



Institut des
Systèmes
Complexes
de Toulouse

Workshop - Dynamic Networks
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PhD students's co-authorship dynamics in three scientific disciplines

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Research Questions

- How can we identify a-symmetrical relationships between PhD students and their supervisors in terms of knowledge exchanges ?
 - Is it possible with bibliometric data ?
 - How is the thesis Committee built?
 - How can co-publications be taken into account?
 - How can we consider the dynamic dimension ?
- The approach here consists in understanding how PhD students are relying or not on their thesis committee to become authors then researchers themselves.
 - It requires to identify committees members and to analyze their relationships, through an analysis of their co-authorship with (*dependency*) and without (*independency*) Phd Students.

State points

- Science is a small world
- Cooperation and collective publications are increasing
- Practices vary on disciplines
 - Regarding co-authorship
 - Regarding labour division
- PhD students' contribution to the scientific literature is significant
- The supervisor's network is important for the students
- The context of the PhD matters (its integration into a network)
- PhD Students' publications are critical for their future carrier

Choice of empirical data

- PhD Theses defended in Toulouse between 2003 et 2008 in three scientific labs :
 - 34 in astrophysics, 22 in archeology and history of art, 65 in economics
 - Thesis Committee's composition
 - Student's name, CV and publications
 - Co-authorship inside the thesis committee (y.c. students)
 - Few interviews
- public information collected in :
 - French database on PhD theses (These.fr, TEL...)
 - International bibliometric databases by discipline (ADS Nasa, Econpapers, Daphne)

1. Complete networks

FOCUS on:

- Discipline-to-discipline differences in publication activities
- The structure of Committees members' networks

Corpus presentation

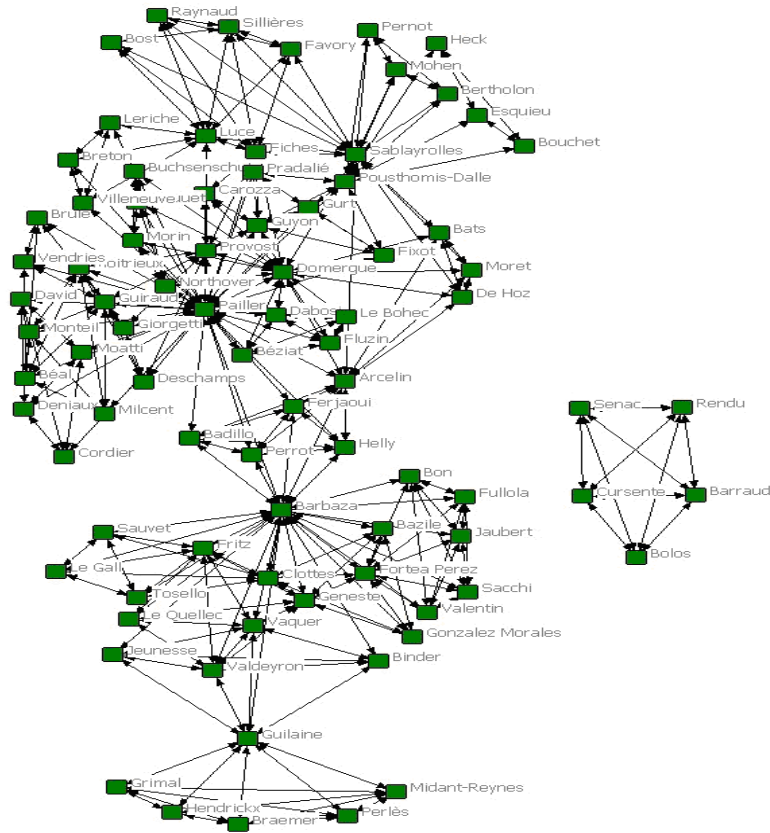
Data Average in general	Astrophysics 17 authors/article	Archeology 2,3 authors/article	Economics 2 authors/article
Thesis (share of publishing Phd students)	34 34 (100%)	22 11 (50%)	65 46 (70%)
Average number of Com. members/thesis	6.57	5.64	5.12
Number of publications Median number of publications/student	2687 10	367 5	486 5
Number of committees members (number of different people/ thesis)	152 4.47	85 3.8	163 2.5
Frequency of belonging to one unique committee	74 %	75 %	70 %
Average frequency of publications/committee members	60 (since 2000)	96 (all times)	90 (all times)
% of PhD students who became researchers	70%	40%	70%

commitee's networks

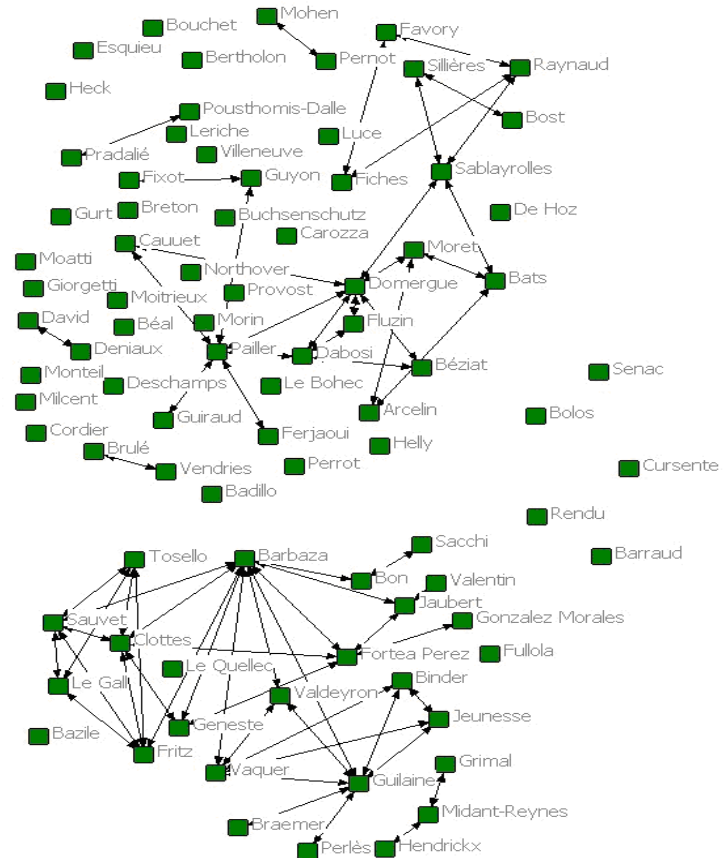
Discipline/type of network	astrophysics	archeology	economics
Co-attendance to commitee's networks	152 members 609 links density = 5,31% Distance = 3,13 Max. shared members = 3 2 members get a centrality > 15%	85 members 280 links density = 7,84 % Distance = 2,61 Max. shared members= 3 2 members get a centrality >15%	163 members 1180 links density = 4,5% Distance = 2,9 Max shared weak 4 members get a centrality>15%
Co-attendance to commitee's and co-publications networks	152 members 227 links => 37% of surviving links density = 2% Distance = 5,5 Centrality and publication are related	85 members 67 links => 24% of surviving links density = 1,88 % Distance = 2,63 2 members get a centrality > 7% Centrality and publication are similar	163 members 168 links => 14% of surviving links density = 0,7% Distance = 4,17 4 members get a centrality > 4% Centrality and publication are not related

Astrophysics example

Co-attendance to the committee's network



Co-attendance to the committee's and co-publications network



2. Personal students networks:

FOCUS on:

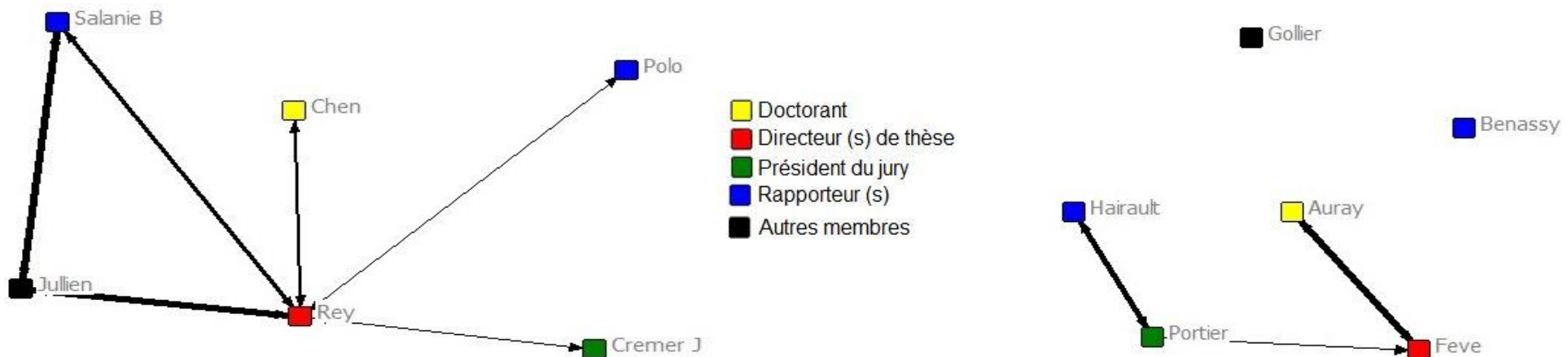
- Discipline-to-discipline differences in publication activities
- co-publications and job
- The structure of PhD students' networks

Differences in Thesis length

- Theses in archeology contain 1000 pages
- Economics theses : 100 pages
- Theses in astrophysics tend to range between 150 and 300 pages

Ego networks

	Astrophysics 34 thèses (all authors)	Archeology 11 students publish on 22	Economics 44 theses
One component	24	7	2
Two components	10	4	33



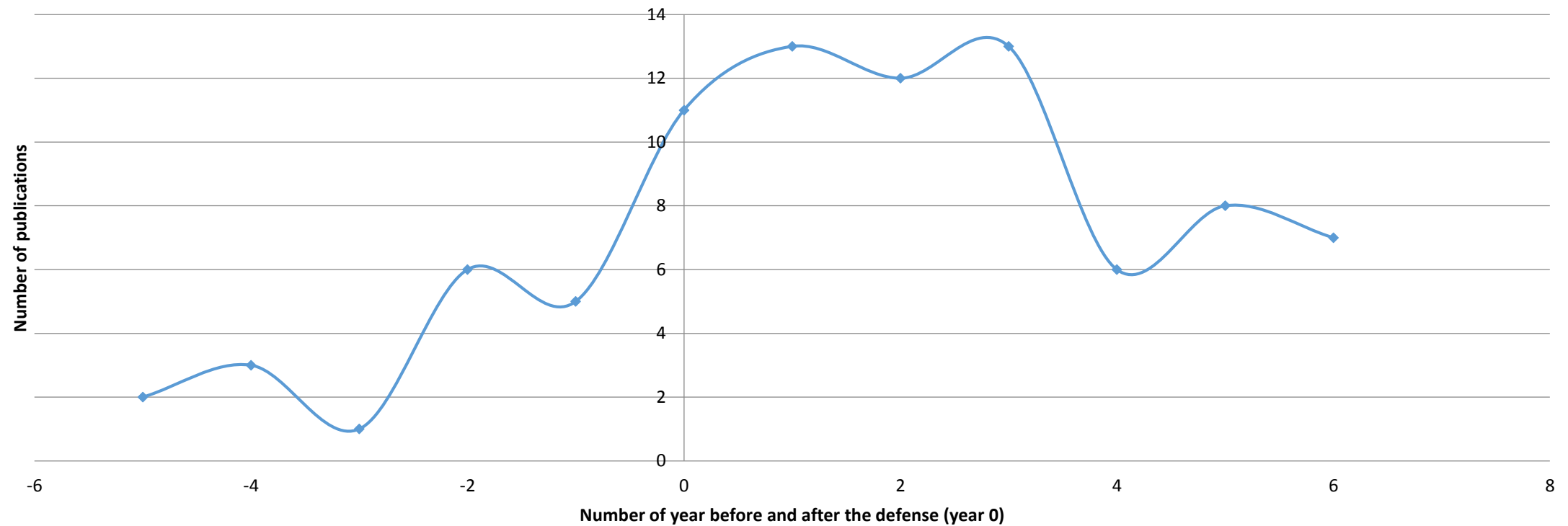
Co-publication activity

	Astrophysics	Archeology	Economics
Number of PhD Students	34	22	62
Having published with committee members only before defending the thesis	6	8	9
Having published with committee members only after defending the thesis	0	0	10
Having published with committee members at all times	28	3	11
Never having published with committee members	0	11	32
<i>Having published with at least one member of the committee but never with the supervisor</i>	0	4	5

* After the PhD presentation = date + 1 year (delay for publication)

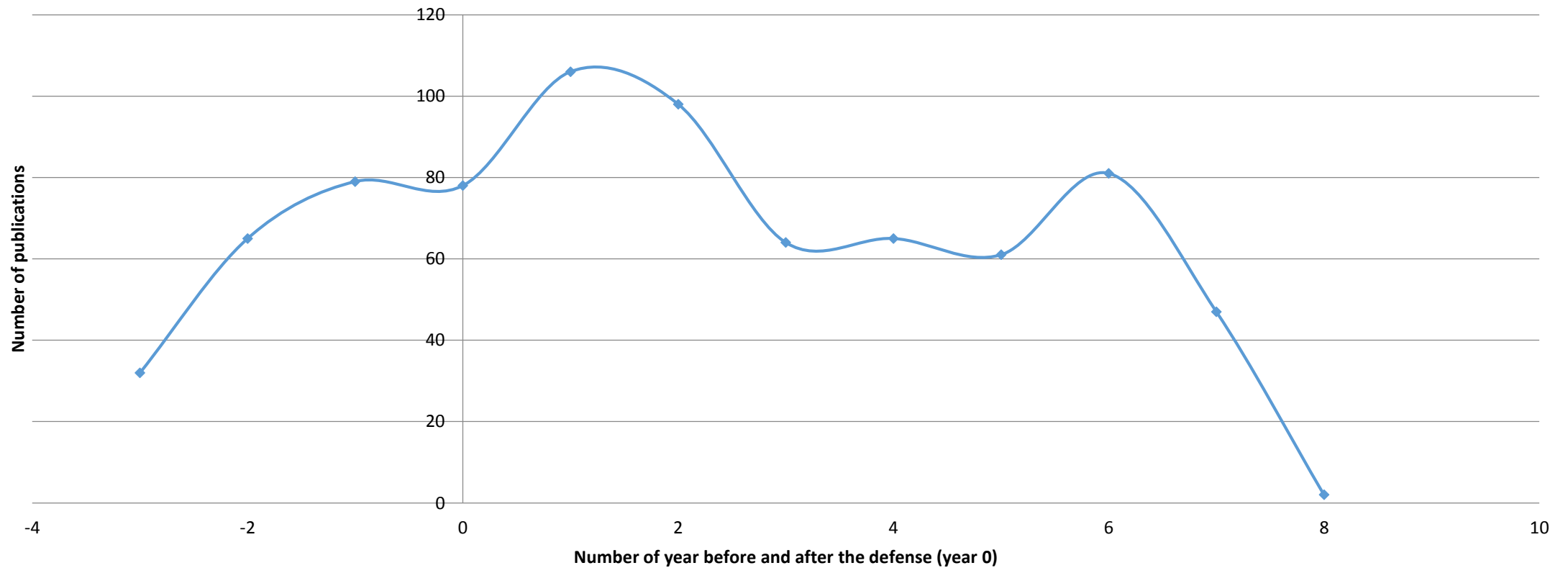
Economics co-publication dynamics

**Co-publications in economics
PhD students with their Commitee**



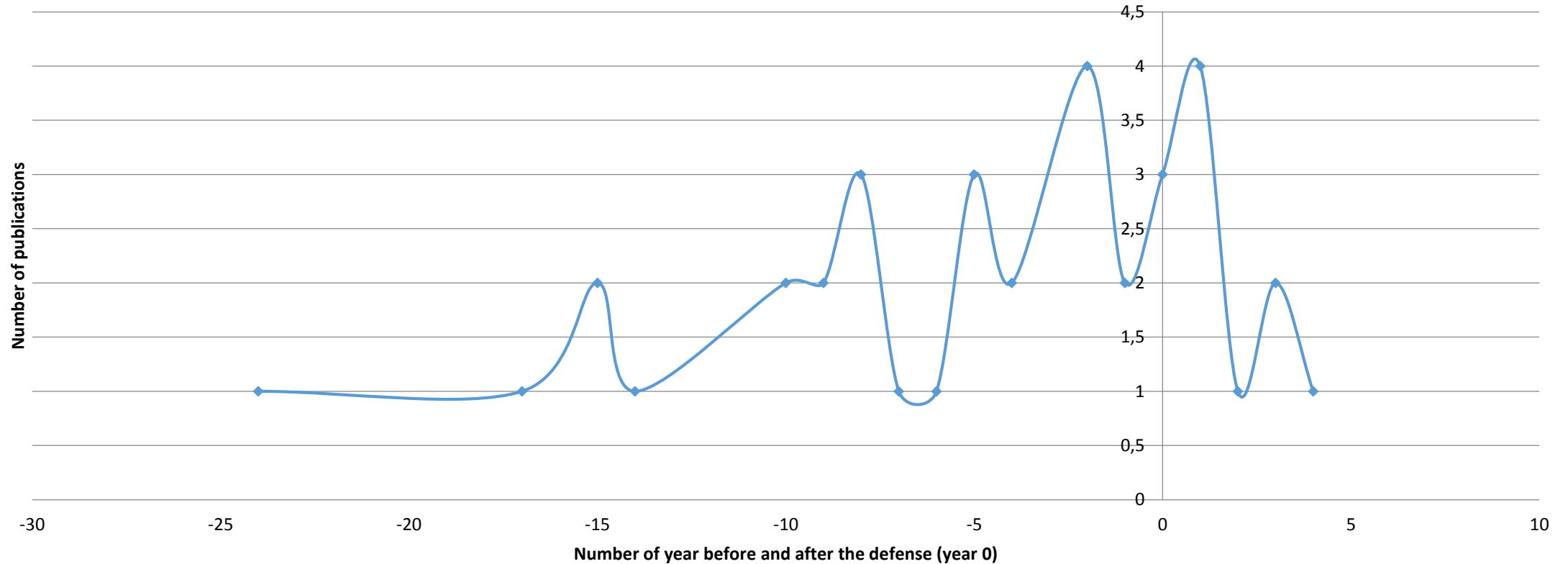
Astrophysics co-publication dynamics

Co-publications in astrophysics PhD students with their Commitee



Archeology co-publication dynamics

Co-publications in archeology PhD students with their Committee



Co-publication and job

- In archeology, the students co-publishing at least one time with their Committee are employed in the academic area.
- No relation between the 2 for economics and astrophysics
- work abroad :
 - $\frac{1}{4}$ of PhD students in astrophysics are now **working abroad**
 - whereas $\frac{3}{4}$ of the PhD students in economics currently do (in 2016),
 - none of the PhD students in archeology do

Citations and thanks

- Does the PhD student thanks their commitee ?
- Test on 10 PhD students in economics (85 publications) :
 - Out of 75 co-publications with other authors :
 - Only 10 publications whithout any thanks at all
 - 11 thanks to the supervisor – among which 6 thanks to the supervisor + one member
 - No publication in which the Phd thanks a member without thanking his supervisor