

# Learning to coordinate: A study in retail gasoline

by David P. Byrne and Nicolas de Roos

Discussion by David Rahman  
University of Minnesota

FTC Microeconomics Conference  
November 4, 2016

# Summary

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date

## Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination

## Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years



# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years
  - ▶ Margins grew by up to 75%

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years
  - ▶ Margins grew by up to 75%
- ▶ Learning to coordinate

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years
  - ▶ Margins grew by up to 75%
- ▶ Learning to coordinate
  - ▶ Much is known about how tacitly collusive agreements are implemented, little is known about how they are initiated

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years
  - ▶ Margins grew by up to 75%
- ▶ Learning to coordinate
  - ▶ Much is known about how tacitly collusive agreements are implemented, little is known about how they are initiated
  - ▶ Authors offer evidence for how gasoline retailers tacitly learned to coordinate their pricing cycles over the last five years

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years
  - ▶ Margins grew by up to 75%
- ▶ Learning to coordinate
  - ▶ Much is known about how tacitly collusive agreements are implemented, little is known about how they are initiated
  - ▶ Authors offer evidence for how gasoline retailers tacitly learned to coordinate their pricing cycles over the last five years
  - ▶ Thursday price jumps and fixed daily decreases of 2 cpl

# Summary

- ▶ Analyzes retail gasoline prices in Perth, Australia, 2001 to date
- ▶ Finds substantial evidence of market-wide pricing coordination
  - ▶ Regular amplitude and wavelength of pricing cycles
  - ▶ Led explicitly by leading firm(s) a day ahead
  - ▶ As well as implicitly with the threat of price wars
  - ▶ Very stable pricing patterns over the last five years
  - ▶ Margins grew by up to 75%
- ▶ Learning to coordinate
  - ▶ Much is known about how tacitly collusive agreements are implemented, little is known about how they are initiated
  - ▶ Authors offer evidence for how gasoline retailers tacitly learned to coordinate their pricing cycles over the last five years
  - ▶ Thursday price jumps and fixed daily decreases of 2 cpl
  - ▶ Price leadership, price wars and experimentation led the market to learn to coordinate on specific pricing cycles

# Learning and Communication

## Learning and Communication

- ▶ Significant coordination until 2010, suddenly extreme amount of coordination after 2010, suggesting some communication



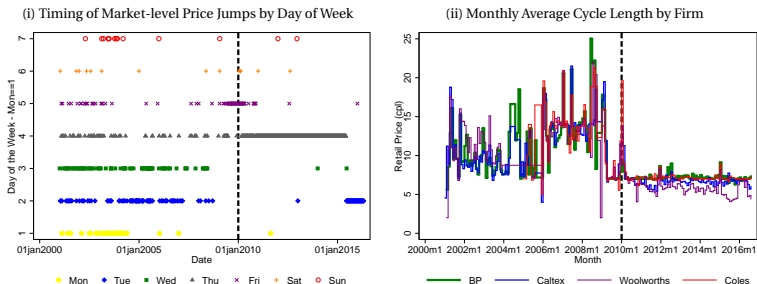
## Learning and Communication

- ▶ Significant coordination until 2010, suddenly extreme amount of coordination after 2010, suggesting some communication

# Learning and Communication

- ▶ Significant coordination until 2010, suddenly extreme amount of coordination after 2010, suggesting some communication

Figure 6: Evolution of the Timing of Price Jumps and Cycle Length



- ▶ Gradual 'tatonnement'-based learning is unlikely to lead to sudden coordination of this magnitude

# Learning and Communication

## Learning and Communication

- ▶ However, BP shows gradual adoption of Thursday price jumps

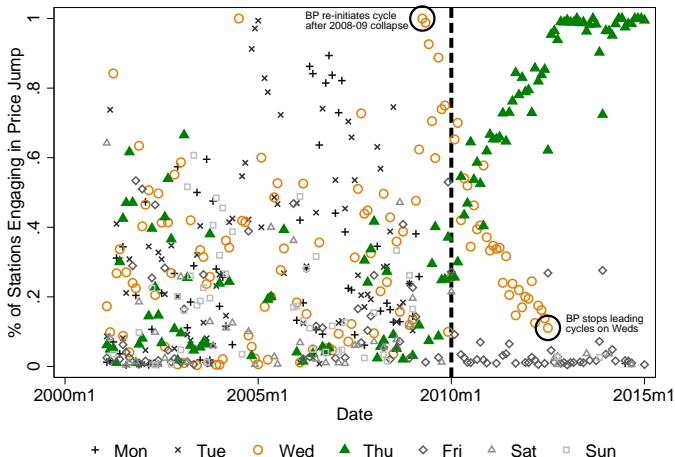
## Learning and Communication

- ▶ However, BP shows gradual adoption of Thursday price jumps

# Learning and Communication

- ▶ However, BP shows gradual adoption of Thursday price jumps

(i) BP



- ▶ Suggests looking at the location of pricing decisions

# Defection and Punishment

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring



## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons
- ▶ Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types)

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons
- ▶ Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types)
- ▶ Impatience may lead firms to steal from a collusive agreement without retribution (Bernheim and Madsen, forthcoming)

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons
- ▶ Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types)
- ▶ Impatience may lead firms to steal from a collusive agreement without retribution (Bernheim and Madsen, forthcoming)
- ▶ Specifically in the 2009 price war

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons
- ▶ Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types)
- ▶ Impatience may lead firms to steal from a collusive agreement without retribution (Bernheim and Madsen, forthcoming)
- ▶ Specifically in the 2009 price war
  - ▶ Profit margins did not seem significantly different from neighboring time periods

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons
- ▶ Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types)
- ▶ Impatience may lead firms to steal from a collusive agreement without retribution (Bernheim and Madsen, forthcoming)
- ▶ Specifically in the 2009 price war
  - ▶ Profit margins did not seem significantly different from neighboring time periods
  - ▶ Moreover, it did not seem that average retail prices changed significantly upon Caltex's ostensible defection

## Defection and Punishment

- ▶ Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring
- ▶ Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives
- ▶ But behavioral fluctuations/experimentation can arise for all sorts of reasons
- ▶ Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types)
- ▶ Impatience may lead firms to steal from a collusive agreement without retribution (Bernheim and Madsen, forthcoming)
- ▶ Specifically in the 2009 price war
  - ▶ Profit margins did not seem significantly different from neighboring time periods
  - ▶ Moreover, it did not seem that average retail prices changed significantly upon Caltex's ostensible defection
  - ▶ Perhaps the location of realized retail prices did fluctuate with a significant effect on firm revenue



# Conclusion

## Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market

## Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market
- ▶ Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins

## Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market
- ▶ Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins
- ▶ Location-based pricing patterns suggest themselves

# Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market
- ▶ Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins
- ▶ Location-based pricing patterns suggest themselves
  - ▶ More detailed view of collusive agreement

# Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market
- ▶ Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins
- ▶ Location-based pricing patterns suggest themselves
  - ▶ More detailed view of collusive agreement
  - ▶ May provide more evidence of tacit learning to coordinate

# Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market
- ▶ Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins
- ▶ Location-based pricing patterns suggest themselves
  - ▶ More detailed view of collusive agreement
  - ▶ May provide more evidence of tacit learning to coordinate
  - ▶ May facilitate estimation of actual profit and extent of competition versus market sharing, especially interesting during periods in which price wars ostensibly occurred

# Conclusion

- ▶ Fascinating account of highly sophisticated pricing coordination practices in Perth's retail gasoline market
- ▶ Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins
- ▶ Location-based pricing patterns suggest themselves
  - ▶ More detailed view of collusive agreement
  - ▶ May provide more evidence of tacit learning to coordinate
  - ▶ May facilitate estimation of actual profit and extent of competition versus market sharing, especially interesting during periods in which price wars ostensibly occurred
- ▶ Conciliatory reaction to apparent defections from collusive practices may be reasonably founded as part of the agreement