Does size matter? An assessment of quota market evolution and performance in the Great Barrier Reef fin-fish fishery

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FAERE thematic workshop on “The use of rights-based instruments in environmental and resource management”

Brest, May 2017

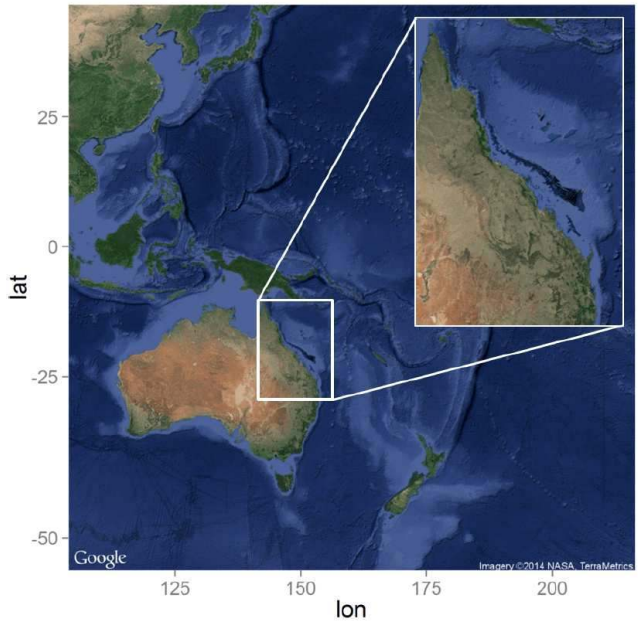
Outline

- Coral Reef Fin-Fish Fishery managed under ITQs since 2004-2005

- Objectives
  - ➢ Gain an understanding of how the market has developed
  - ➢ Obtain insights with respect to functionality / efficiency?

- Several approaches / findings
  - Market trends
  - Account typologies
  - Network analysis
  - Gap analysis

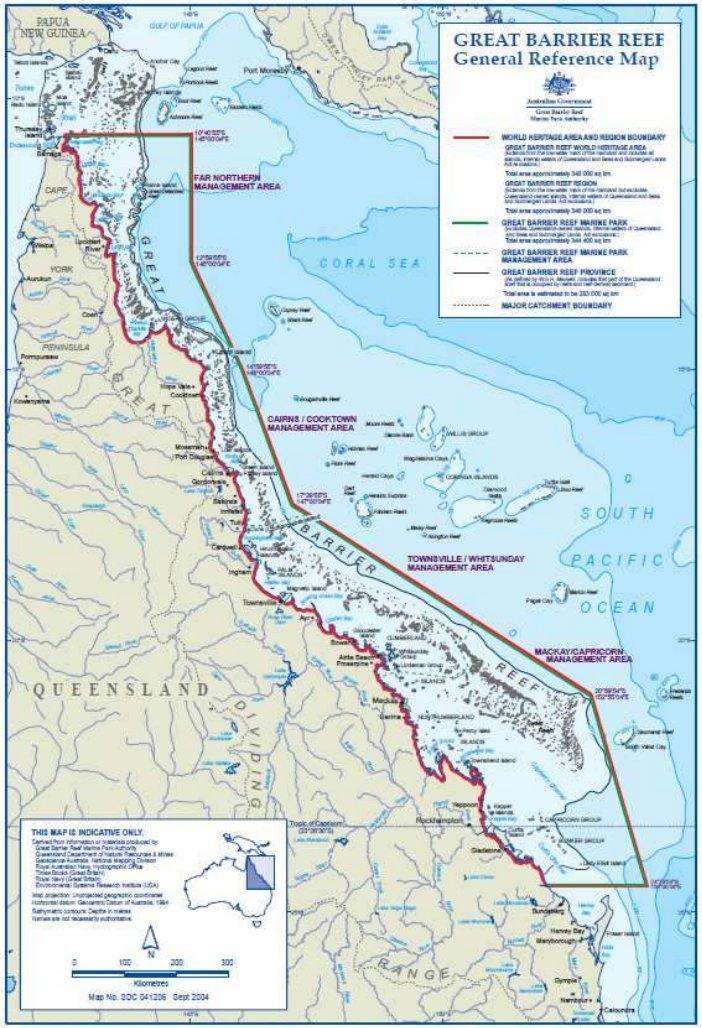
- A side observation



Innes et al., 2014. Ecology and Society, 19(3)

The Coral Reef Fin-Fish Fishery

- Multi-sector line fishery (hand-line)
  - **Coral trout**, Red throat emperor,
    Other Species (~154)
- 213 active commercial vessels 2010-11
  - Primary vessel + dories
  - Diverse (spatially / operationally)
- Input & output controls
  - TAC and ITQs since 2004-05
- Markets
  - Domestic (dead fish)
  - Asia (live Coral Trout)



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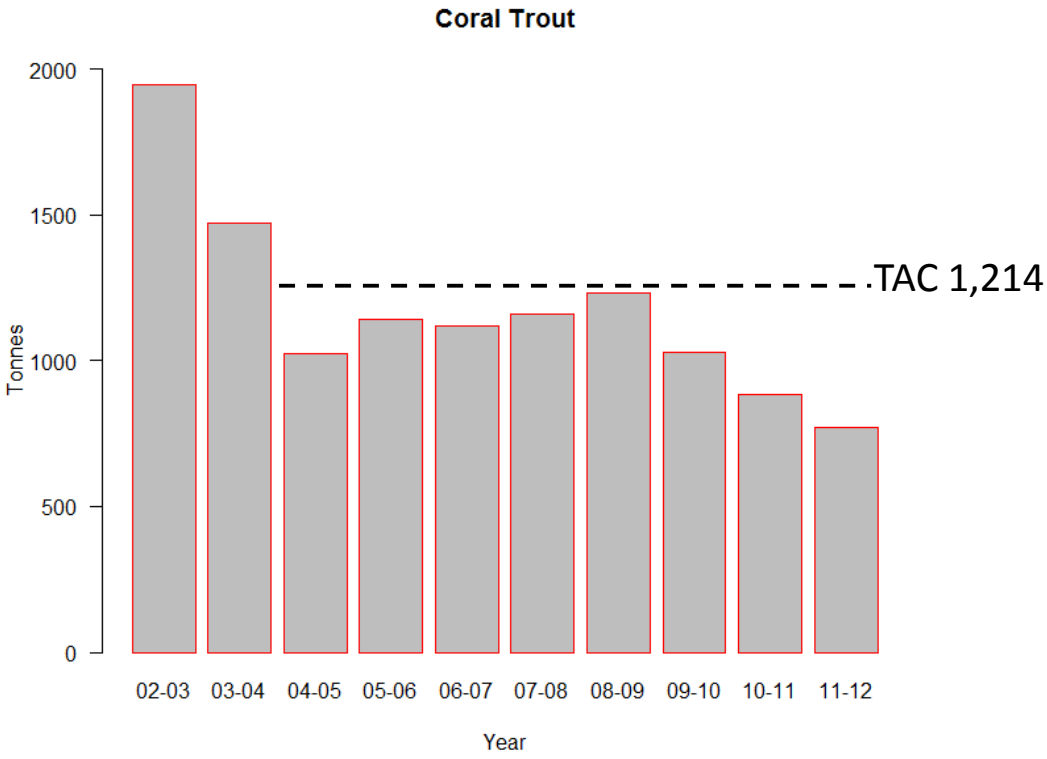
Coral Trout (CT) Fishery

- 2011-12
  - catch 772t (64% TAC)
  - $32m ($30m live, $2m dead)
  - $47/kg live, $17/kg dead
- In addition to TAC
  - Marine Parks zoning plan 2004
    - Area no-take <5% to >33%
    - Restructuring
  - Landings increased to 08-09
- Natural events
  - Tropical Cyclone Hamish Mar 09
  - Tropical Cyclone Yasi Feb 11
- Catch and CPUE down



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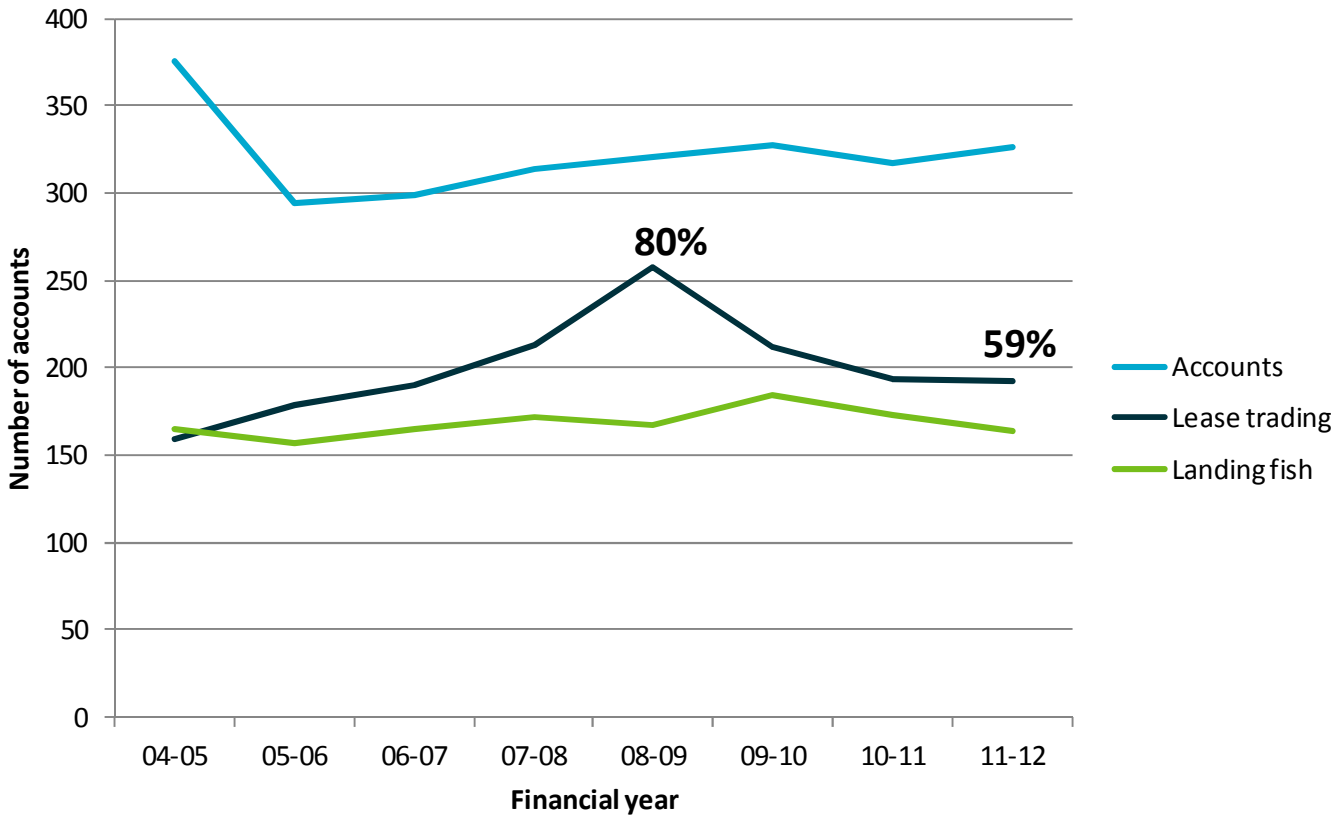
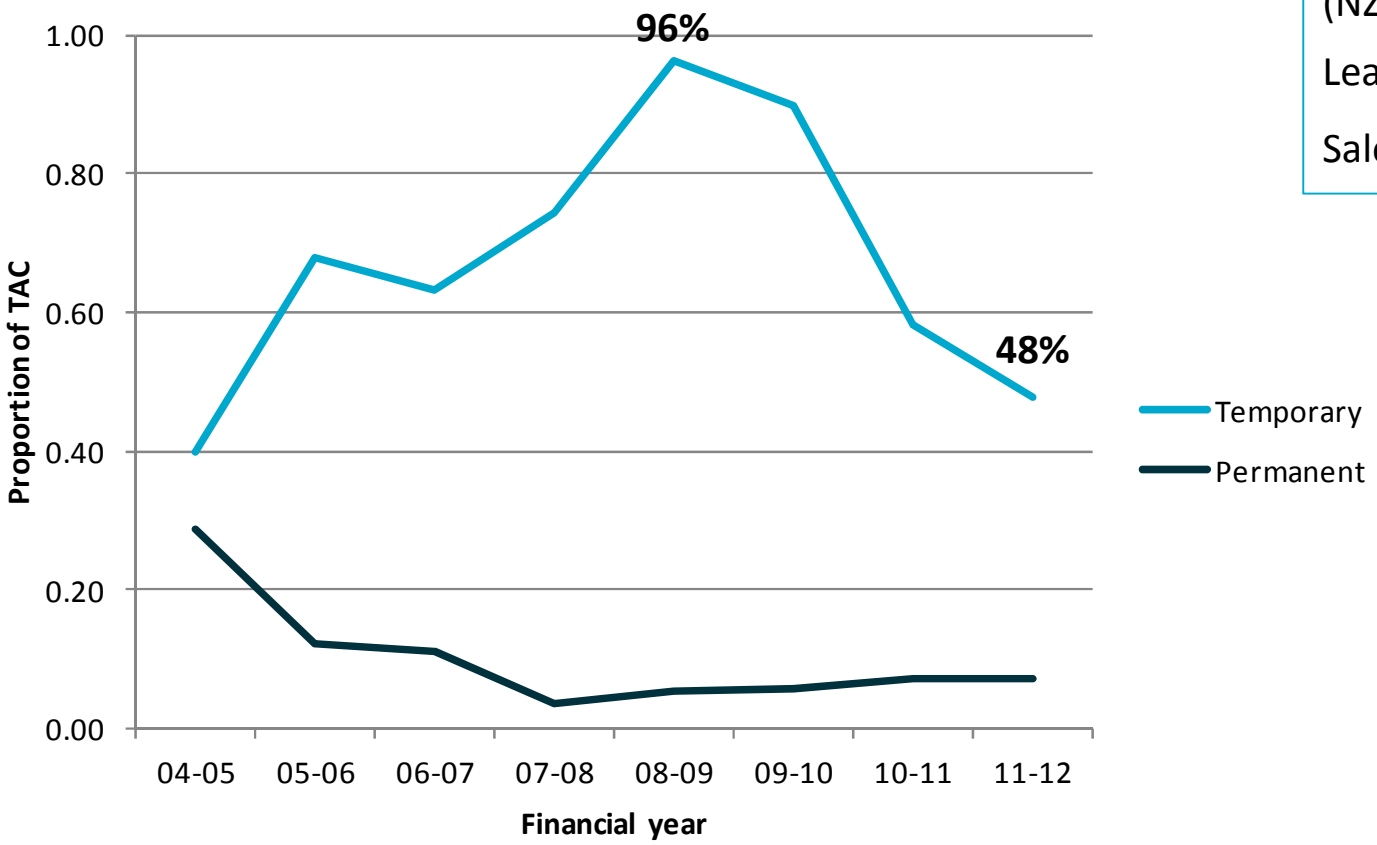
Coral Trout Quota Market Trends



Market Trends –Typologies – Network Analysis – Inefficiency?

Innes et al., 2014. Ecology and Society, 19(3)

Coral Trout Quota Market Trends



Other mature markets
(NZ, TAS, SETF)

Lease 44-60-66%

Sale 3-5%

Market Trends – Typologies – Network Analysis – Inefficiency?

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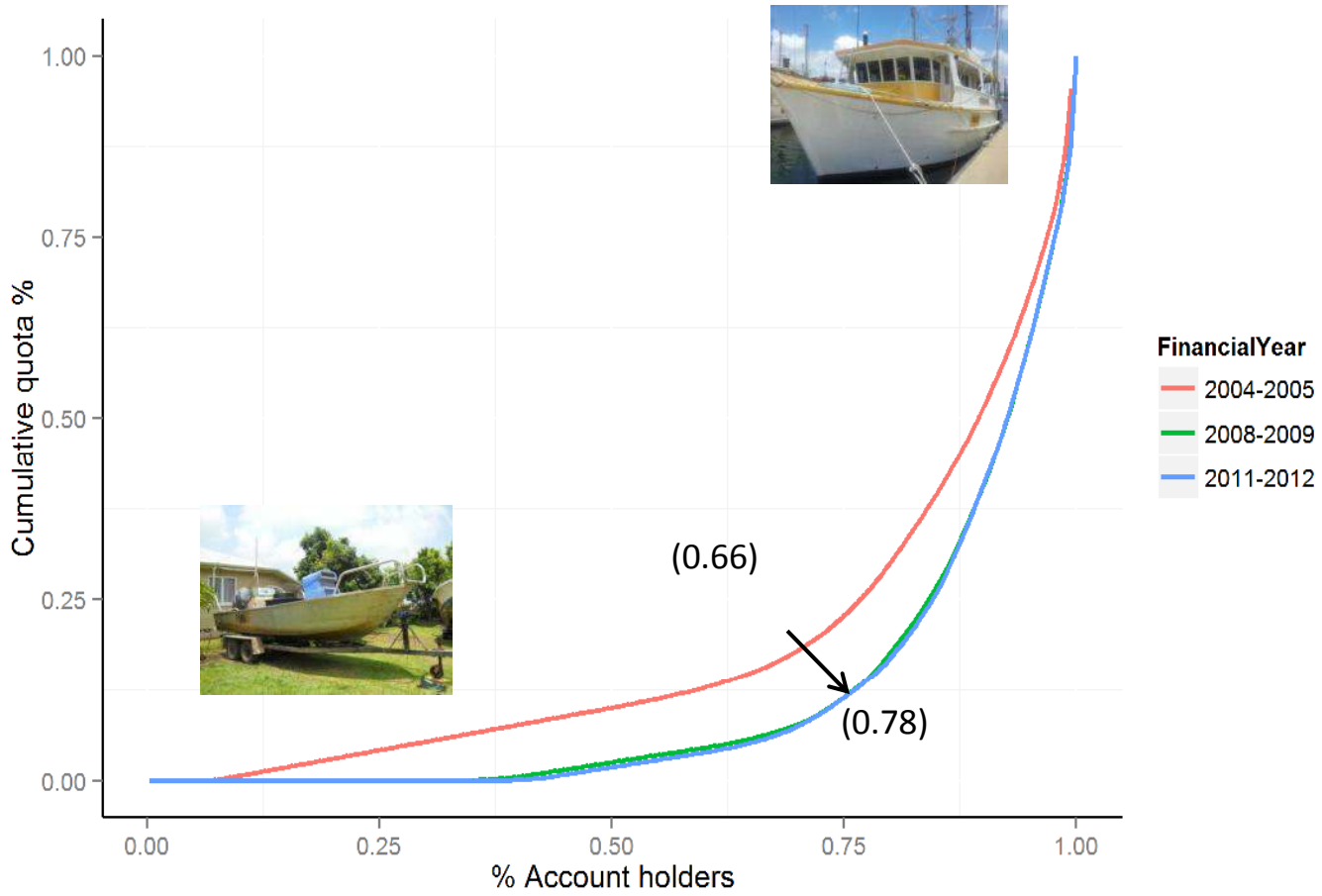
Coral Trout Quota Market Trends



Market Trends –Typologies – Network Analysis – Inefficiency?

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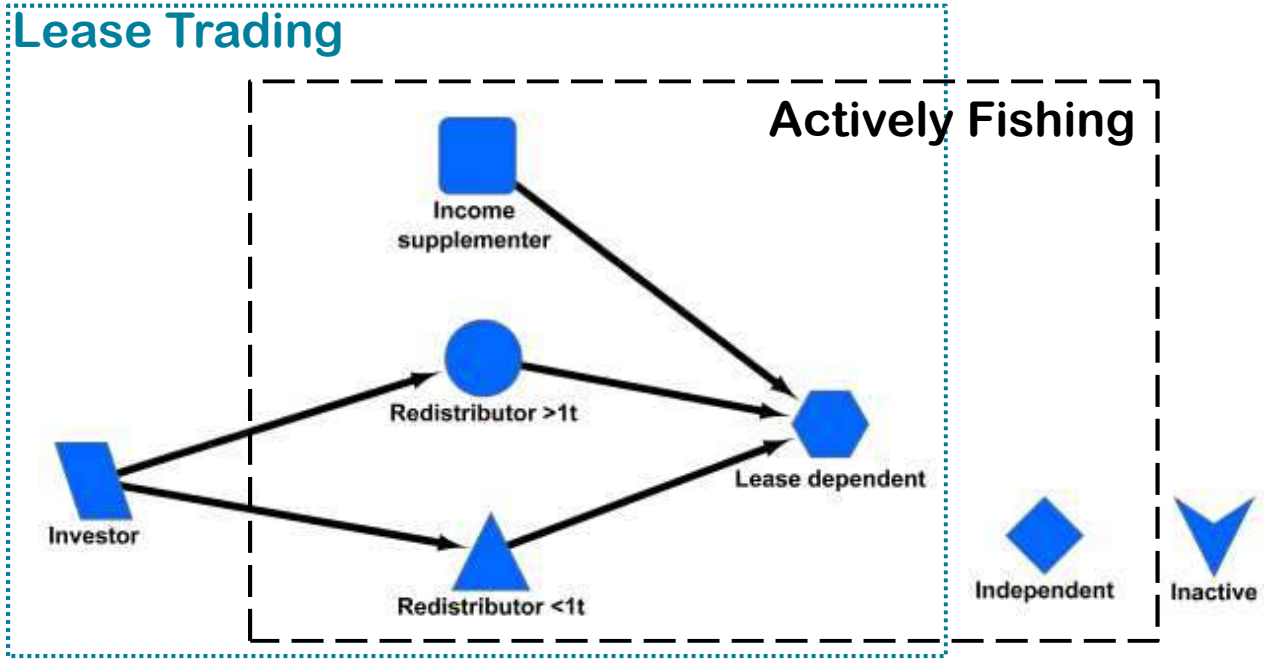
Account Holder Typologies

Position with respect to the CT quota market

- Landings, leased in, leased out (based on typology of van Putten and Gardner (2010))



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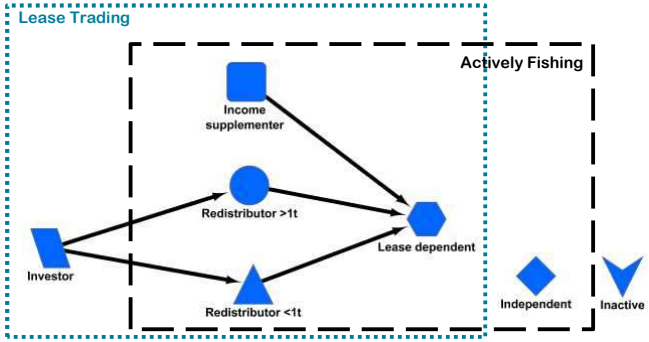
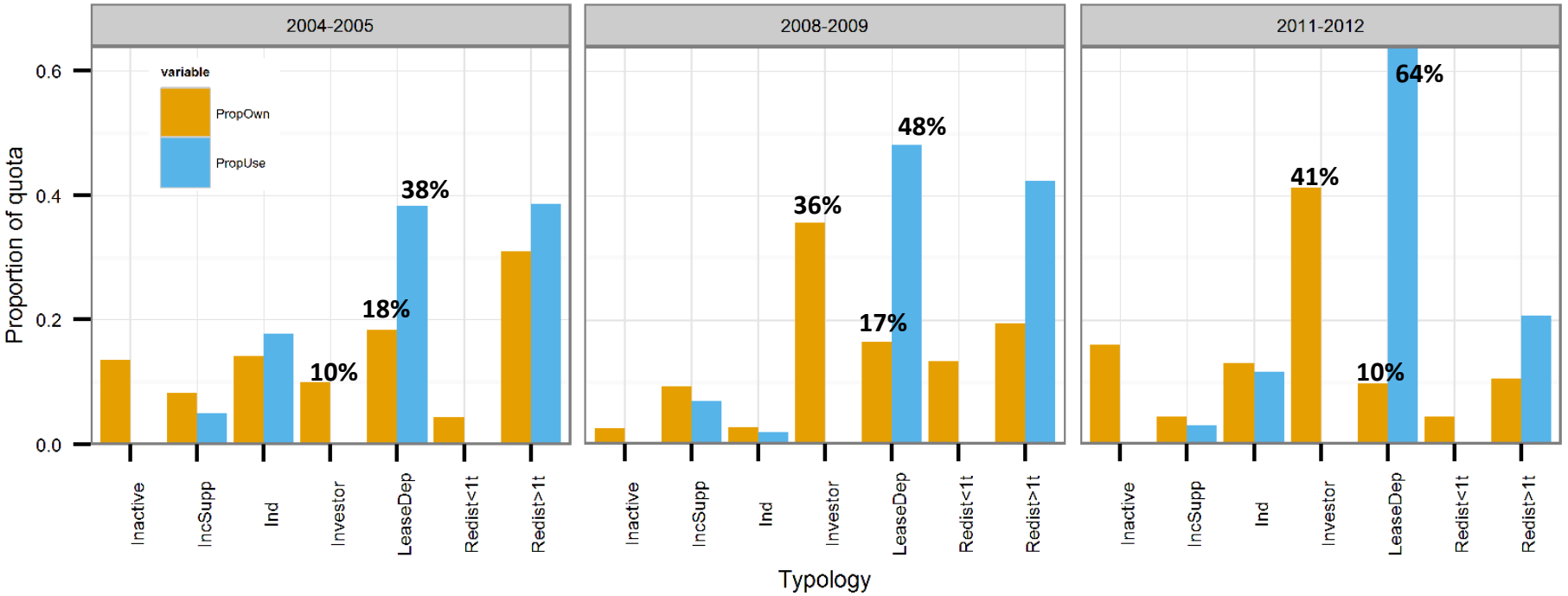
Ownership & Landings by Typology

- Investor/lease dependent relationship develops
- Inactive become investors in peak





Market Trends – Typologies – Network Analysis – Inefficiency?

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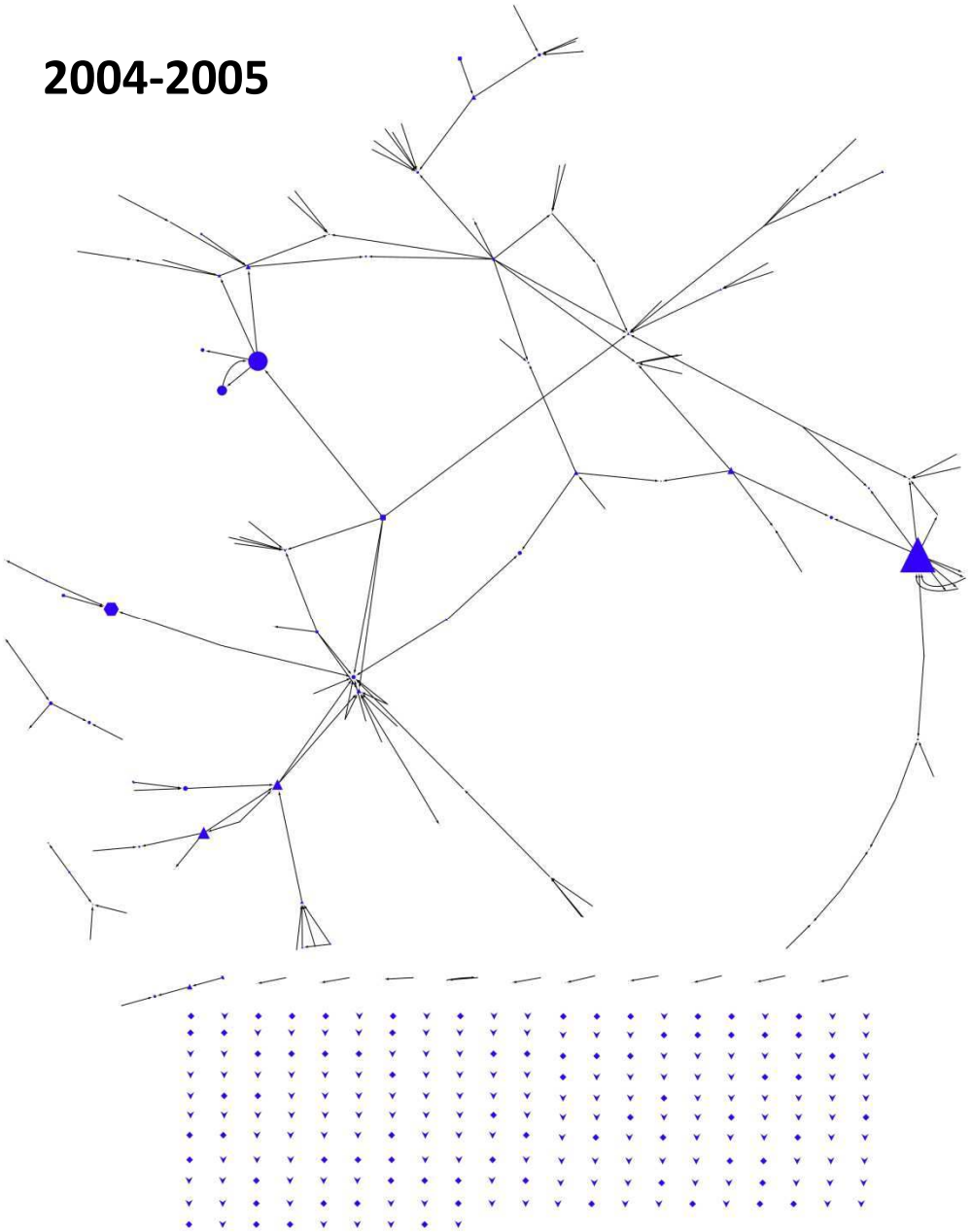
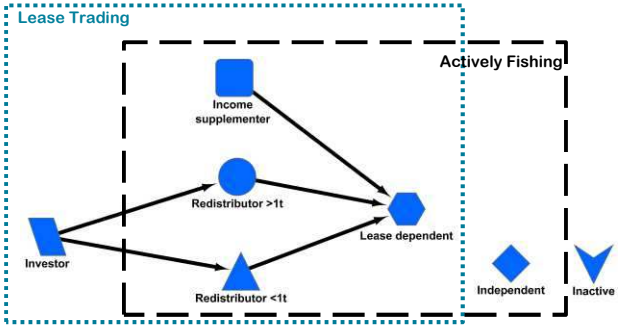
2004-2005



Lease Network



- 285 trades (mean 1807 units)
- 42% accounts trading

Market Trends – Typologies – Network Analysis – Inefficiency?

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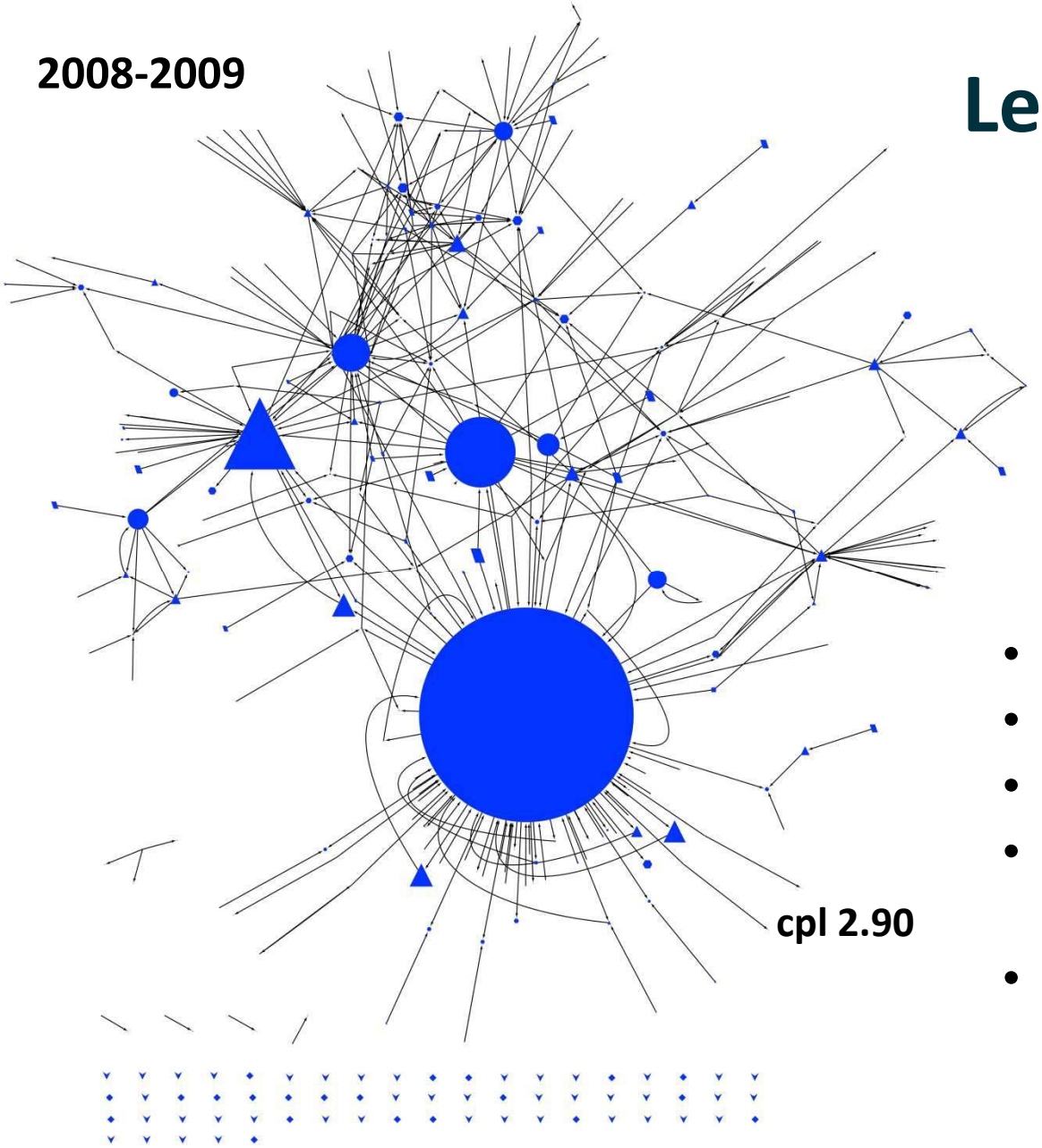
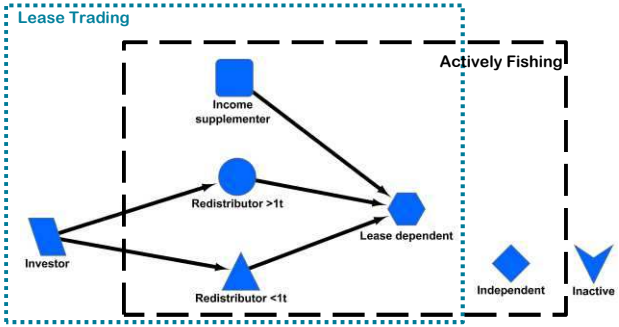
Lease Network

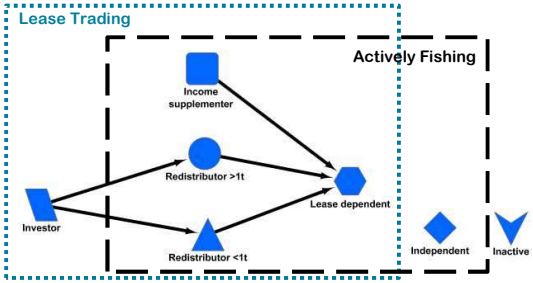




- 730 trades (mean 1701 units)
- 80% accounts trading
- Non-random development
- Scale-free structure
  - High degree ‘broker’ hubs
- Structure relatively compact (low characteristic path length)

Innes et al., 2014. Ecology and Society, 19(3)

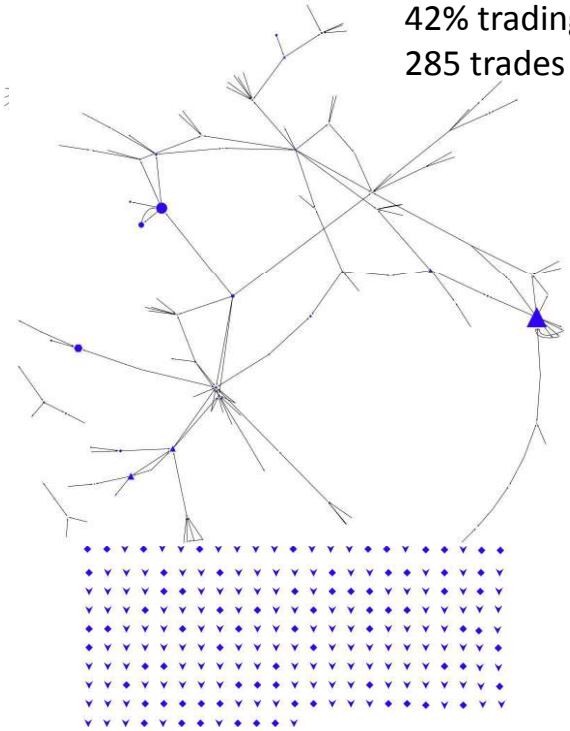
CT Lease Network



- Scale-free structure
- Inactive & independent high again in 2011-12

2004-2005

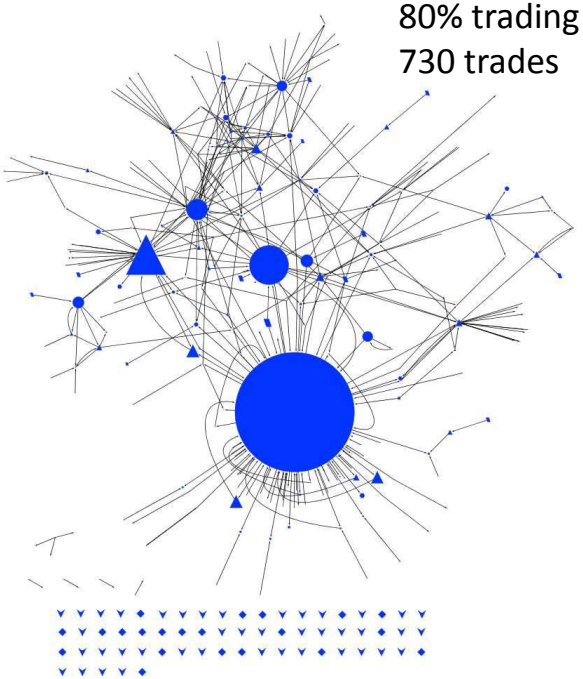
42% trading
285 trades



cpl 1.45

2008-2009

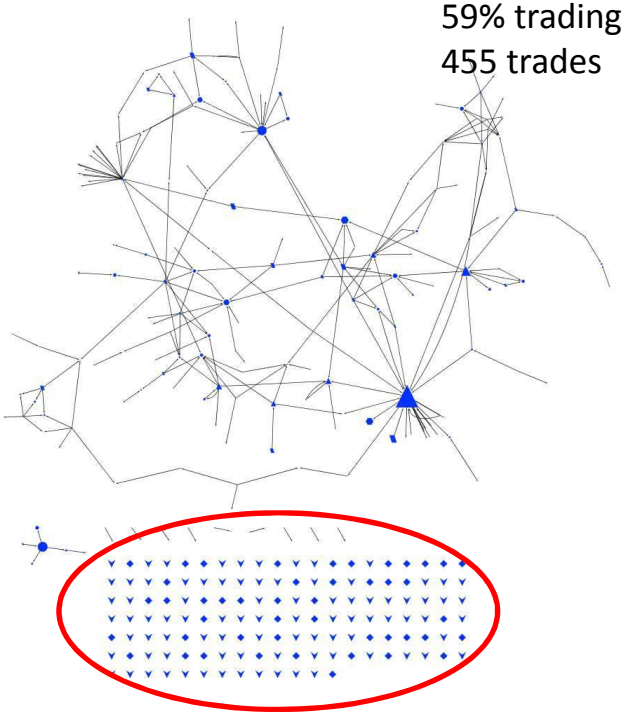
80% trading
730 trades



cpl 2.90

2011-2012

59% trading
455 trades



cpl 1.98

Market Trends – Typologies – Network Analysis – Inefficiency?

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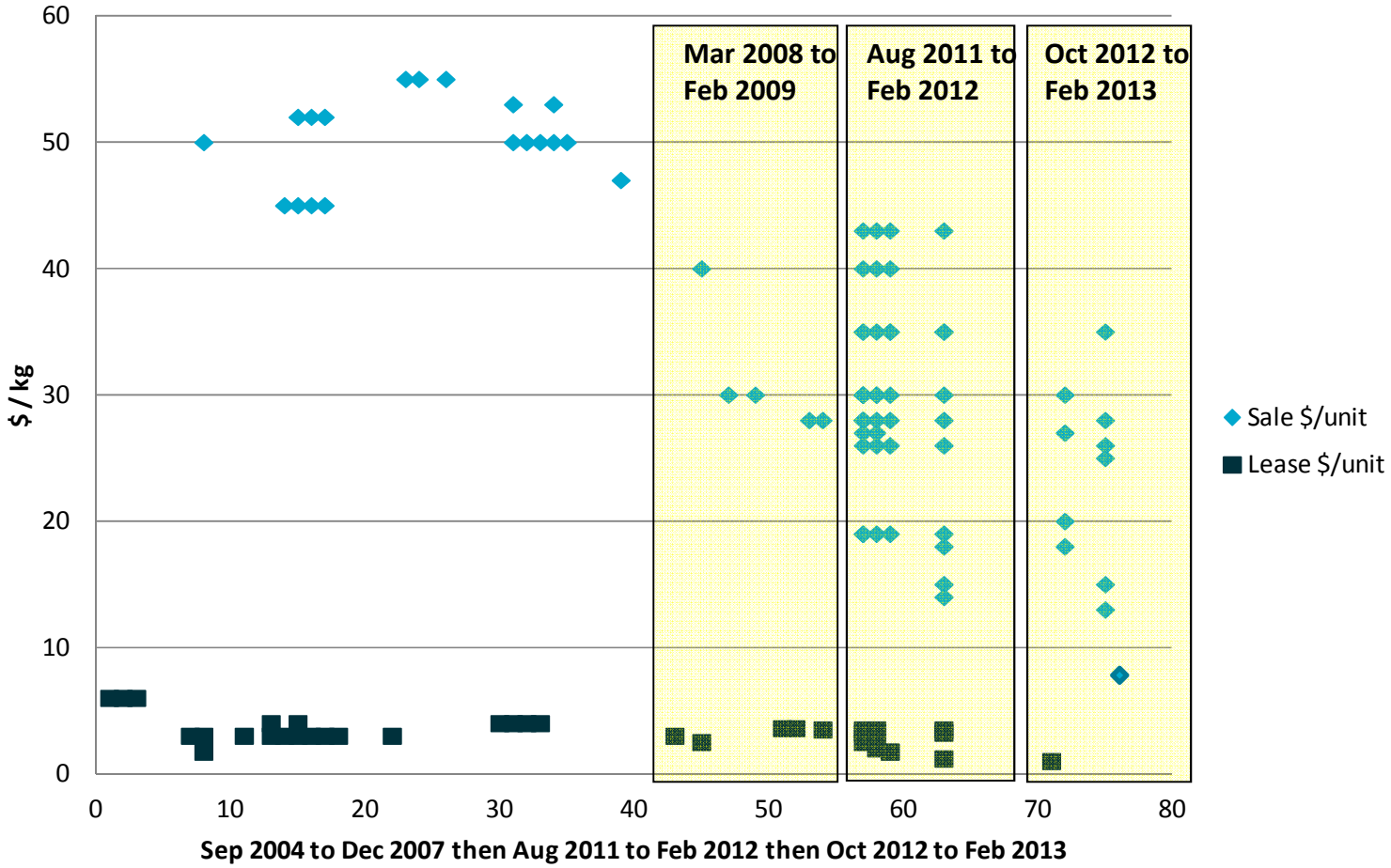
Advertised Quota Prices

- Falling demand and increasing uncertainty
- But, +ve lease prices despite untraded quota...



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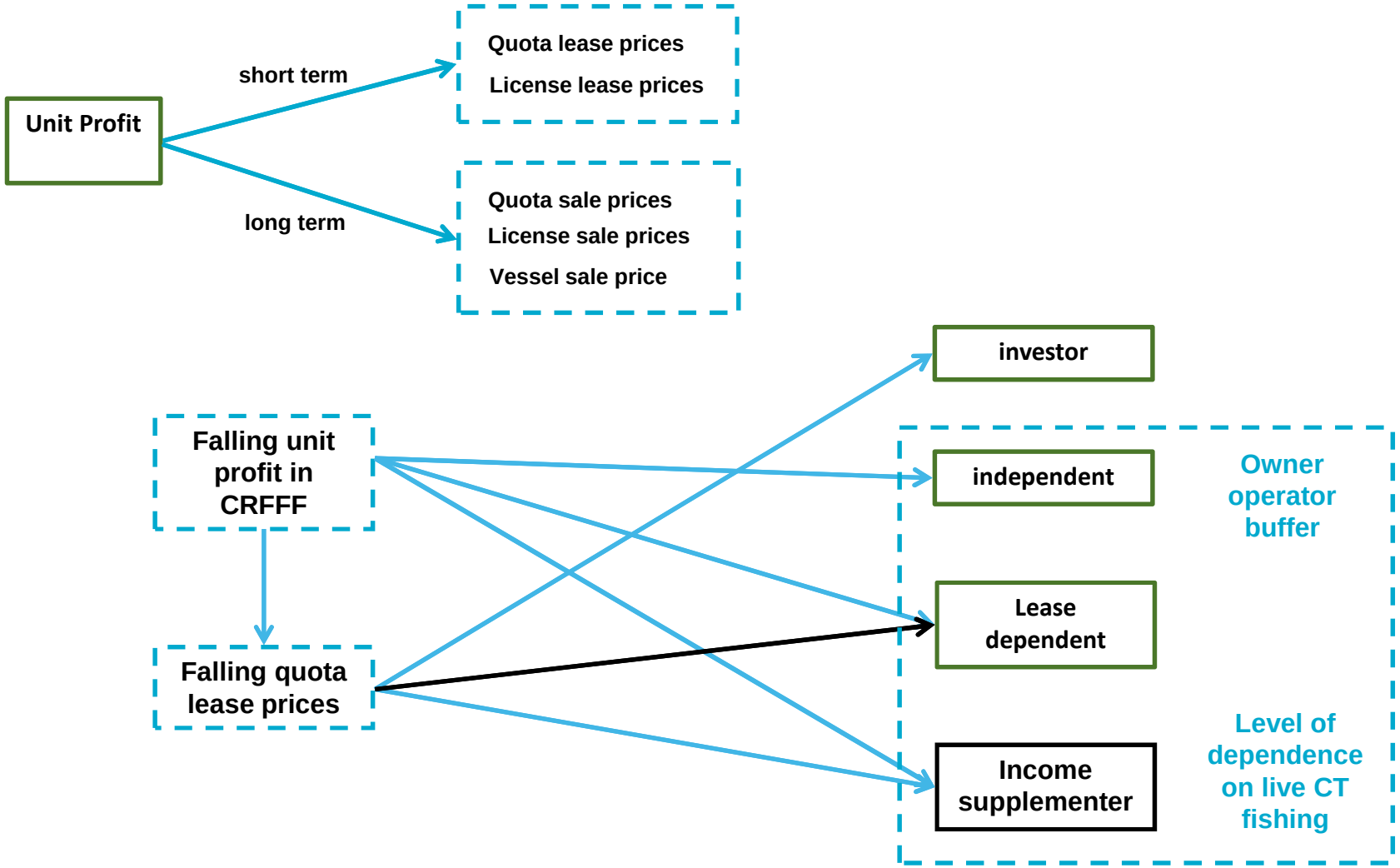
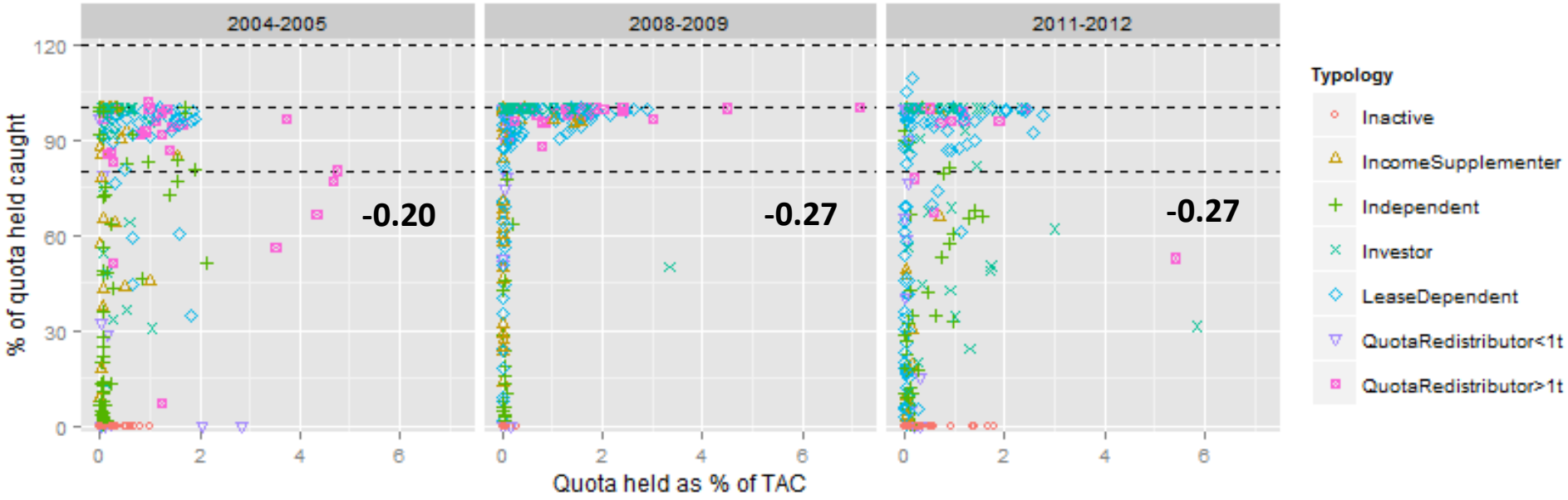
Impacts on firm status



Thébaud et al. 2013; Little et al. 2014

Inefficiency?

- Aim to use quota held & minimise 'gap' – opportunity cost (Connor and Alden 2001)



- In peak year, only smaller holders (<0.1% TAC) do not balance (average 28% gap)
  - Transaction costs due to geographical constraints ? (relative to size of operation)
  - Option value? (average 200kg)
  - Asymmetries in information / bargaining power depending on operation size?

Innes et al., 2014. Ecology and Society, 19(3)

Conclusions

- Market activity and complexity peaked in 2008-09, fallen since
  - When demand is high role for broker nodes develops
  - More accounts linked in when fishery closer to TAC
  - Inactive quota limited and gaps only for small account holders (option value?)
- Since 2008-09: fishery situation has deteriorated
  - Gaps for a broader range of accounts
    - → Smaller holders still worst job of balancing accounts
  - Inactive quota increases to 22%, +ve lease price
    - → Inefficiency? (management fee still > $0)
- If transaction cost issue - market can be considered efficient at current cost levels
  - But equates to higher costs for lease dependents (~80% landings on leased quota)
  - Initial distribution of quota potentially impacting outcomes
  - Alternative market configurations (quota-pooling?)

A side observation: evidence of “package trading”

- Theoretical and modelling work suggests it may be beneficial to trade packages of quota in multi-species markets (e.g. Iftekhar & Tisdell 2012; Tisdell & Iftekhar 2013)
  - Benefits greater when: Mature market, complementarity in quota - varying between participants
  - Most likely when: Joint production, economies of scale, transaction costs
  - All implying value of a package > sum of its parts

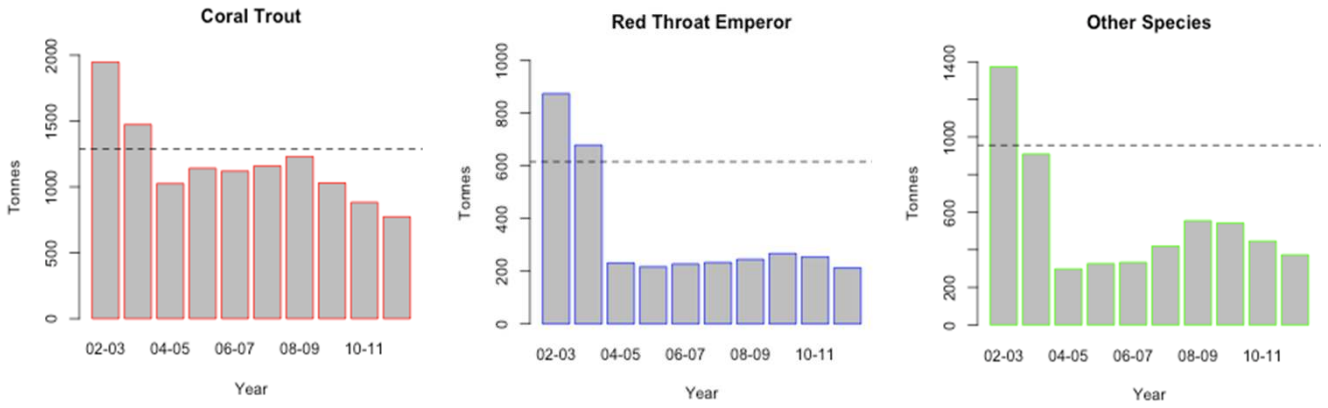
- Practical implications?
  - Realistic descriptions of how markets operate
  - Credible modelling assumptions
    - Typically assume separate single species markets
  - Assumptions around potential efficiency gains?

Innes et al., 2014. Marine Policy 46: 68-71.

Characteristics of the Fishery

- Relatively selective (handline)
- Heterogeneity in:
  - Species composition by latitude
  - Targeting by vessel
  - $ value is primarily live coral trout (CT)

→ Results in heterogeneous demand wrt mix of quota



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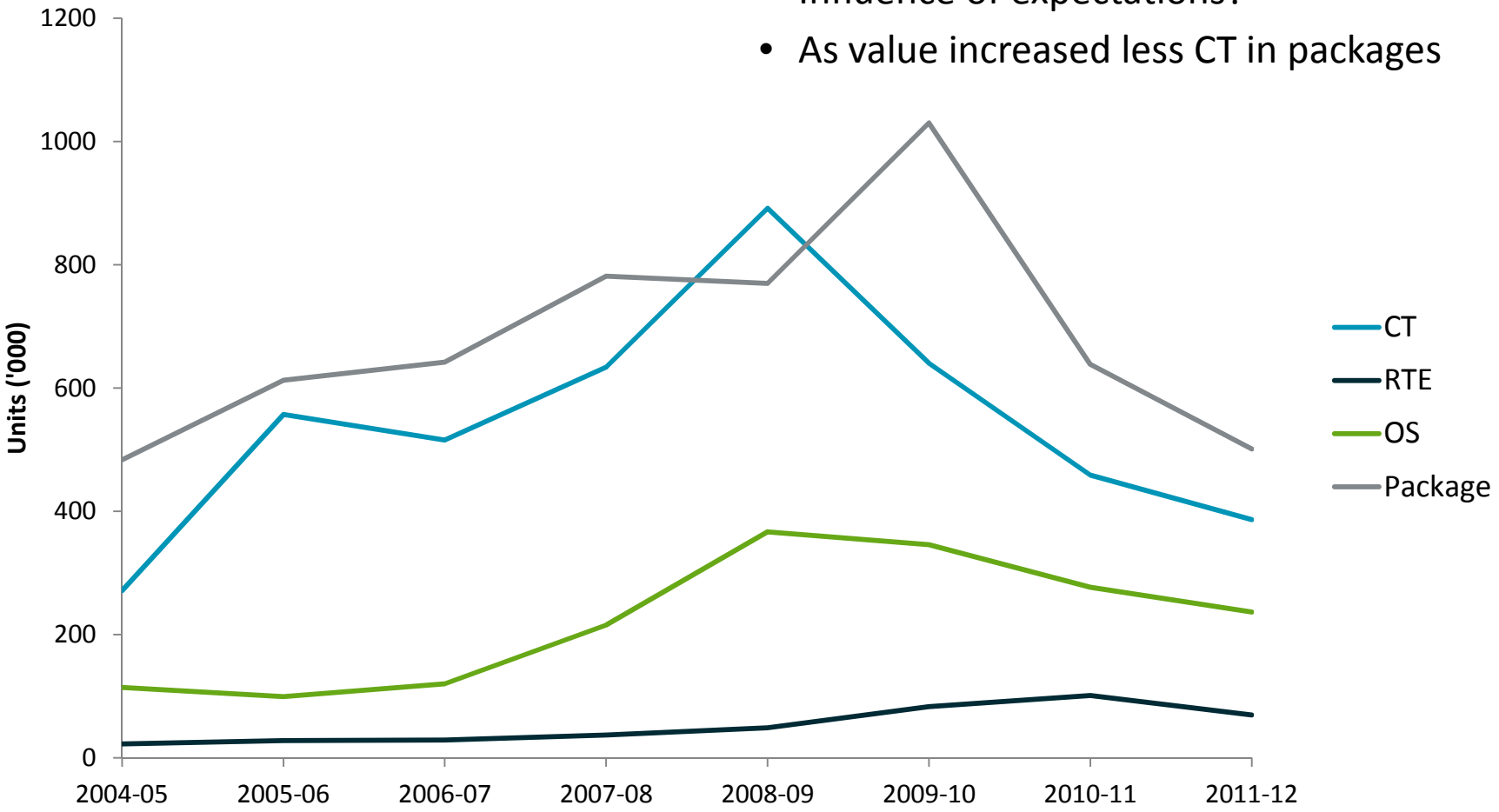
Quantities of quota leased

- Packages just under 50% by volume
- Influence of expectations?
- As value increased less CT in packages



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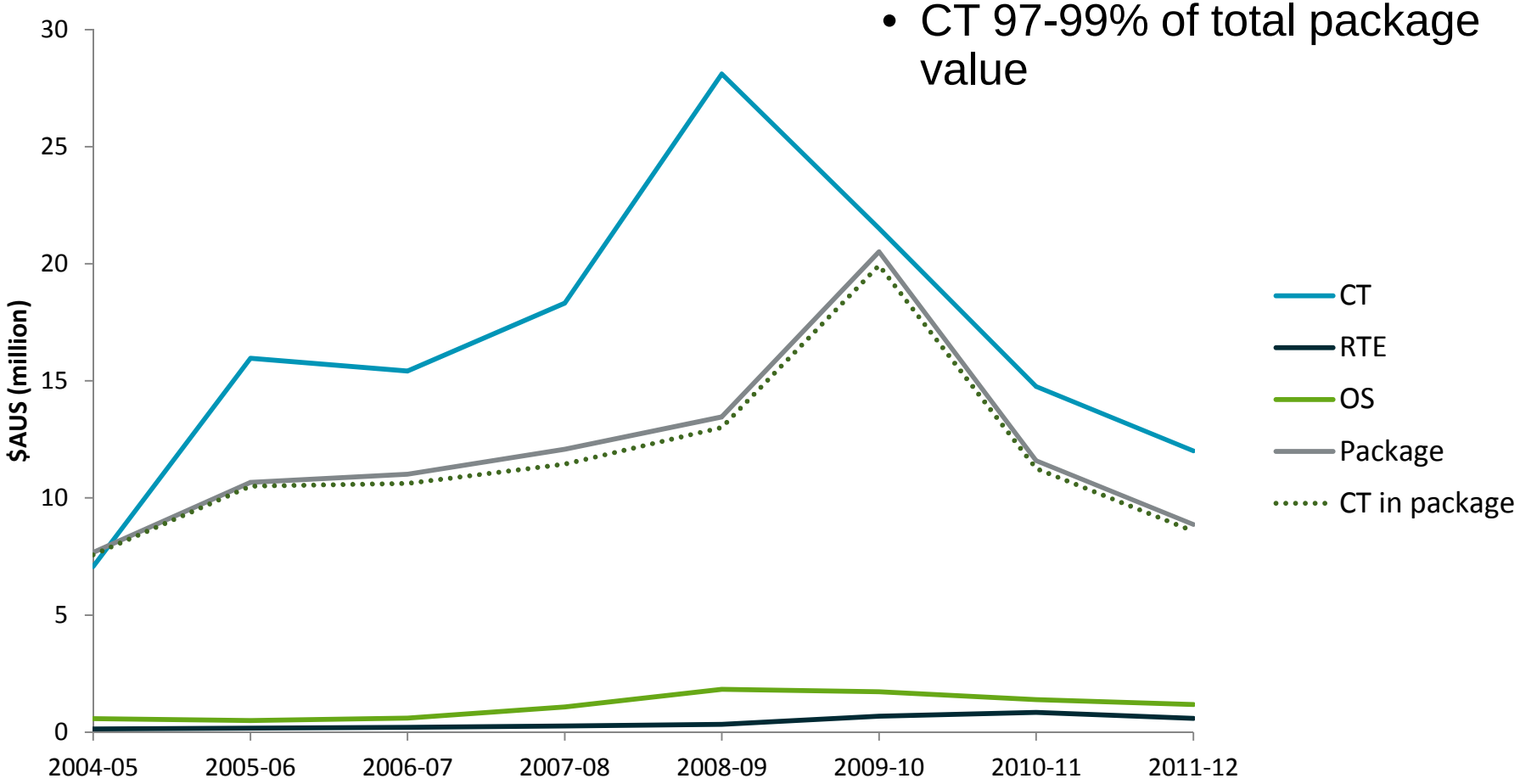
Value of trades

- Weighted by beach price
  - CT 97-99% of total package value



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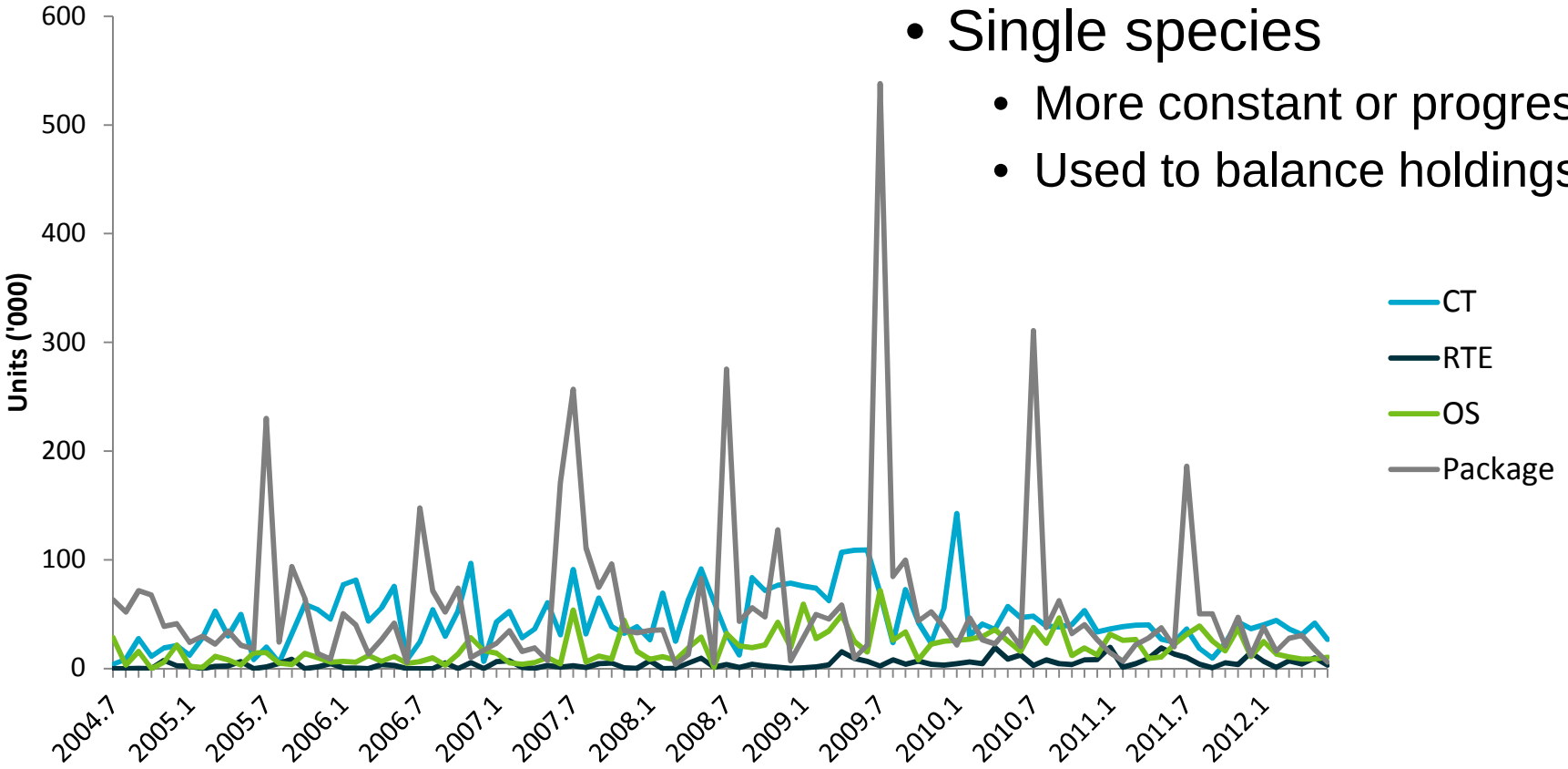
Intra-annual trends

- First month/s
  - Predominantly package trades
  - 2nd best solution to minimise transaction costs?
  - Reflection of expectations
- Single species
  - More constant or progressive
  - Used to balance holdings



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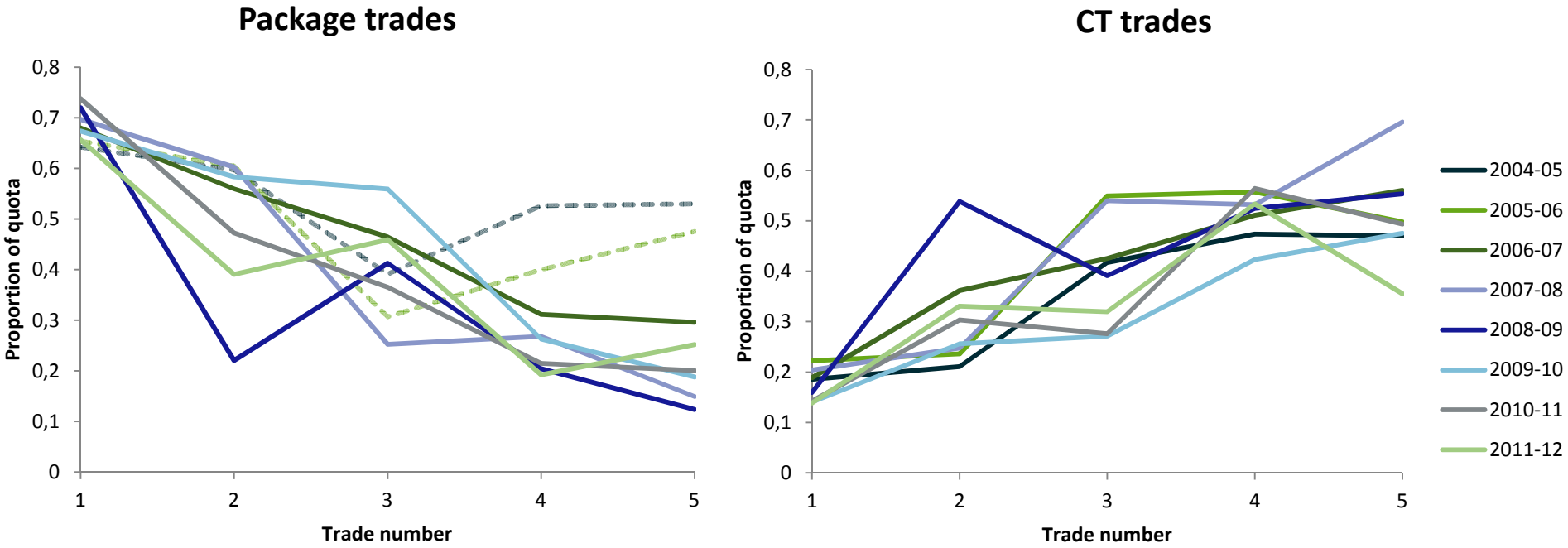
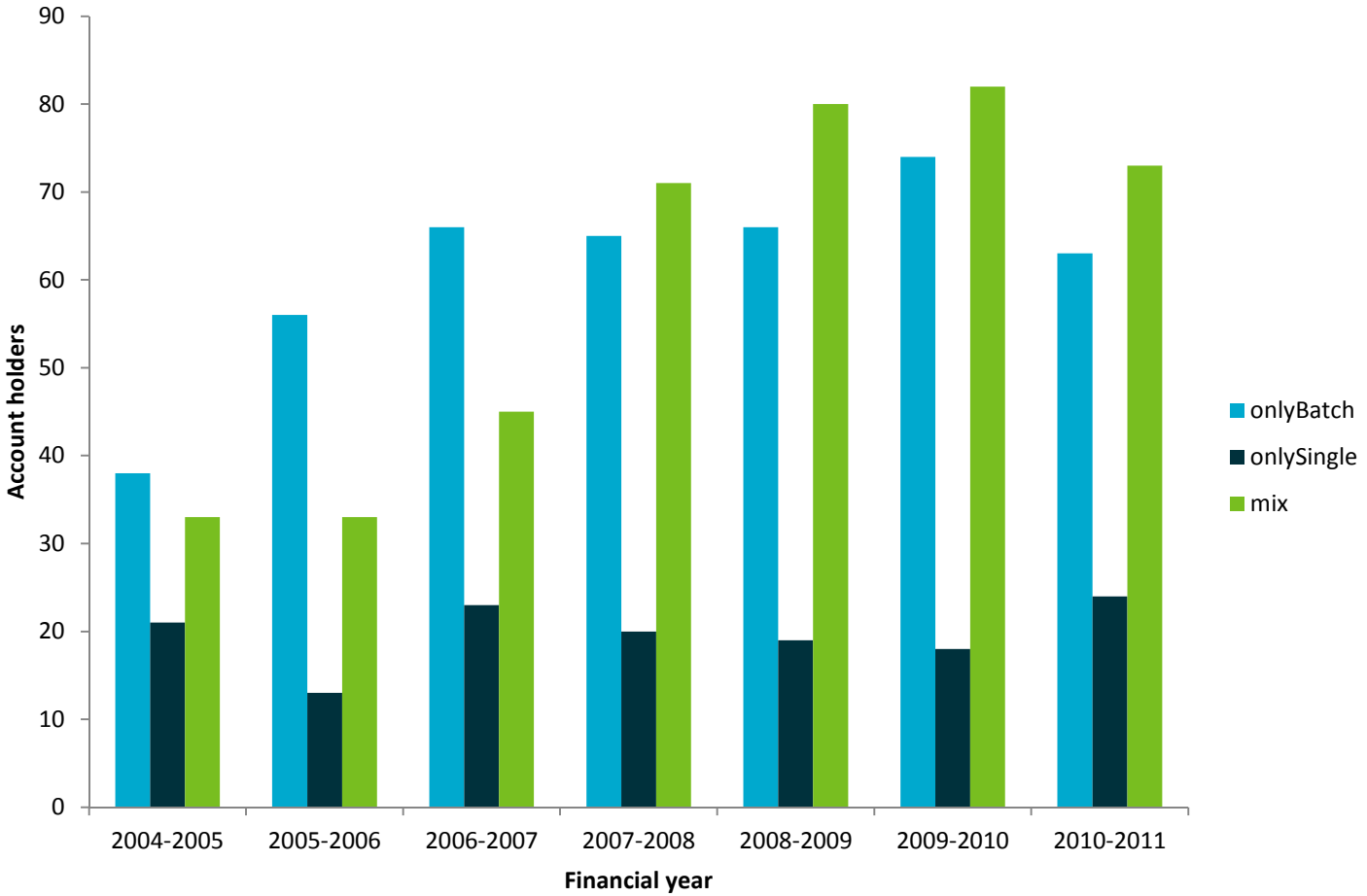
Sequence of trades



- 1st trade 68% in a package only 17% CT
- Distinct behaviours at the traders level?
  - 'packageOnly' 40-50% , 'singleOnly' 10-17%, 'mix' 34-48%

Innes et al., 2014. Marine Policy 46: 68-71.

Numbers of traders



Conclusions (ctd.)

- Package trading behaviour present in the CRFFF quota market
  - Implies 4 (or more) markets for quota (CT, RTE, OS, package)
  - 3 trading strategies (at least); single only, package only, mix
- Bio-economic analysis of the fishery should account for this?
  - First prioritising package trades, then single species
- Further evidence of transaction costs in the CRFFF?
- Questions for the future
  - Distinct sub-groups within the traders?

Innes et al., 2014. Marine Policy 46: 68-71.

Thank you!