect	0.9%
District 8	1.0%	2.2%	No effect	0.3%	1.0%
District 8A	0.5%	0.7%	No effect	0.2%	0.5%
District 9	0.2%	0.4%	No effect	No effect	0.4%
District 10	0.6%	0.5%	No effect	0.3%	0.5%

[a] Full sample: statewide Jan. 1974 - Apr. 2014, district Jan. 1975 - Dec. 2013

[b] Period 1: statewide Jan. 1974 - Nov. 1987, district Jan. 1975 - Nov. 1987

[c] Period 2: statewide & district Dec. 1987 - Mar. 1997

[d] Period 3: statewide & district Apr. 1997 - May 2005

[e] Period 4: statewide Jun. 2005 - Apr. 2014, district Jun. 2005 - Dec. 2013

Oil and Gas Sector Employment responses to a 10 - percent increase in gas prices

	Full Sample[a]	Period 1[b]	Period 2[c]	Period 3[d]	Period 4[e]
Texas Statewide	0.40%	6.70%	No effect	1.30%	No effect
District 1	-1.3%	No effect	-2.8%	No effect	No effect
District 2	2.3%	10.9%	No effect	5.3%	1.6%
District 3	-0.2%	No effect	No effect	No effect	-0.3%
District 4	No effect	No effect	No effect	No effect	0.6%
District 5	-0.4%	-2.0%	-0.4%	No effect	No effect
District 6	No effect	No effect	No effect	3.5%	0.5%
District 7B	No effect	16.1%	-5.7%	6.1%	No effect
District 7C	No effect	No effect	No effect	2.2%	No effect
District 8	No effect	11.8%	No effect	1.3%	No effect
District 8A	No effect	No effect	No effect	No effect	No effect
District 9	3.3%	No effect	No effect	5.4%	No effect
District 10	No effect	No effect	-2.4%	0.7%	No effect

[a] Full sample: statewide Jan. 1974 - Apr. 2014, district Jan. 1975 - Dec. 2013

[b] Period 1: statewide Jan. 1974 - Nov. 1987, district Jan. 1975 - Nov. 1987

[c] Period 2: statewide & district Dec. 1987 - Mar. 1997

[d] Period 3: statewide & district Apr. 1997 - May 2005

[e] Period 4: statewide Jun. 2005 - Apr. 2014, district Jun. 2005 - Dec. 2013

Effects of a crude oil production shock during shale boom period

- Oil production growing while prices flat
- Could mess up statistical relationships
- Explore oil production effects
- Study impacts on total & energy employment

Employment response to a 10 - percent increase in crude oil production

- Total Employment rises 0.8%
- Energy Sector Employment rises 3.7%

Time Frame: Nov. 2007 – Mar. 2014

Conclusion

- Energy prices have had important effects on Texas economy
- Largest impacts during heyday in 70s and 80s
- Effects have become more pronounced again in recent years for many cases

Dynamic response to an oil price shock