



Energy Policy Act of 2005: Effects of the 3-Year Inspection Requirement on Compliance

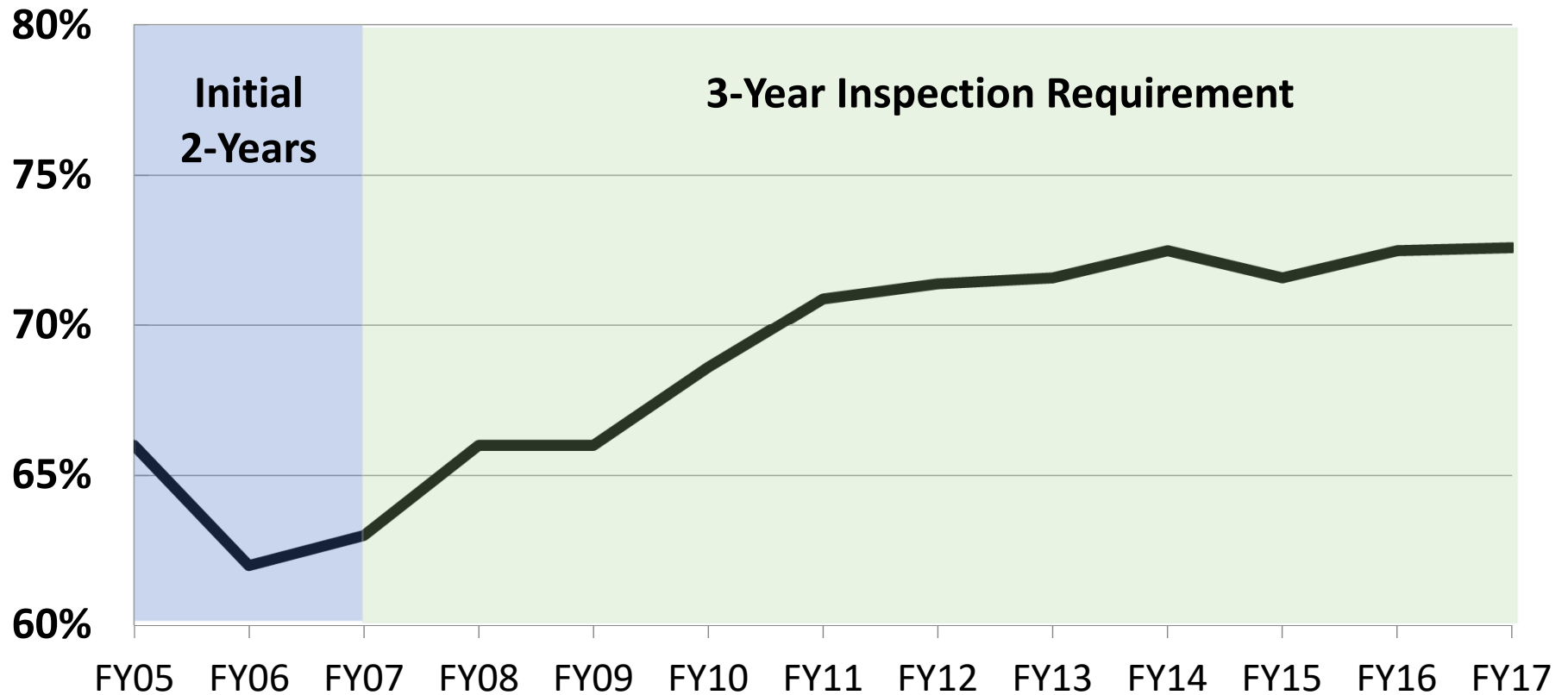
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The opinions and conclusions expressed here are those of the authors and do not necessarily represent the views of the U.S. Environmental Protection Agency.

National UST Compliance Rate



Source: U.S. EPA, Underground Storage Tanks Program

Objective: Determine the impact of increasing inspection frequency to at least once every 3 years (as required by the Energy Policy Act of 2005) on UST compliance

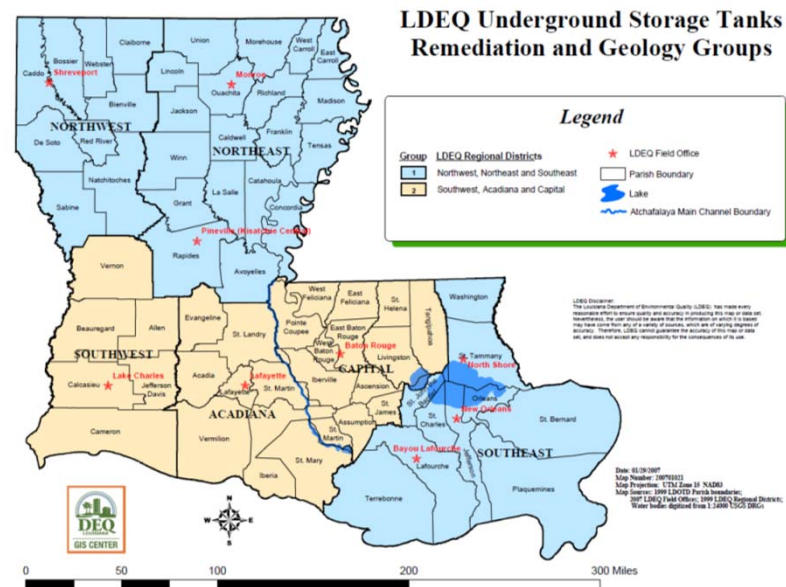
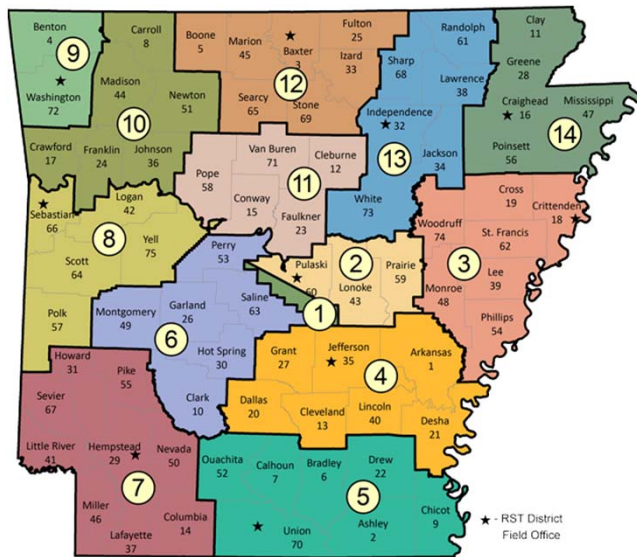
Project Road Map:



1. Identify statistical methods and data needed
 - ✦ What statistical methods will give us robust evidence?
 - ✦ What data is needed to use that statistical method?
 - ✓ Facility level data on inspection, compliance, enforcement and releases
 - ✓ Data from several years before and after EPAAct
 - ✓ A change in inspection frequency
2. Acquire data needed, evaluate its suitability and prepare it for analysis
3. Analyze data

2: Acquire and prepare data for analysis

- Several states shared their data. Thank you!
- Arkansas and Louisiana (still analyzing New York)
 - ✓ Sufficient before/after data
 - ✓ An increase in inspection frequency

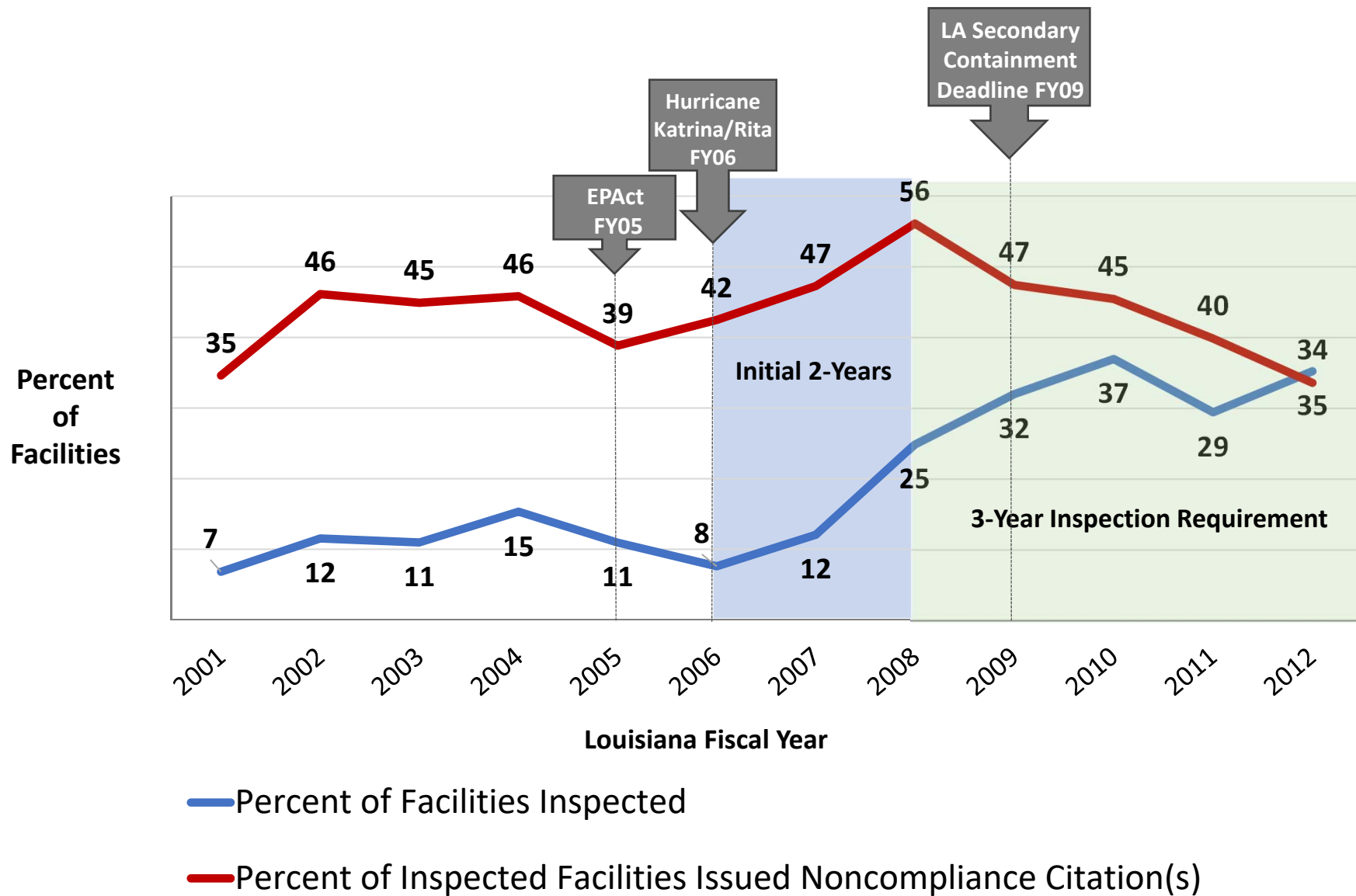


2: Acquire and prepare data for analysis

Data	Source
Facility data: <ul style="list-style-type: none">• Tank characteristics• Inspections• Compliance• Enforcement• Confirmed releases	Arkansas DEQ, Regulated Storage Tank Division <ul style="list-style-type: none">• FY2002-2012• Final Sample: 8,000 inspections; 2,984 facilities Louisiana DEQ, UST & Remediation Division <ul style="list-style-type: none">• FY2001-2012: Inspection, compliance and releases• FY2004-2012: Enforcement• Final Sample: 10,389 inspections; 4,614 facilities
Socioeconomic data	2009-2013 American Community Survey 5-year Estimates (U.S. Census) Block Group Data
Biophysical data	Soil Survey Geographic (SSURGO) Database (Soil Survey Staff, Natural Resources Conservation Service, USDA)

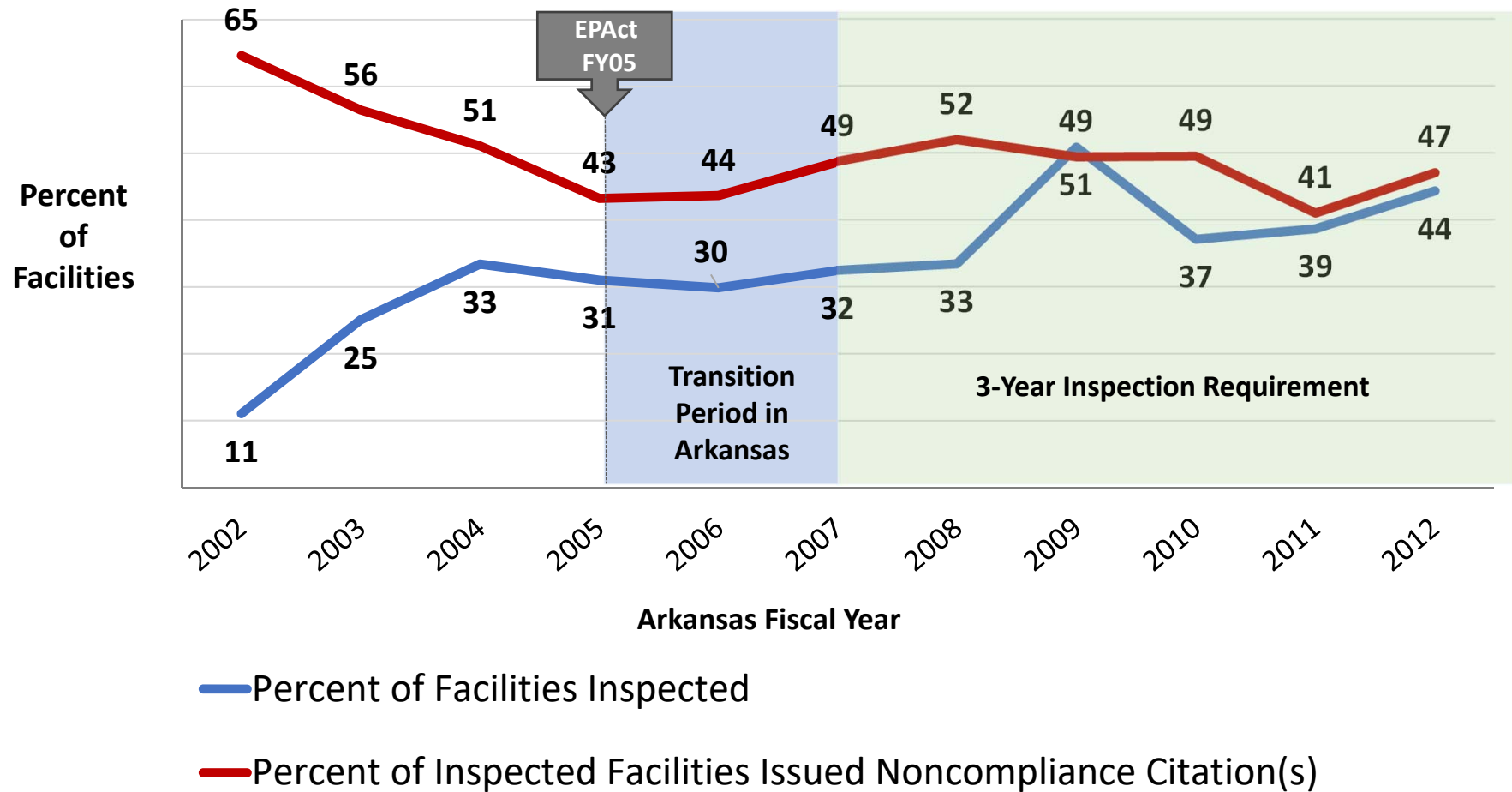
3: Analyze data

Louisiana UST Inspection and Noncompliance (FY2001-2012)



3: Analyze data

Arkansas: UST Inspection and Noncompliance (FY 2002-2012)



3: Analyze the data

$$\Pr(\text{noncompliance}_{it}) = F(\text{years since last inspection}_{it}, \text{other factors}_{it})$$

= 1 if facility received
at least one noncompliance
citation at the inspection
= 0 otherwise

Facility's History

Cumulative inspections
Compliance history
Release history
Enforcement history

Facility Characteristics

Number of tanks
Age of tanks
Average tank capacity
Single owner (AR)

Regulator Characteristics

Distance to the nearest field office
State or contracted inspector (LA)

Nearby Characteristics

Population density
Median income per capita
Water table depth
Soil permeability
Source water protection area (AR)

Other

Start of operator trainings
Regions and FY quarters

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Statistical Concerns:

- Censored Data
- Selection Bias



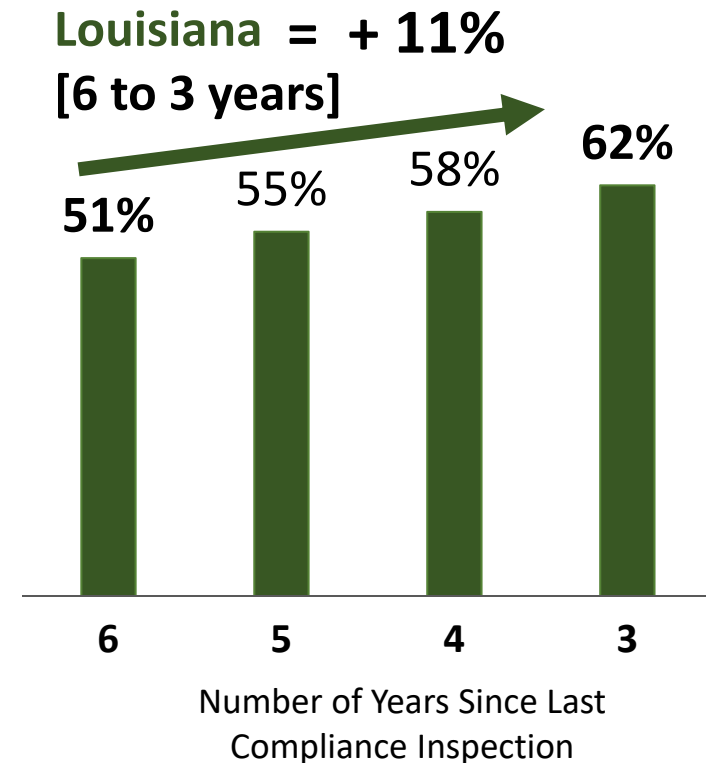
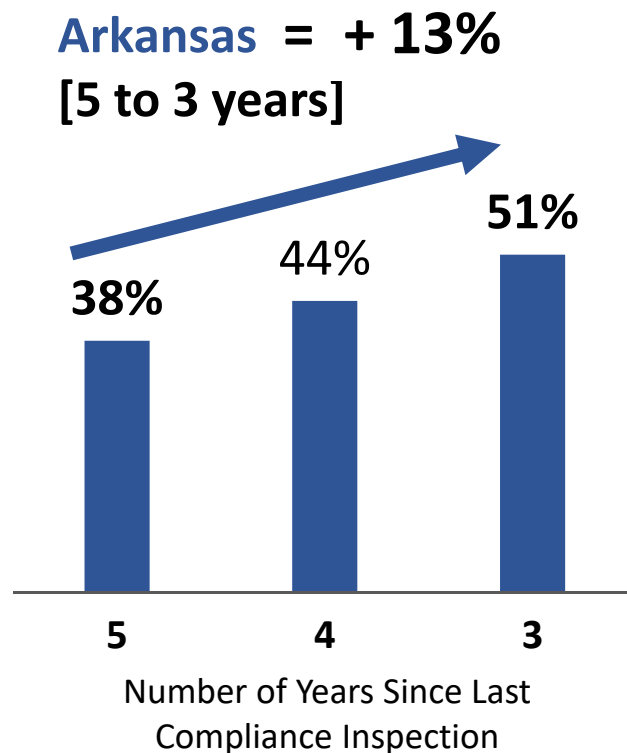
Bivariate Probit Model:

- ✓ Probability of an Inspection (Selection Equation)
- ✓ Probability of Noncompliance

Main Results

Results suggest that increasing inspection frequency to at least once every 3 years as required by EPCRA of 2005 has improved UST compliance in Arkansas and Louisiana.

Predicted Probability of Compliance at a Typical Facility



Some Highlighted Additional Results



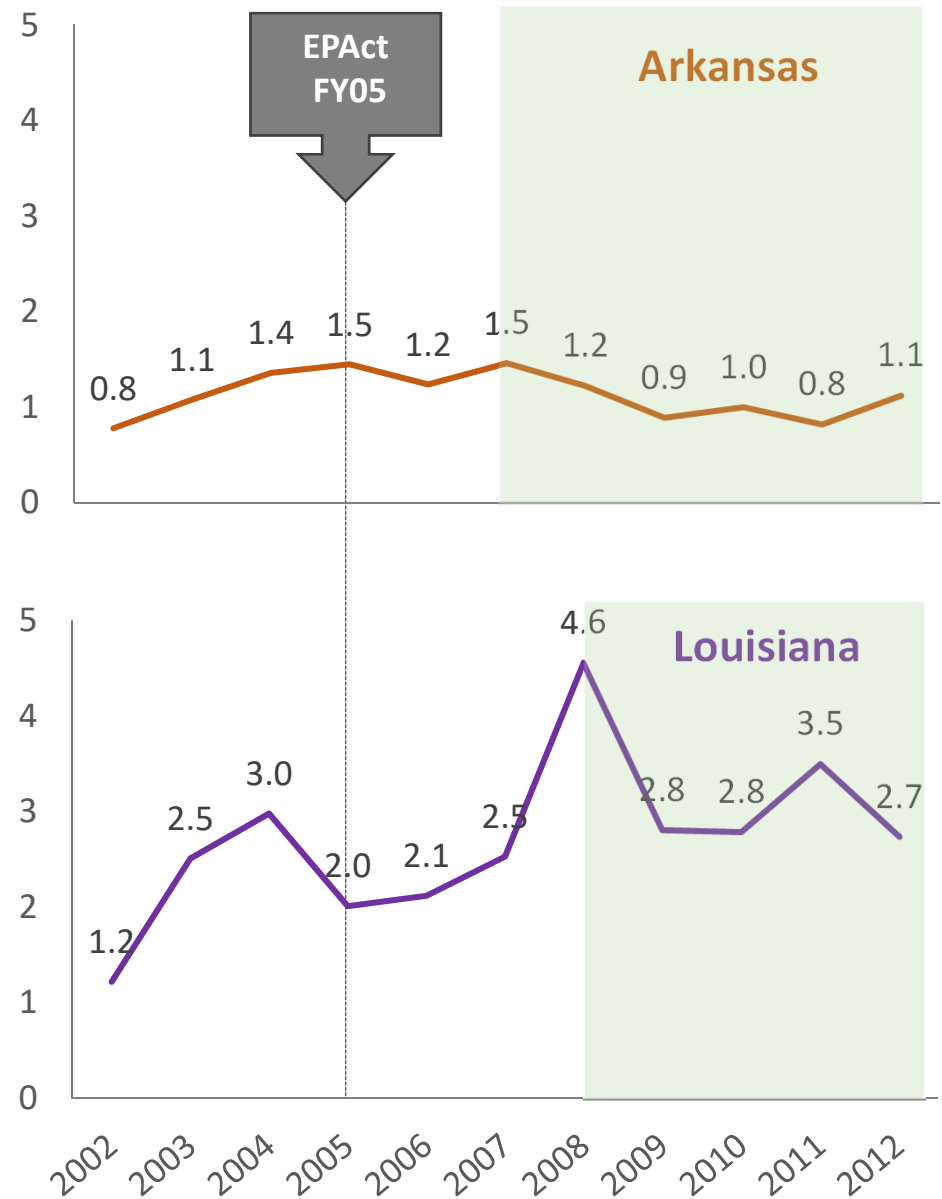
More likely to comply if:

- Higher # of previous inspections (AR^{**}, LA^{**})
- Newer tanks (AR^{**}, LA^{***})
- Inspected after state began holding operator trainings but before deadline, March 2010 – Aug 2012 (AR^X, LA^{***})

Note: *** 1%, ** 5%, * 10% statistical significance; X = Not statistically significant

Did increased inspection frequency prevent releases?

Percent of Facilities with a Confirmed Release



Did increased inspection frequency prevent releases?

Limited ability to directly answer due to:

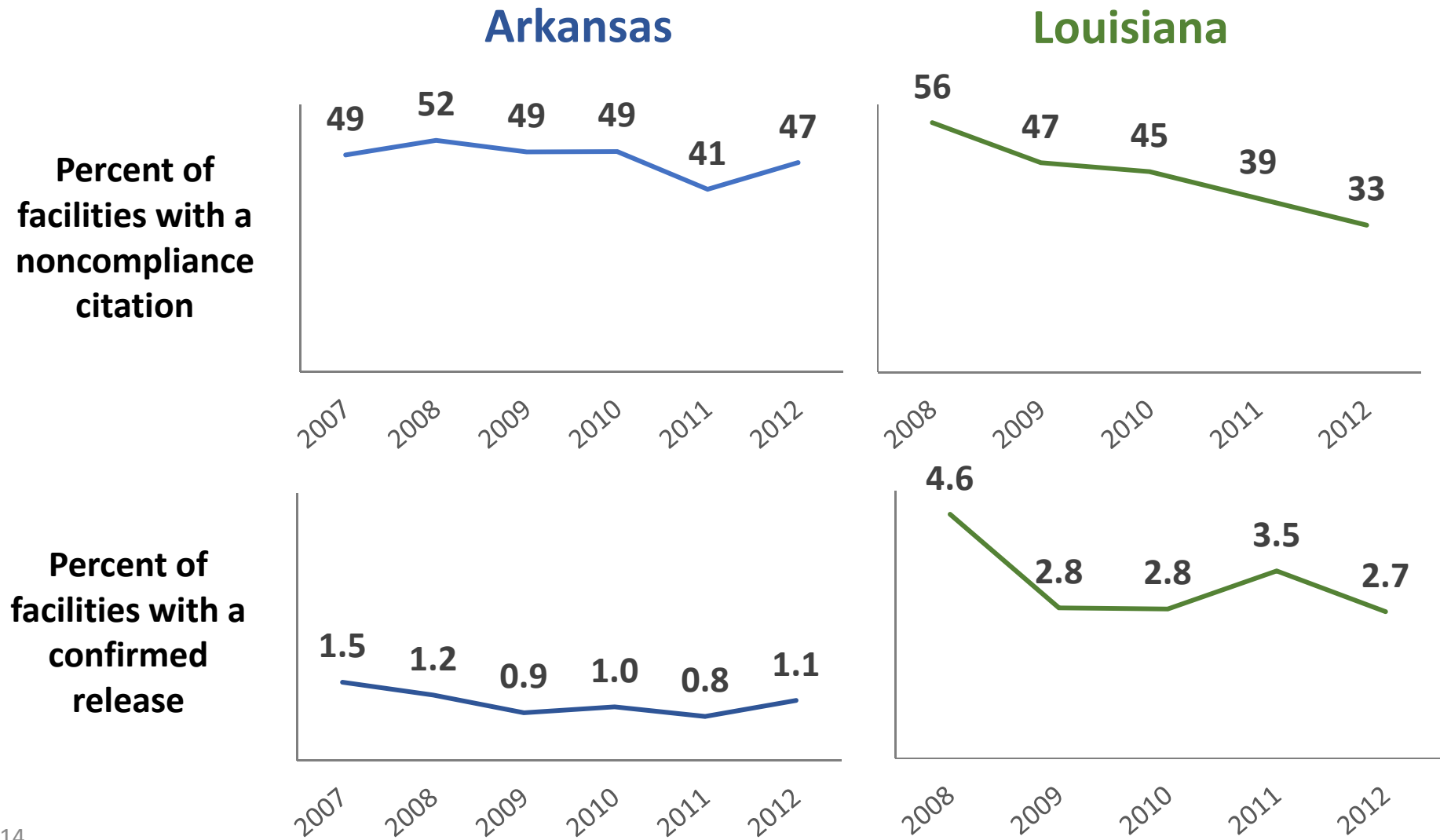
1. Nature of Release Data

- Timeline of release and compliance inspection is unreliable in some instances

2. Potential Issues Identifying a Causal Effect

- Potential under-reporting of releases in pre-EPA Act years
- Increased inspection effort expected to both reduce occurrence of release and to increase the likelihood of discovering releases

How does compliance at the last inspection affect the likelihood of a release in the period that follows?



How does compliance at the last inspection affect the likelihood of a release in the period that follows?

Arkansas: Not a statistically significant predictor of a release

Louisiana: A facility that was compliant at the last inspection is less likely to have a release than a facility that was noncompliant



Louisiana	
Compliance status at last inspection	Predicted Probability of a Release for Typical Facility
No Violations	1.44%
Violations	2.64%

How do *other factors* affect the likelihood of a release?



Less likely to have a release if:

- Smaller average tank capacity (AR^{***}, LA^{***})
- Less tanks (AR^{***}, LA^{***})
- After operator trainings began in the state (AR^X, LA^{*})

Note: *** 1%, ** 5%, * 10% statistical significance; X = Not statistically significant

Preliminary Conclusions:

Increasing inspection frequency (to at least once every 3-years) has improved UST compliance with release detection and prevention requirements in both Arkansas and Louisiana!

Results from Louisiana also suggest that compliance at the last inspection reduces the likelihood of a release.

Next Steps:

- Finalize preliminary results for AR (explore adding more pre-EPA Act inspection data)
- Finish NY Analysis!

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