



ESSA Conference – 18-21/09/03

How To Be Loyal, Rich And Have Fun Too

(The Fun Is Yet To Come)

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Thematic and methods

The observation of *real* markets to understand the formation of prices:

- Which competition actually takes place and are there market powers?
- What are the available information for individuals and how does one individual deal with information?
- What is the influence of individual rationality on an established institution?

Two tools that interact:

- Field observation and interviews with stakeholders and actors (the demand originates in the market itself)
- Simulations to see the coherence of our understanding of the system

« les Arnavaux »



- Marseille wholesale fruits and vegetables market.
- Outside the city, near the port, the airport, the motorway.
- Open from 3:30 until 8:30 am.
- 3 bars, 2 restaurants, a bank, tobacco retails

Important remarks

- Structural: position of the market
 - There are other markets in the area, « producer markets ». This is the one with imported goods (winter mainly).
 - Formation of prices for the region? (importers, producers, supermarkets)
- Individual behaviours and norms:
 - Buyers don't make any prior offer, they ask for the price or declare a quantity they want (Kirman).
 - No written price, a seller makes individual offers.
 - It is not “normal” to interfere in others' transactions

Retailers: market vs network

Basic constraints (variable):

- List of goods to acquire (season and past sells)
- Limited time (employees)
- Type / quality of goods (situation of the shop)
- (we leave money out – why?)

Knowledge that determine choices

- « les mercuriales » and producers
- Ask wholesale sellers while negotiating
- Ask other retailers « at the bar » or friendly wholesale sellers

Search habits

- First go to producers' area
- « Favourite » wholesale seller
- Extensive search for some goods
- Stick to the list or adapt to offer (time and space)

Wholesale sellers

Numerous aspects to a relation for price making

- Regularity
- Loyalty
- Quantity
- Feelings

Variation of 30 to 50% off the « basic price »

Expectations after a good deal offer

Signs of good relation and trust

- Credit
- Information about prices for the next day
- Keeps some goods that are ordered by telephone

Aspects emphasised in this work

« Network vs market » (Kirman, Galtier)

Time is used for:

transacting, negotiation

information search

friendship relations

Agents have different strategies to use the time
(loyalty vs selfish)

Market

Agents (buyers and sellers)

Products

Probability of supply for each product

Difference in Price (among agents and in time)

Wholesale Seller

Normal supply

List of goods and prices

Regulars

Sets base prices

Revise prices

Answers requests

Revise stock

Revise normal supply

Buyer

Type

Timing

List of goods

Regular

Gathers
information

Chooses best deal

Supply

Market

Probability Range for supply = 60 – 80

Difference in Price : From one step to another = Among agents = 10%

One time-step:

Prob. supply	80	78	63	70	71	65	72	64	68	80
Price										

Wholesale seller

Requests
for supply

Yes/No
Price per unit

Normal Supply	8	6	7	3	7	4	4	2	9	8
Stock	(p1, p2,...)									

List:

[price, date]
[price, date]

Revises
Supply: 1/2

Throws old
products

Calculates prices
Revises prices

Base Price: + 30 %
At half time: +/- 10%

Demand

Need: 5 products needed for one time-step ; one unit of each

Knowledge about prices: starts with no knowledge of prices
or supply > gets knowledge (5 wholesale seller)

Stock	Average Price	Average Price	0	0	Average Price	0	Average Price	0	Average Price	Average Price
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Choice:

Loyal go to Regular first, then to the Wholesale seller who possesses the more products

> asks for all its needs

Selfish selects the wholesale seller who makes the best price for each products

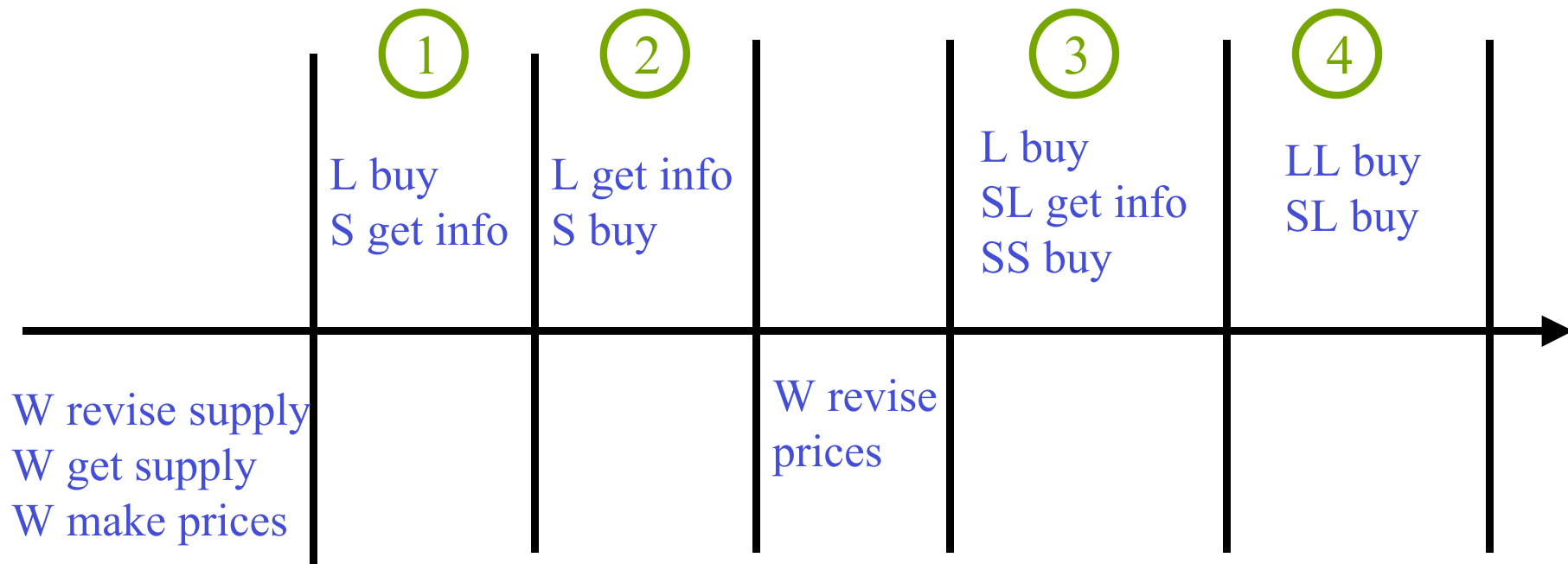
> asks for 1 to 5 product for each selected

Interaction

- Request by the seller = a list of products
- Ordering of requests: regulars first
- Answers Yes as long as it has the product
 - Reduction of 10% if the buyer is a regular
 - Reduction of 10% if the buyer buys more than 3 units
 - Reduction of 20% if the buyer is a regular and takes more than 3 units
- Buyer update its knowledge about price and availability of products with the answer.
- Seller updates its knowledge about regular = bought at least 20% of needs (5 units) in the last 10 time-steps

Time-step

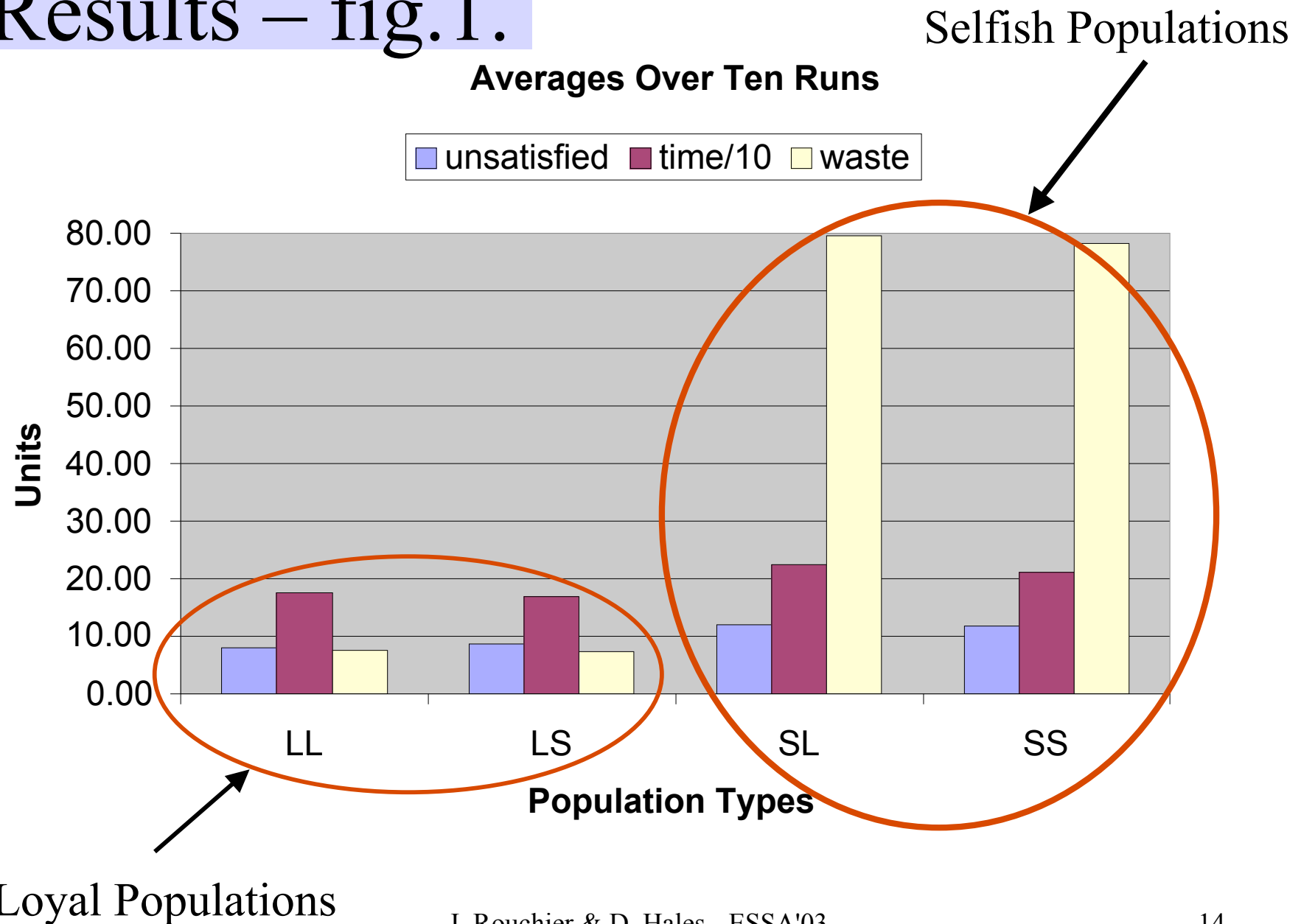
There are 4 possible stories for buyers, depending on type and timing
LL – LS – SL –SL



Simulations

- 100 Homogenous buyers (compare 4 different populations)
- 10 sellers (wholesalers)
- 10 products with prices initially randomly drawn from [50..100] and then changed each cycle rnd [-/+10%] (perish in 4 cycles)
- Supply probabilities drawn from [0..1] each cycle for each product
- Inter-wholesale agent price variation [-/+10%]
- When a wholesaler can not satisfy an order it increases its desirable stock level by one unit, but when it has to throw out waste product it reduces the desirable stock levels by half of the amount wasted
- 200 market days
- Observed output:
 - The average number of unsatisfied agents after a market day,
 - the average amount of time spent by agents on the market
 - the average amount of products wasted at the end of each market day

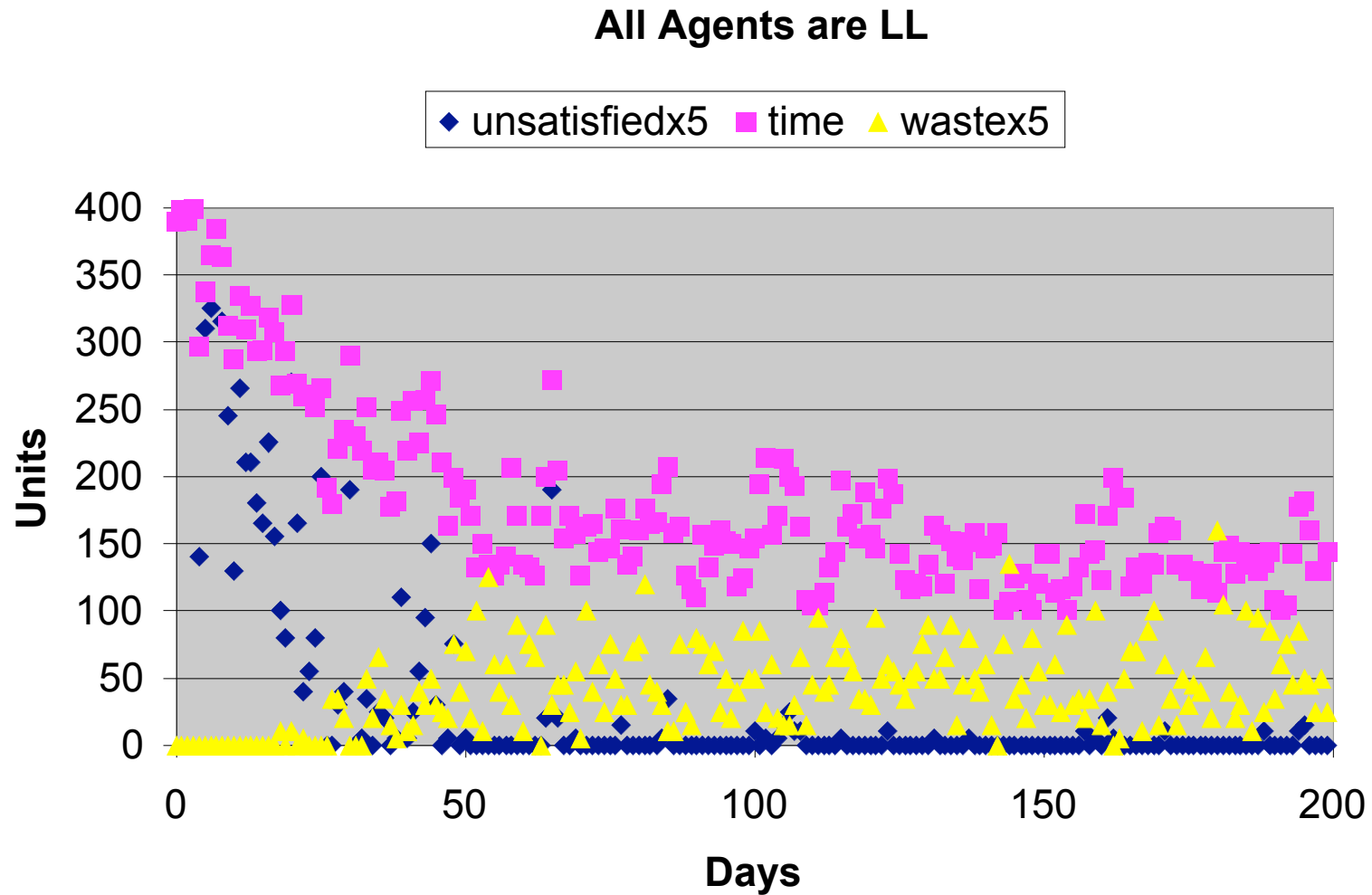
Results – fig.1.



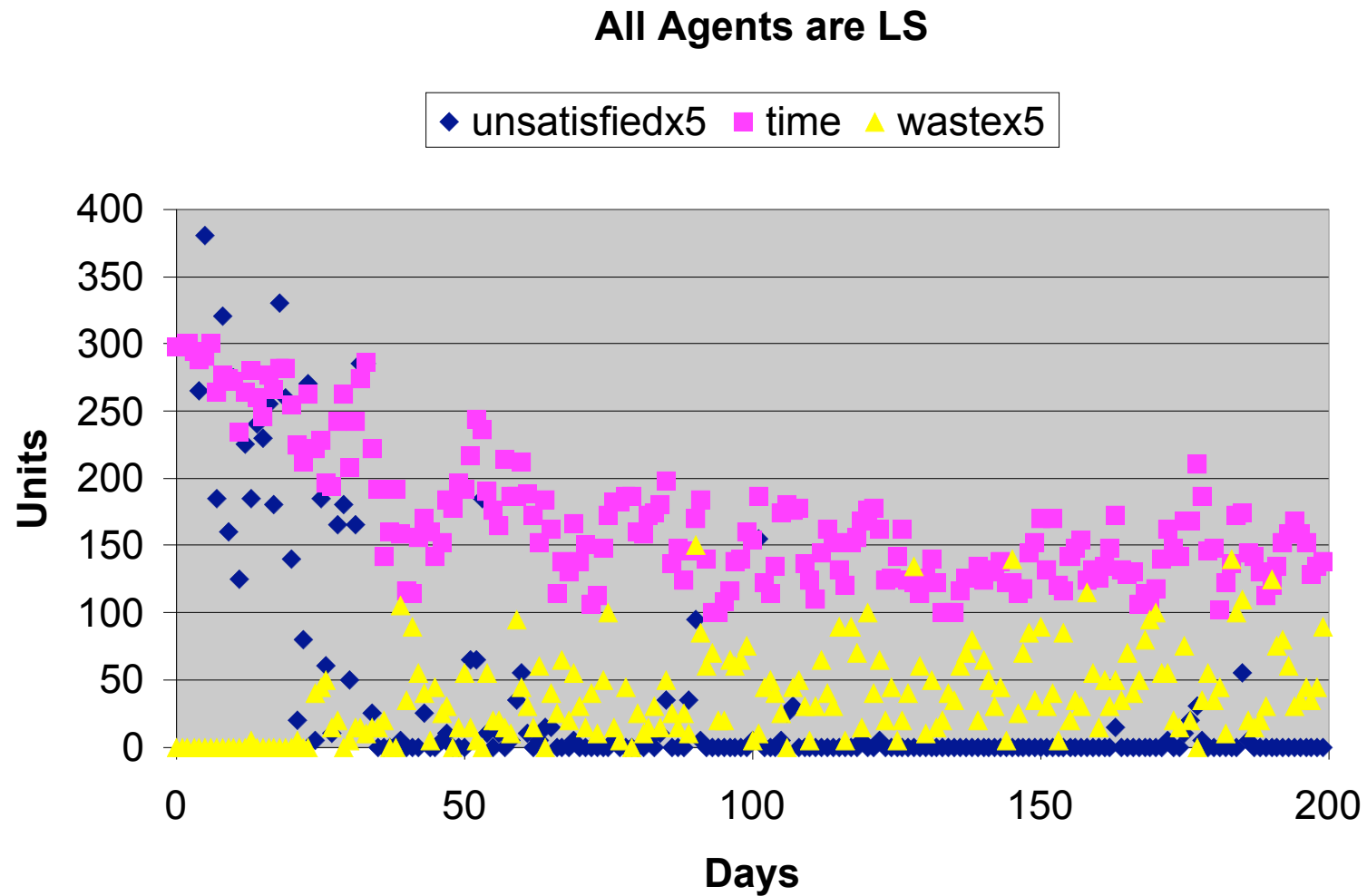
Results

- In figure 1 the major result is that waste increases significantly when all the agents are selfish (SL and SS). You should also notice that both satisfaction is increased and time is decreased when agents are loyal (LL and LS).
- This increase in waste is mainly due to wholesale agents overstocking to attempt to satisfy sales that are subsequently not made – since in previous days selfish agents ask several wholesale agents to supply various products.

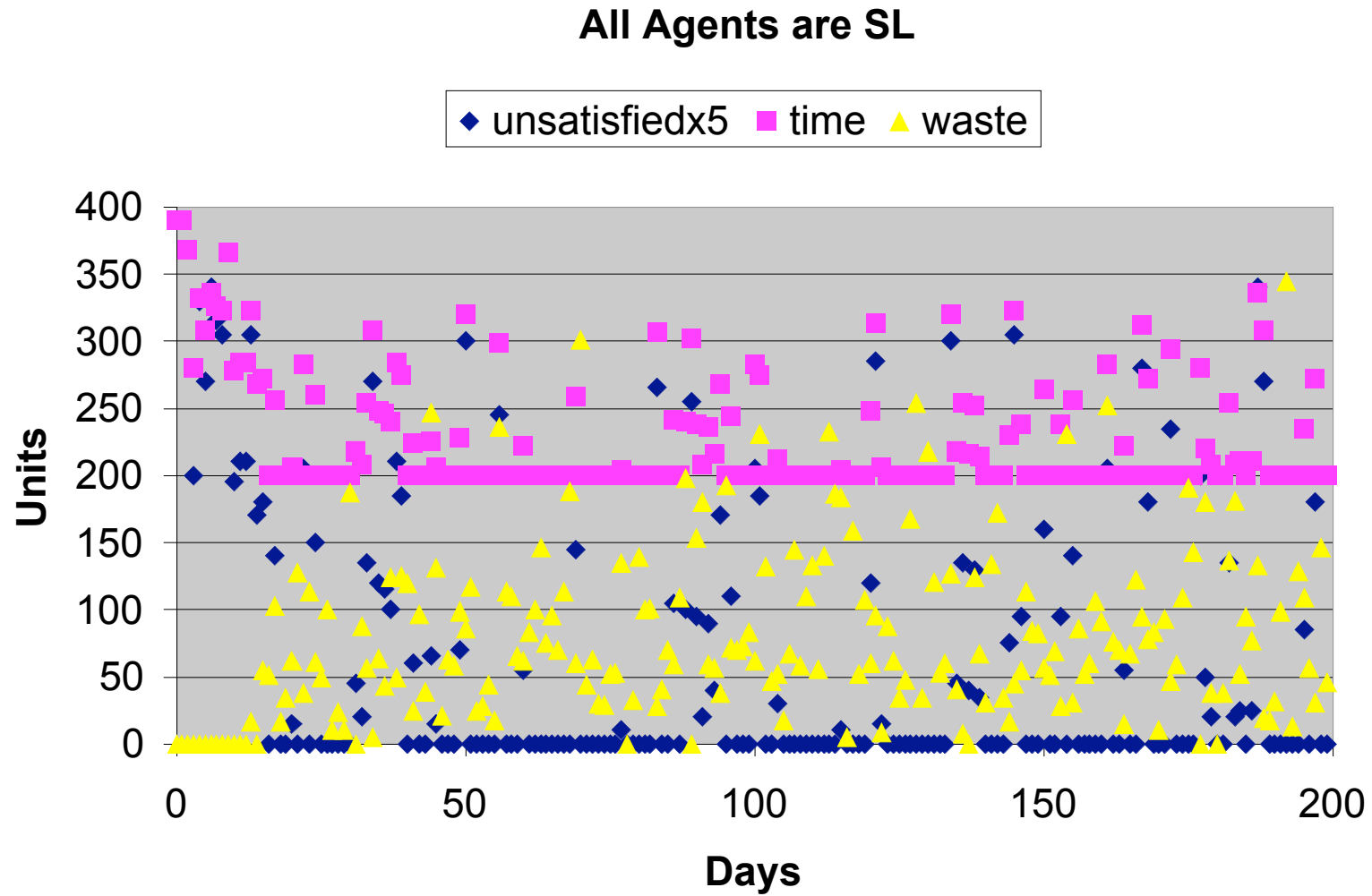
Results – fig.2



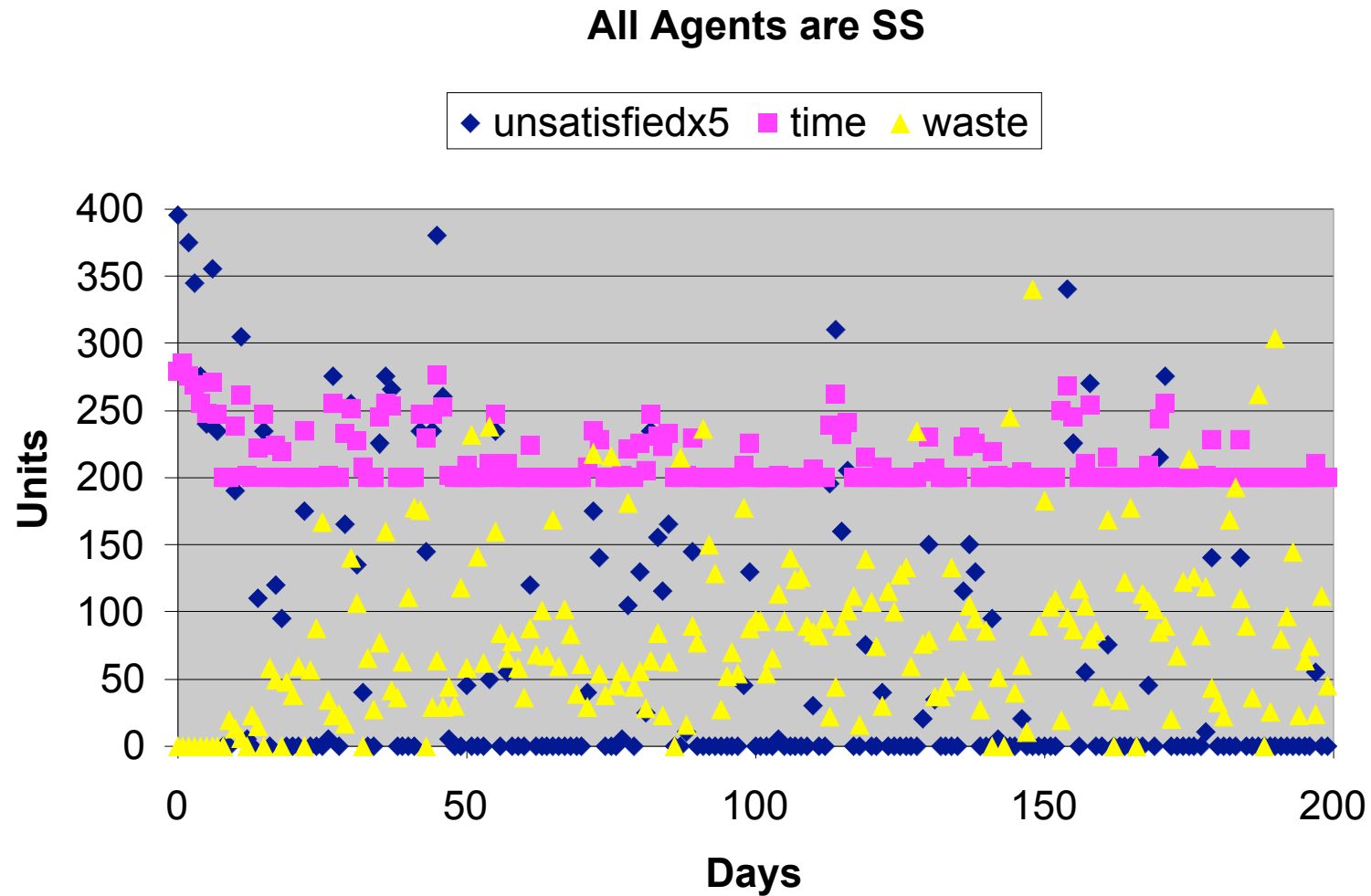
Results – fig.3



Results – fig.4



Results – fig.5



What's happening?

- Intuitive (we have no great surprise)
- In the selfish populations many wholesalers are approached for different products
- If / When they can't supply they increase their desirable stock levels
- But they can't control what price they may have to pay relative to others
- This means, they could be unlucky – pay more than others – and then selfish agents will buy elsewhere => waste
- Because there is no specialisation, all agents try to supply all products => high waste
- In the loyal populations the shopkeepers (by being loyal) help to smooth out the price variations and save time on info gathering activities.

Thinking aloud (a conjecture or a “good idea for a simulation”)

- Supermarkets operate outside these kinds of markets.
- They are their own wholesalers (getting economies of scale from ultimate suppliers) but they are all (generally) trying to supply ALL customer needs => high waste?
- Are “loyalty card” type schemes an attempt to artificially recreate a less wasteful situation by “kick back” inducements rather than human social relationships? Does it work? Can it be modelled?

Next steps

Time as the observed data

- In the model: build artificial agents with more ability to use their time and check how they do it
- In interviews: check the relevance of the description, see how regular individuals are in their use of time

Introduction of fun

- A friendly visit as equivalent to a transaction?
- Has to do with the issue of time