



# Analysis of French timber prices over the past 50 years

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# Analysis of French timber prices

- Price data presentation
- Volatility analysis
  - Method, results, comments on forest management
- Correlation analysis
  - Method, results, comments on forest management

# Analysis of French timber prices

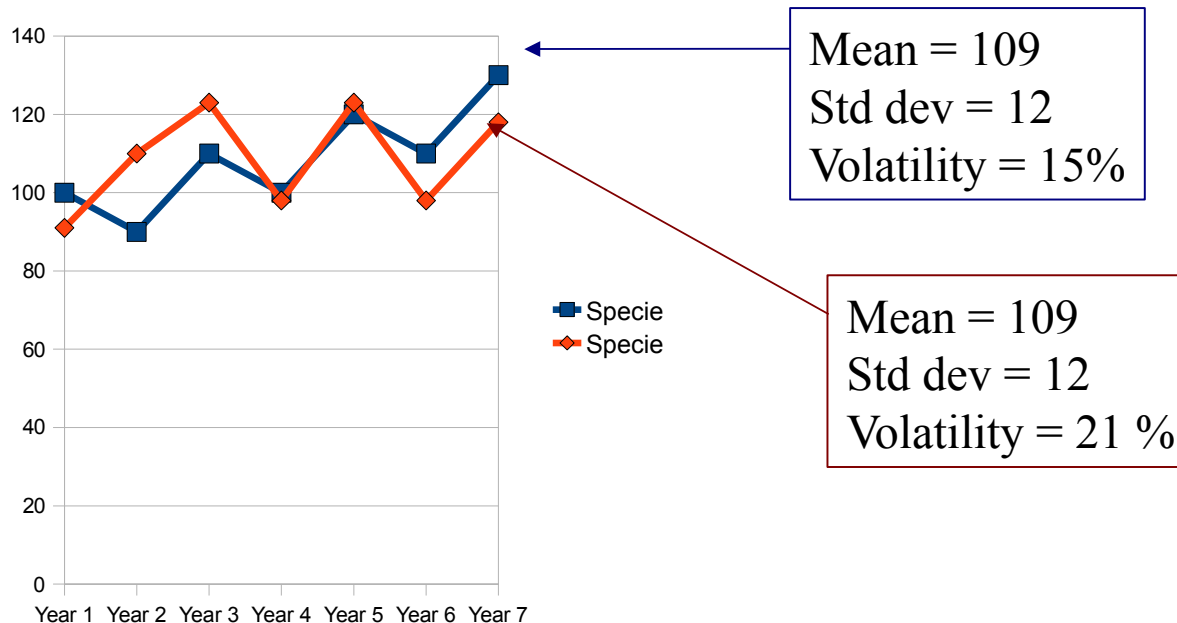
- Price Data Presentation
  - Data from private forests sales (forest experts)
  - 20 species :
  - Aulus, Betula, Carpinus betulus, Acer campestre, Castanea Sativa, Quercus, Acer pseudoplatanus and platanoides, Fraxinus excelsior, Fagus sylvatica, Prunus avium, Populus, Tilia, Ulmus, Platanus, Populus Tremula
  - Pseudotsuga menziesii, Picea abies, Abies alba, Larix, Pinus nigra laricio, Pinus pinaster, Pinus nigra, Pinus sylvestris
  - 7 diameter classes
  - 1 to 3 qualities
  - 1958-2008

# Analysis of French timber prices

- Volatility analysis :
  - Standard deviation :
    - usually used to describe the spread of any distribution
    - But includes long-term variations (not only short term fluctuations around a tendency)

# Analysis of French timber prices

- Volatility analysis :
  - Here : volatility is the standard deviation of annual relative variation  $R_t$
  - $R_t = \ln(P_t) - \ln(P_{t-1}) = \ln(P_t/P_{t-1})$



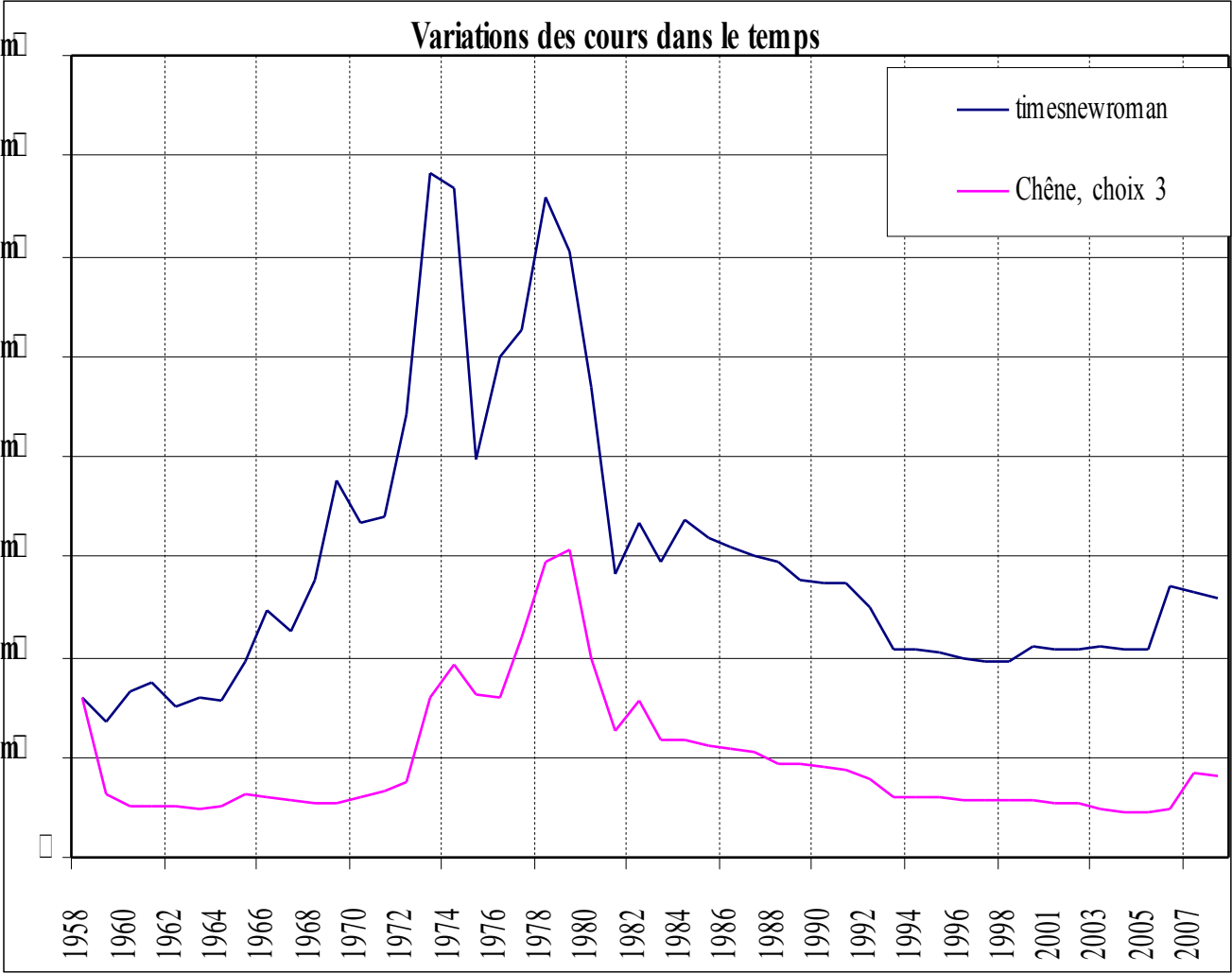
# Analysis of French timber prices

- Average volatility (all qualities, large diameters)

	50 years	20 years	10 years	5 years
Hardwood species	17,6	10,5	9,7	9,7
Softwood species	16,6	7,6	6,5	8,5
All species	17,2	9,2	8,6	8,5
Min-Max	1,9 - 47,6	0,8 - 26	0,7 - 25,2	0,6 - 34,1

- Higher volatility : 50 years (oil crisis)
- Higher volatility for hardwood than for softwood

# Analysis of French timber prices



Quercus

Best quality

Low quality

# Analysis of French timber prices

Best quality	50 years	5 years
Quercus	18,2	15,7
Fagus sylvatica	15,9	9,6
Fraxinus	18,6	8,8
Pseudotsuga menziesii	12,6	6,4
Picea abies, Abies alba	12	7,9
Pinus sylvestris	13,9	8,6

Hardwood best quality  
higher volatility than  
softwood best quality :

Fashion effect ?



# Analysis of French timber prices

- Volatility for best and 2d quality

	50 years	20 years
Quercus, best quality	18,2	10,9
Quercus, 2d quality	20	20,7
Fagus sylv, best quality	15,9	15,6
Fagus sylv, 2d quality	19,7	17,1
Picea abies, best quality	12	8,8
Picea abies, 2d quality	19,8	6,1
Pinus sylv, best quality	13,9	10,5
Pinus sylv, 2d quality	15,9	7,1

# Analysis of French timber prices

- Volatility for large and low diameters

	50 years	20 years
Quercus, 2d qual, large diameters	20	20,7
Quercus, 2d qual, low diameters	32,9	3,4
Fagus sylv, 2d qual, large diameters	19,7	17,1
Fagus sylv, 2d qual, low diameters	26,6	1
Picea abies, best qual, large diameters	12	8,8
Picea abies, best qual, low diameters	8	2,4
Pinus sylv, best qual, large diameters	13,9	10,5
Pinus sylv, best qual, low diameters	9,2	5,3

Effect of oil crisis  
on volatility  
low diameters of  
hardwood

# Analysis of French timber prices

- Some comments on forest management :
  - Short bibliography review :
  - higher spread => higher benefit from flexible management
  - In France, higher spread for Quercus => even if high price of quercus today, perhaps lower than its reservation price ?
  - Best and 2d qualities : not the same volatility
  - Large and low diameters : not the same volatility

# Analysis of French timber prices

- Correlations :
  - Short-term decisions : flexible management strategy, which species should I harvest ?  
Spearman's rank correlation (few data/period)
  - Long-term decisions : which species should I choose ?  
graphical analysis and linear correlation (ongoing work)

# Analysis of French timber prices

- Correlations

- For 11 ecological situations typical of France
- main and secondary species of these situations
- Correlations between species of the same ecological context
  - Not necessary to calculate correlations between species which will not be in the same forest

N°	Ecological situation	Main species	Secondary species
I	Mountain	Abies alba, Picea abies, Fagus sylvatica	Acer pseudoplatanum
II	Middle mountain	Quercus, fagus sylvatica, Abies alba	Pinus sylvestris
III	Limousin	Pseudotsuga menziesii, Fagus sylvatica	Castanea sativa
IV	Picardie	Quercus, Fagus sylvatica, Fraxinus, Acer	Prunus avium, Aulus, Carpinus betulus
V	Picardie 2	Populus, Quercus	Aulus
VI	Centre	Quercus, Pinus sylvestris	Betula, Pinus nigra laricio, Pinus nigra
VII	Centre 2	Quercus, Fagus sylvatica	Carpinus betulus
VIII	Massif central	Pseudotsuga menziesii, Picea abies	Pinus sylvestris
IX	Aquitaine	Pinus pinaster	Pinus nigra laricio, Abies alba
X	Saône	Quercus	Tilia, Betula
XI	Alluvial forest	Quercus, Fraxinus	Acer pseudoplatanum, Tilia

# Analysis of French timber prices

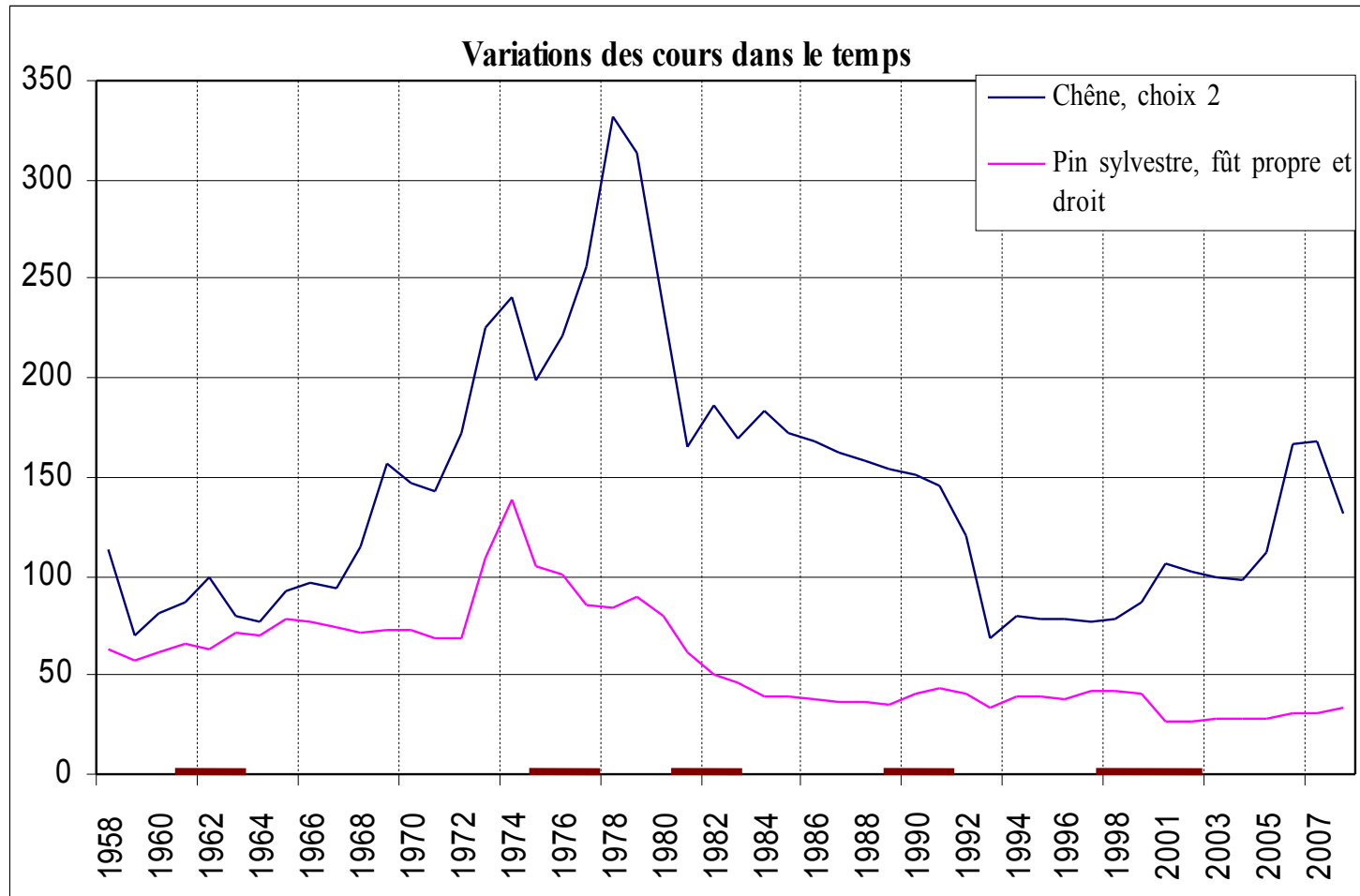
- Short time periods analysis  
Spearman's rank correlation

Periods	1960 1964	1965 1968	1969 1972	1973 1977	1978 1983	1984 1988	1989- 1994	1995 1999	200 1- 200 4	200 5- 200 8	Total
Number of correlation <0	7	22	5	0	0	1	0	6	25	13	79
Number of correlation >0	17	43	36	33	145	70	68	28	73	28	541

Oil crisis

Economic crisis

# Analysis of French timber prices



Quercus

Pinus  
sylvestris

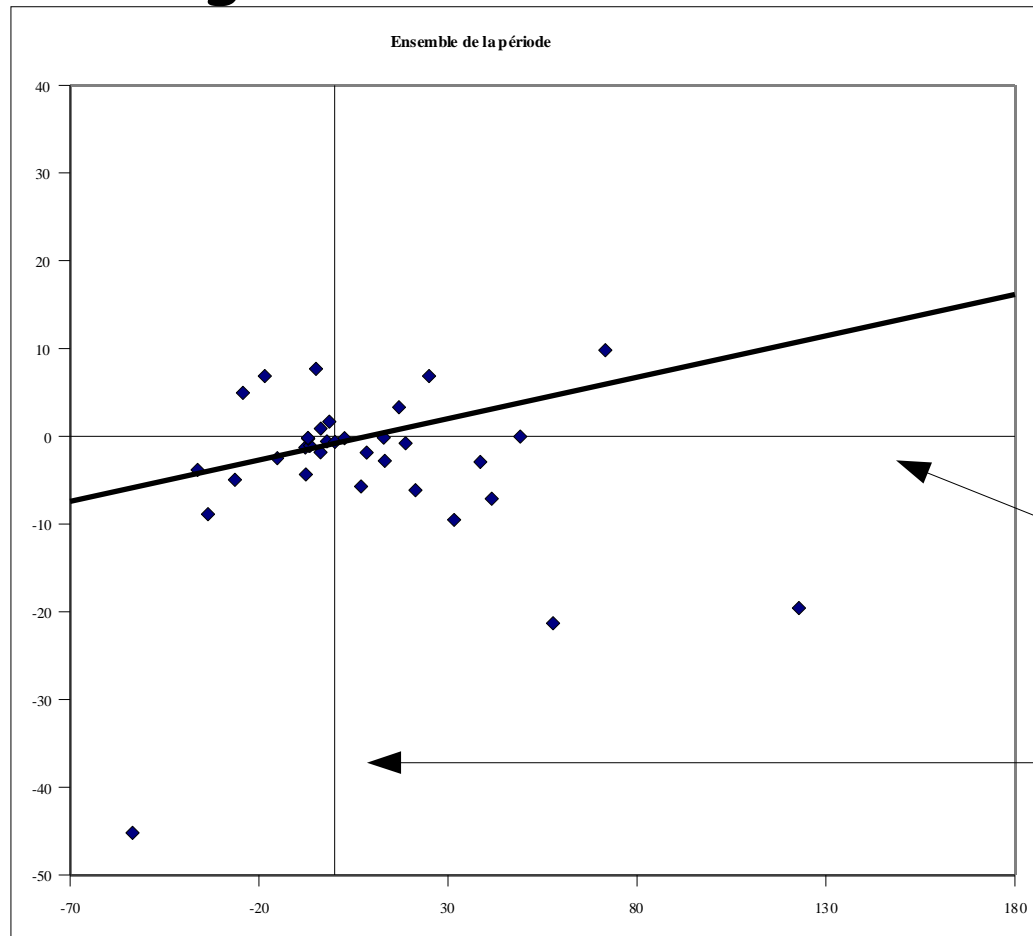
# Analysis of French timber prices

- Correlations between species in the same ecological context :
  - Change over time (economic context, forest sector context)
- Negative correlations due to :
  - Different markets
    - For instance : woodframe (*Picea abies* and *Abies alba*) and emballage (*Pinus pinaster*)
  - Substitution for the same market
    - For instance : *Acer pseudoplatanum* and *platanoides* and *Fagus sylvatica*



# Analysis of French timber prices

- Long-term correlation :



Ongoing work :  
Graph. analysis when more  
than 2 short-time periods  
with negative correlations  
=> always positive

Annual variation of  
Quercus price

Annual variation of  
Pinus nigra price

# Analysis of French timber prices

- Some comments / forest management :
  - Short term analysis :
    - Mixed species with negative correlation => diversification
    - as correlation change, flexible management on choice of species to harvest
  - Long-term analysis : choice of species
    - Least cost strategy :
      - Mixed species (positive correlation but  $<1$ )
      - Species which grow naturally in the ecological situation



# Thank you for your attention

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