Socioprofessional Dynamics in the 19th Century Geneva

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Séminaire d'actualité économique SAE, March 31, 2008

UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES ÉCONOMIQUES ET SOCIALES
Département d'économétrie

Outline

Section outline

Research project

The work presented in this seminar is part of the FNS project

- Early Life Conditions, Social Mobility and Longevity in Later Life. A Contribution to the Urban Population History in 19th Century French-Speaking Switzerland
- FN 1114-068113, 2003-2004, and FN 100012-105478, 2005-06.
- Main applicant: prof. Michel Oris, Dept of Economic History and Laboratory of Demography

- It is based on papers (Oris et al., 2006; Oris and Ritschard, 2007) written with
  - Michel Oris
  - Grazyna Ryczkowska (De Montmollin)

Section outline

Geneva in the 19th century: Historical background

- Eventful political, economic and demographic development
- City enclosed inside walls: lack of lands $\Rightarrow$ prevents development of agricultural sector.
  $\Rightarrow$ turns to trade and production of luxury items: textile ($\longrightarrow$ beginning 19th) and clocks, jewelery, music boxes (Fabrique)
- Sector turned to exportation, hence sensitive to all the 19th political and economic crises.
  [1798-1816] French period (period of crises)
  [1816-1846] "Restauration" (annexation of the surrounding French parishes), economic boom during the 30's
  [1849- ...] Modernization of economic structure, destruction of the fortifications

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Historical Context: Demographical aspects

- "Calvinist Rome" has to open its doors
  - Strong population growth:
    from 21'237 (in 1806) to 31'200 (in 1850).
    however natural balance = only +557 !!!
  - Massive Immigration.
  - Catholics: 11 % 1816
    28 % 1843
    46 % 1900

- Mix of
  traditional malthusianism — Women age at 1st marriage = 28, 20% women final celibacy
  modern neo-malthusianism — birth control

- Le Roy Ladurie's hypothesis: duality of urban populations
  enrooted, stable $\Leftrightarrow$ immigrant, turbulent !!!

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Data

- Data from 6 censuses 1816, 1822, 1828, 1831, 1837, 1843, individual with name beginning with letter 'B'.
- Socioprofessional groups 1200 professions grouped into 5 classes:
  - Unskilled workers,
  - Fabric (clockmaker),
  - Craftsmen,
  - Businessmen,
  - Public and private services
  - Inactive.
- Social statuses 1200 professions grouped into 5 classes:
  - Unknown,
  - Unskilled worker,
  - Skilled worker,
  - White collar,
  - Petite et Moyenne Bourgeoisie
  - Elites.

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Rebuilded life trajectories

- 35'592 individual records, 10'723 household records
- Matching of censuses: **24'718 life trajectories**
- Dynamics: Analysis of transitions (on 6 years intervals)
  1816 $\longrightarrow$ 1822
  1822 $\longrightarrow$ 1828
  1831 $\longrightarrow$ 1837
  1837 $\longrightarrow$ 1843
  including new comers and those who dropped out.

Transitions

Transition	GSP in t	GSP in $t+6$	other condition
stays inactive	inactive	inactive	
becomes active	inactive	active	
stable	active	active	$\mathrm{GSP}(t) = \mathrm{GSP}(t+6)$
mobile	active	active	$\mathrm{GSP}(t) \neq \mathrm{GSP}(t+6)$
leaves activity	active	inactive	
new comer	non present	present	
disapears	present	non present	

Socioprofessional groups and social statuses (at t)

Social Status / GSP	Unknw	Unsk. worker	Skilled worker	White collar	P.M.B.	Elite	Total
Inactive	4467	23	0	79	1	344	4914
Unskilled	274	1672	96	118	3	0	2163
Clockmaker	0	71	1330	0	213	0	1614
Craftsmen, skilled	0	173	1527	3	80	0	1783
Business	0	112	64	21	537	7	741
Public/private serv.	0	28	18	37	156	82	321
Total	4741	2079	3035	258	990	433	11536

Outline

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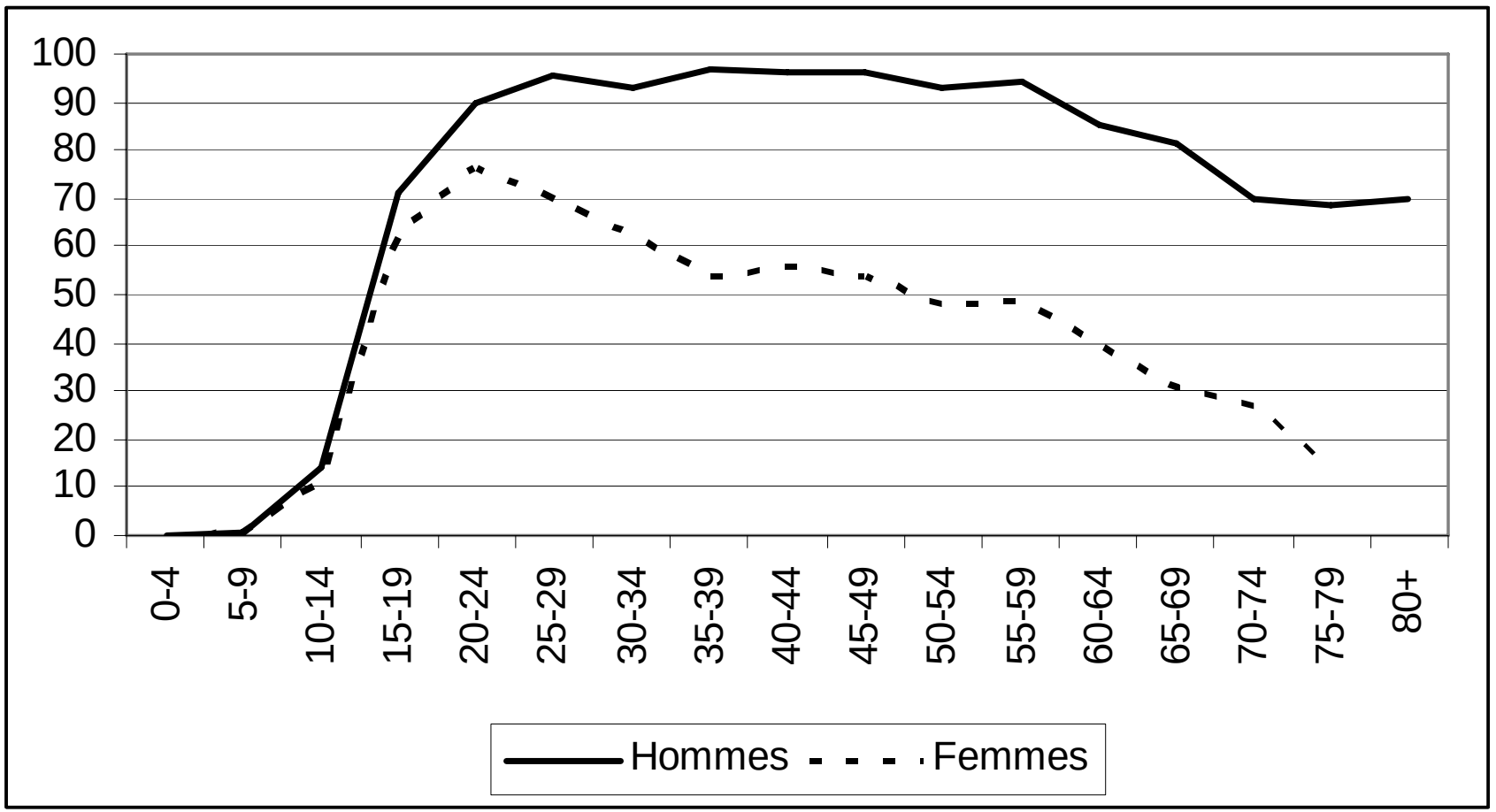
2. From structure to dynamics
   - Labor force engagement rate by age and sex (at t)
   - Inactive and active populations, from t to $t+6$
     - Leaving active life
   - Dynamics of socioprofessional groups

Labor force engagement rate by age and sex (at t)



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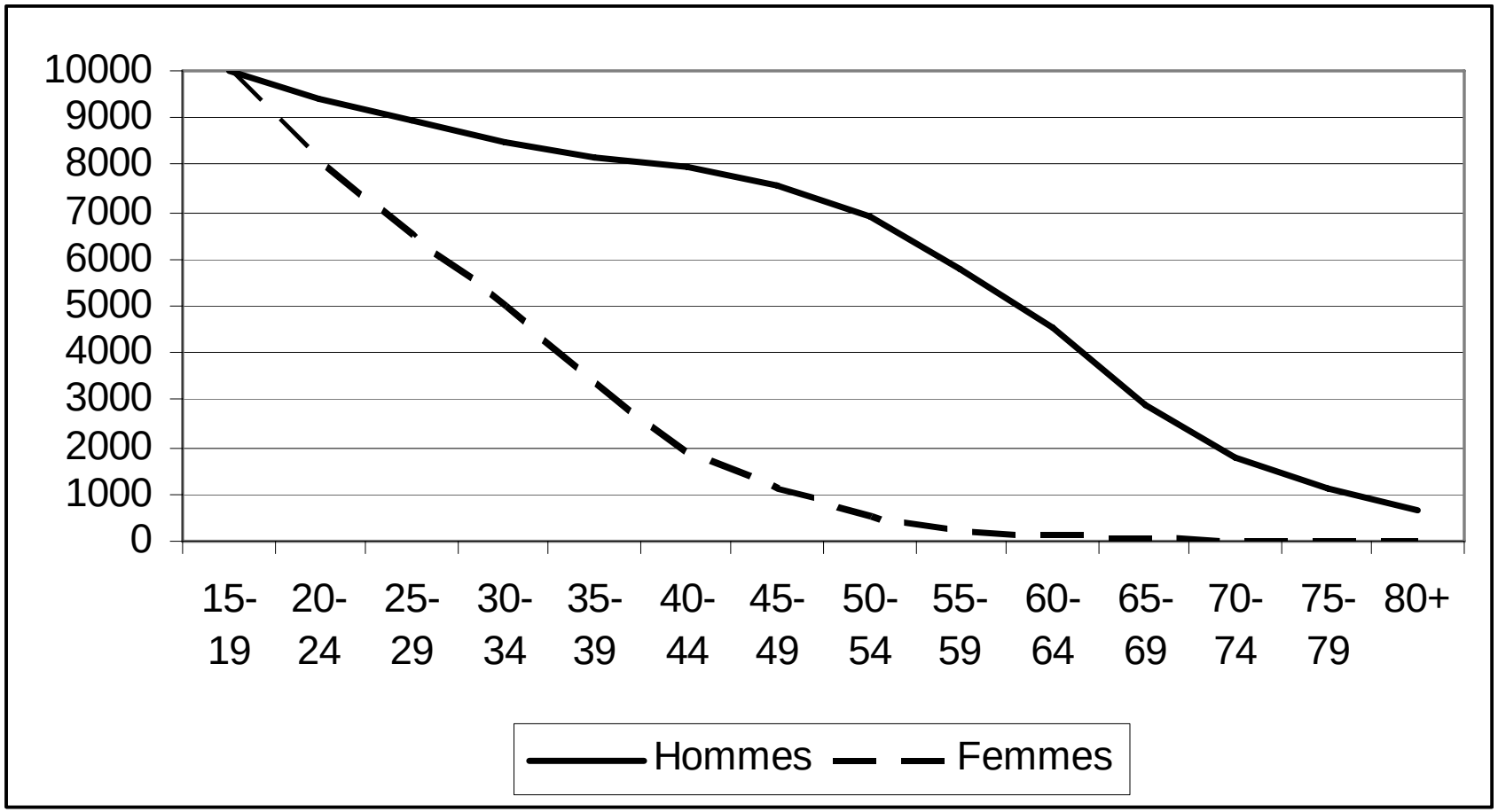
Dynamics from t to $t+6$

Dynamics of inactive and active populations from t to $t+6$

Transition	Inactive	Active	Total
Counts in t	4914	6622	11536
1. Stays inactive	1922	0	1922
2. Stays active	0	2604	2604
3. Leaves activity	362		362
4. Becomes active		666	666
Balance $4-3$	*-304*	*304*	*0*
5. Drops out from Geneva	2326	3656	5982
6. New comer in Geneva	3057	4222	7279
Balance $6-5$	*731*	*566*	*1297*
Counts in $t+6$	5341	7492	12833
Gains between t and $t+6$	427	870	1297

Leaving active life

Survival curves by sex (surviving = remaining in active population)



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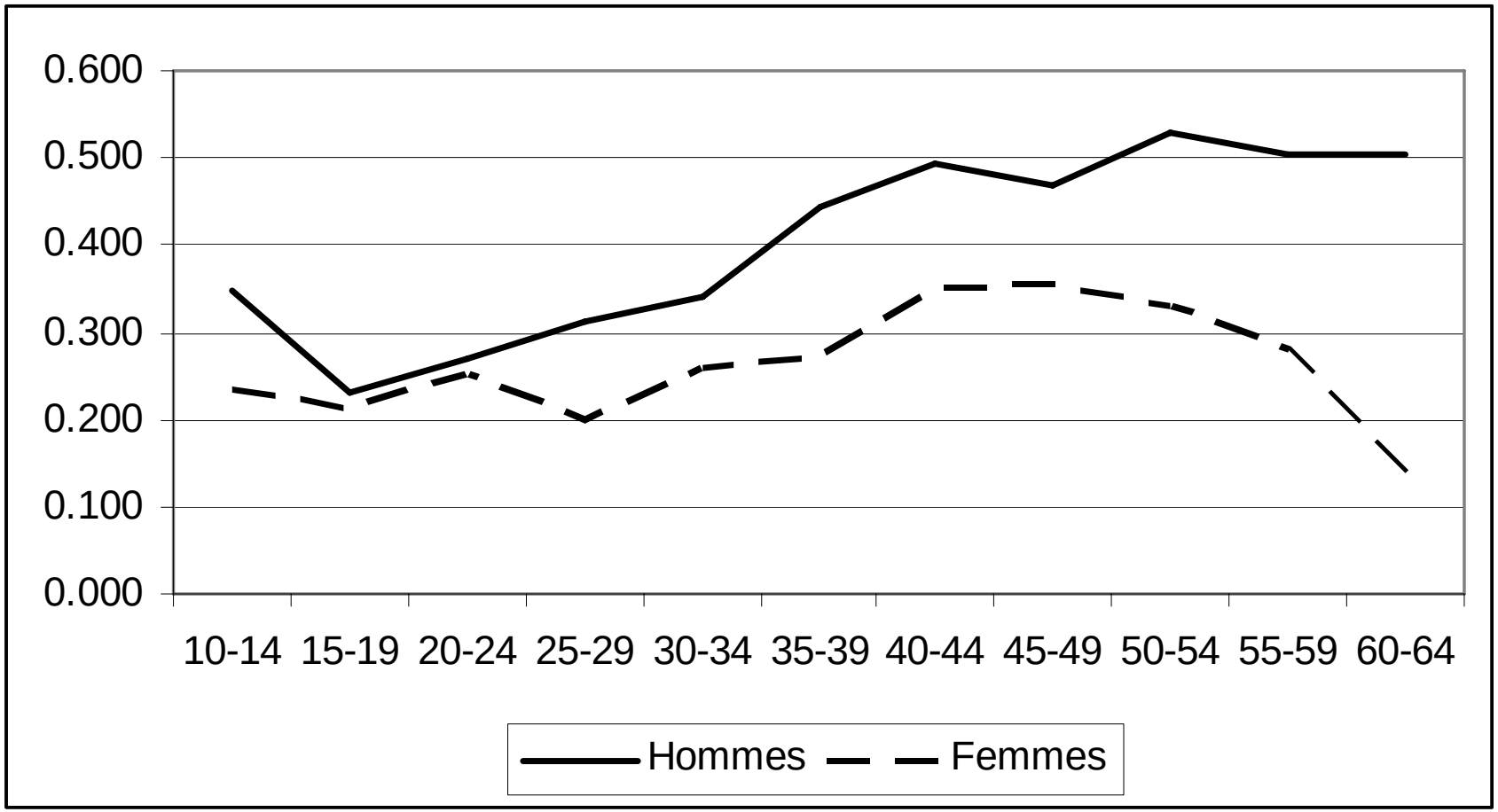
Changes between t and $t+6$, rates

Dynamics of socioprofessional groups of actives between t et $t+6$

Groups / Transition	unskilled	fabric	craftsmen skilled workers	business	public and private services	Total
Stable in % of t	20.8	45.2	31.4	32.8	27.4	30.9
‰ (with respect to mean count between t and $t+6$)						
2. Leaves activity	48.2	39.5	49.3	85.1	62.3	51.3
3. Becomes active	73.0	116.7	94.9	111.3	89.0	94.4
Balance 3 − 2	*24.7*	*77.2*	*45.6*	*26.3*	*26.7*	*43.1*
4. Mobility, exits	69.6	64.7	70.8	95.1	124.6	78.6
5. Mobility, entrees	46.9	59.3	64.5	180.1	142.4	78.6
Balance 5-4	*-22.6*	*-5.4*	*-6.3*	*85.1*	*17.8*	*0.0*
6. Drops out	613.6	425.0	521.9	442.8	471.8	518.1
7. New comers	765.5	420.8	612.1	477.8	522.3	598.3
Balance 7 − 6	*151.9*	*-4.2*	*90.2*	*35.0*	*50.4*	*80.2*
Gains from t to $t+6$	154.0	67.6	129.6	146.3	95.0	123.3

Mobilité socioprofessionnelle des actifs selon le sexe

Quotients de mobilité socioprofessionnelle des actifs selon le sexe



Outline

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Logistic regression: A short introduction

- Aim: Measuring impact of factors on a binary variable.
- Binary variable: takes 2 states (0 or 1, yes or no).
- Example: *mobile*.
- p probability to be mobile among those who stay active.
- then, $1-p$ is probability of not being mobile.
- Odd ratio: $p/(1-p)$
- Logit: logarithm of the odd ratio, i.e. $\log\left(\frac{p}{1-p}\right)$
- Logistic regression model :

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots$$

- $\exp(\beta)$ measures by how much the odd ratio is multiplied when x_1 increases by one unit.

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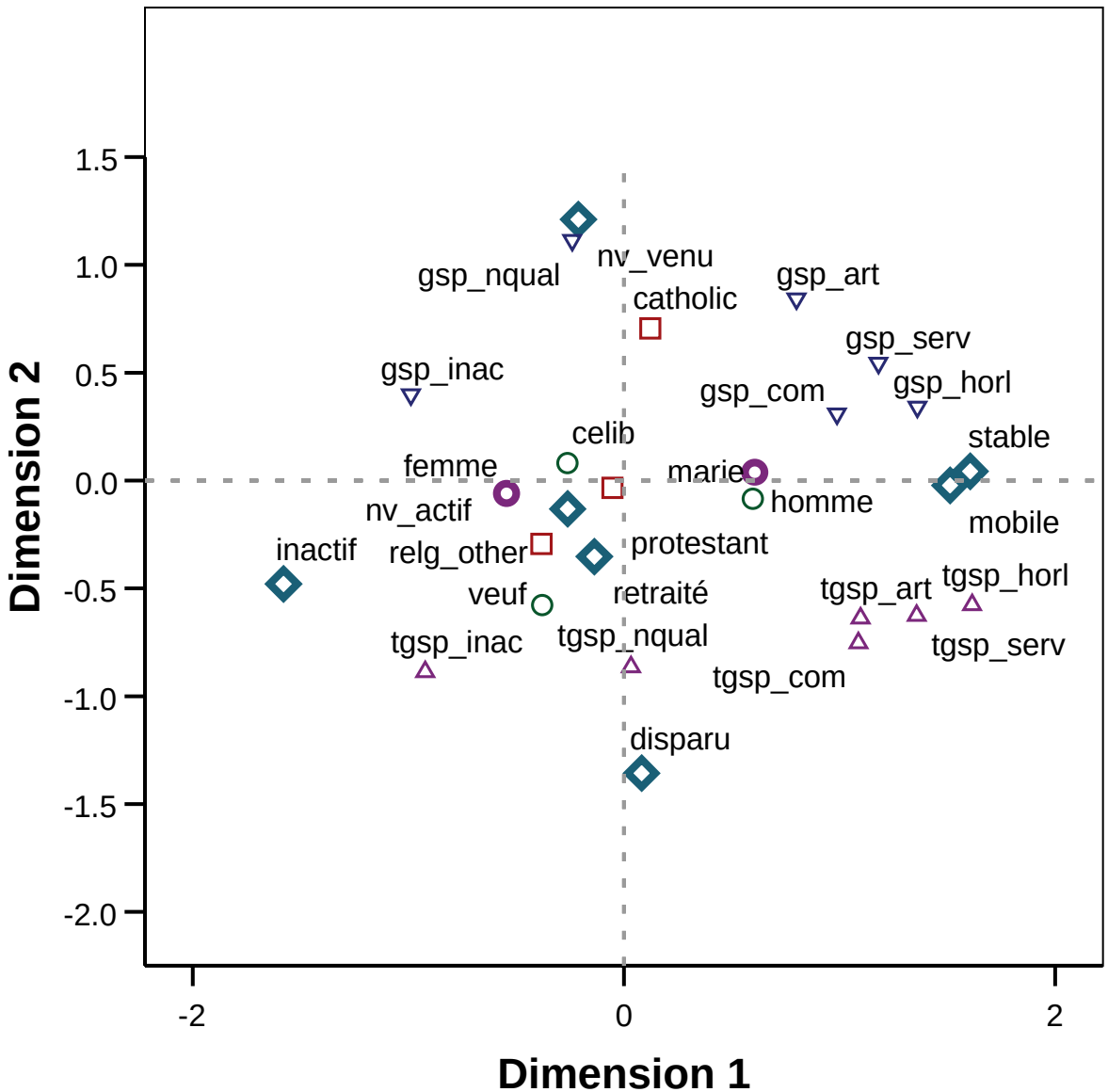
Logistic regressions: odd ratios

	mobile	stays active	leaves activity
t_gsp_nqual	2.01***	.	0.65***
t_gsp_art	ref	.	ref
t_gsp_hor	0.73	.	0.97
t_gsp_com	0.45***	.	1.48**
t_gsp_serv	0.97	.	1.33
gsp_nqual	0.86	.	.
gsp_art	ref	.	.
gsp_hor	0.73	.	.
gsp_com	4.05***	.	.
gsp_serv	2.14***	.	.
protestant	1.29*	1.40**	5.04***
catholic	ref	ref	ref
woman	0.58***	1.46***	4.32***
man	ref	ref	ref
single	ref	ref	ref
married	0.99	1.08	2.96***
widowed	0.89	2.21***	1.09
Constant	0.21***	1.61***	0.01***
n	2603	2588	3830
Khi2	180.1***	35.3***	354.7***
d.l.	12	4	8

***,** ,* statistically significant at 1%, 5% and 10%

Section outline

Multiple factorial correspondence analysis

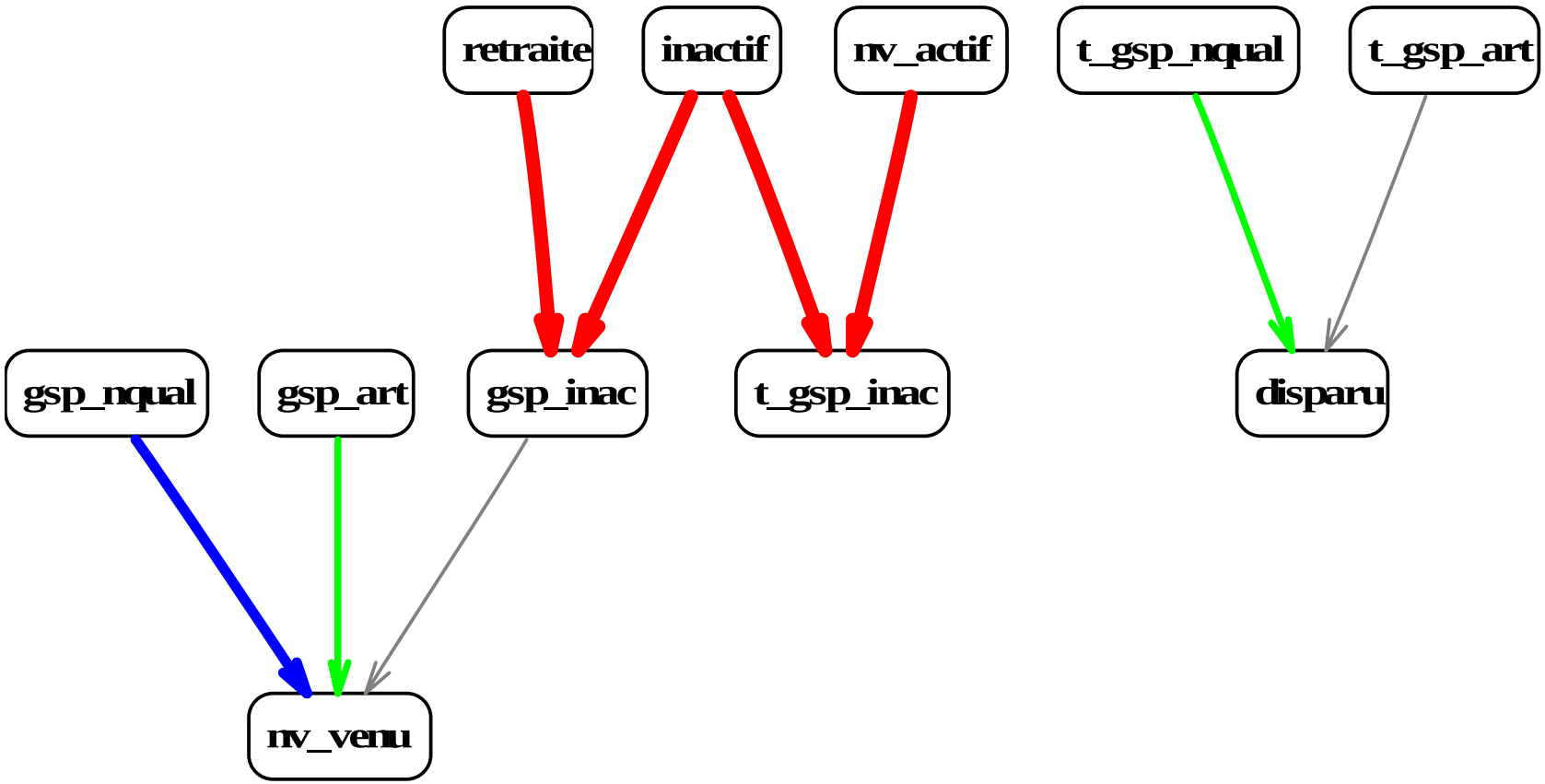


Section outline

Statistical implicative analysis (Gras et al., 1996)

- Implication Rule. "widowed ⇒ woman"
  when widowed is observed, we have most often also woman.
- Implication intensity. Probability to get, in case of independence, more counter-examples than observed
  $p(N_{w\bar{f}} \geq n_{w\bar{f}} \mid \text{indep})$.
- Implication graph (unidirectional)
  For each pair of variables (modalities)
  - Select implication direction
    ("widowed ⇒ woman" or "woman ⇒ widowed")
    with strongest intensity.
  - Arrow for each implication with intensity above a given threshold.
  - For readability, direct implications may be hidden when there is also an indirect path between the same variables.

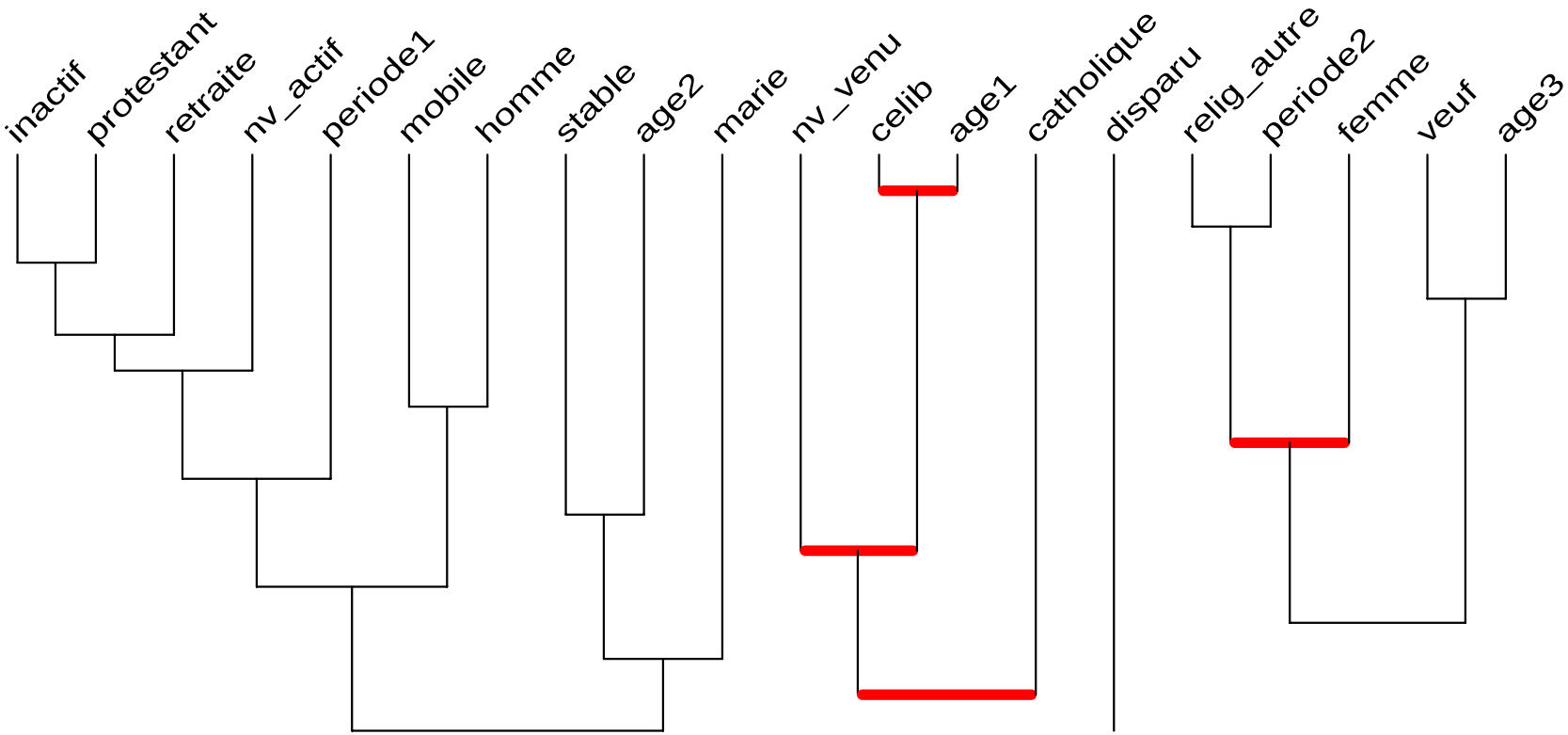
Transitions and socioprofessional groups



Entropic measure, thresholds 99%, 81%, 63%, 58%.

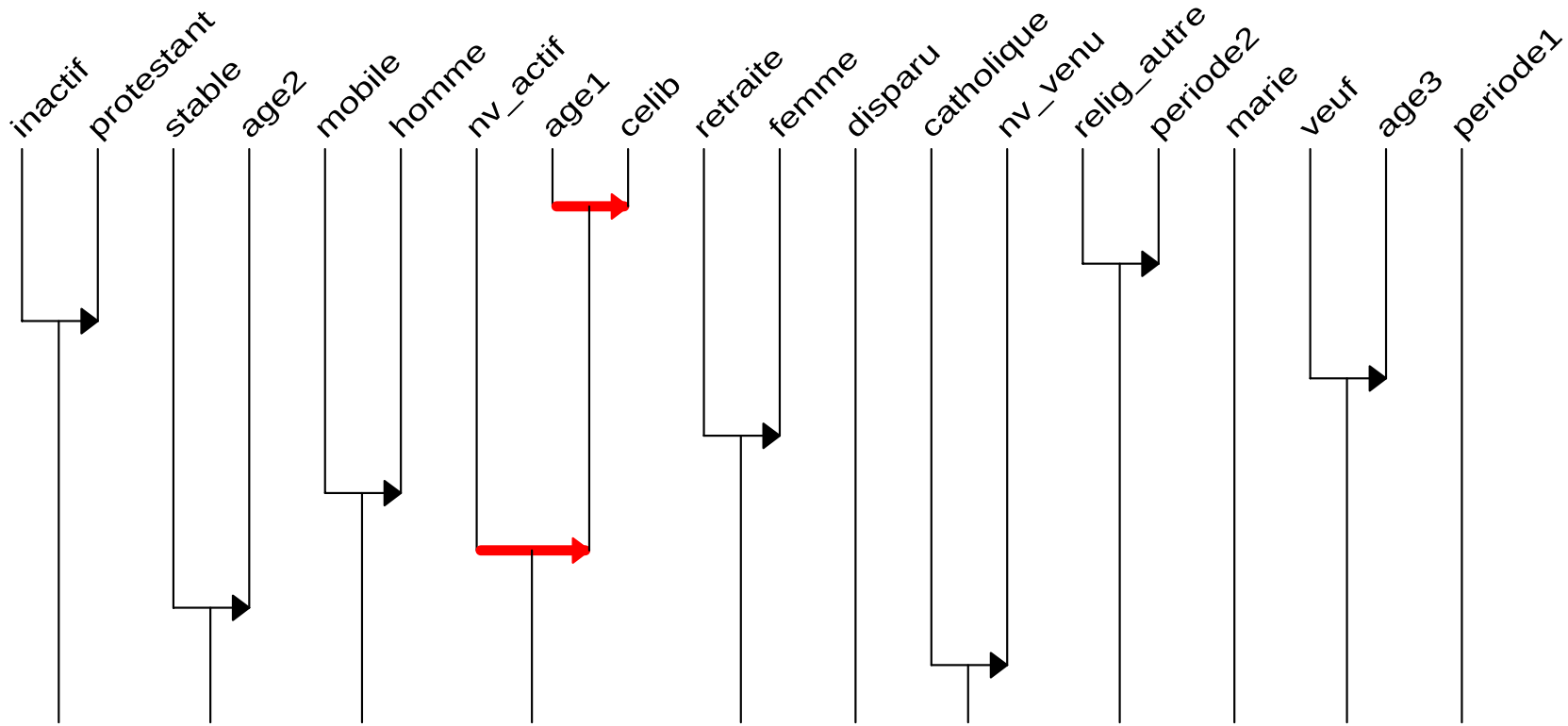
Transitions and demographic characteristics 1

Similarity tree (symmetrical measure)

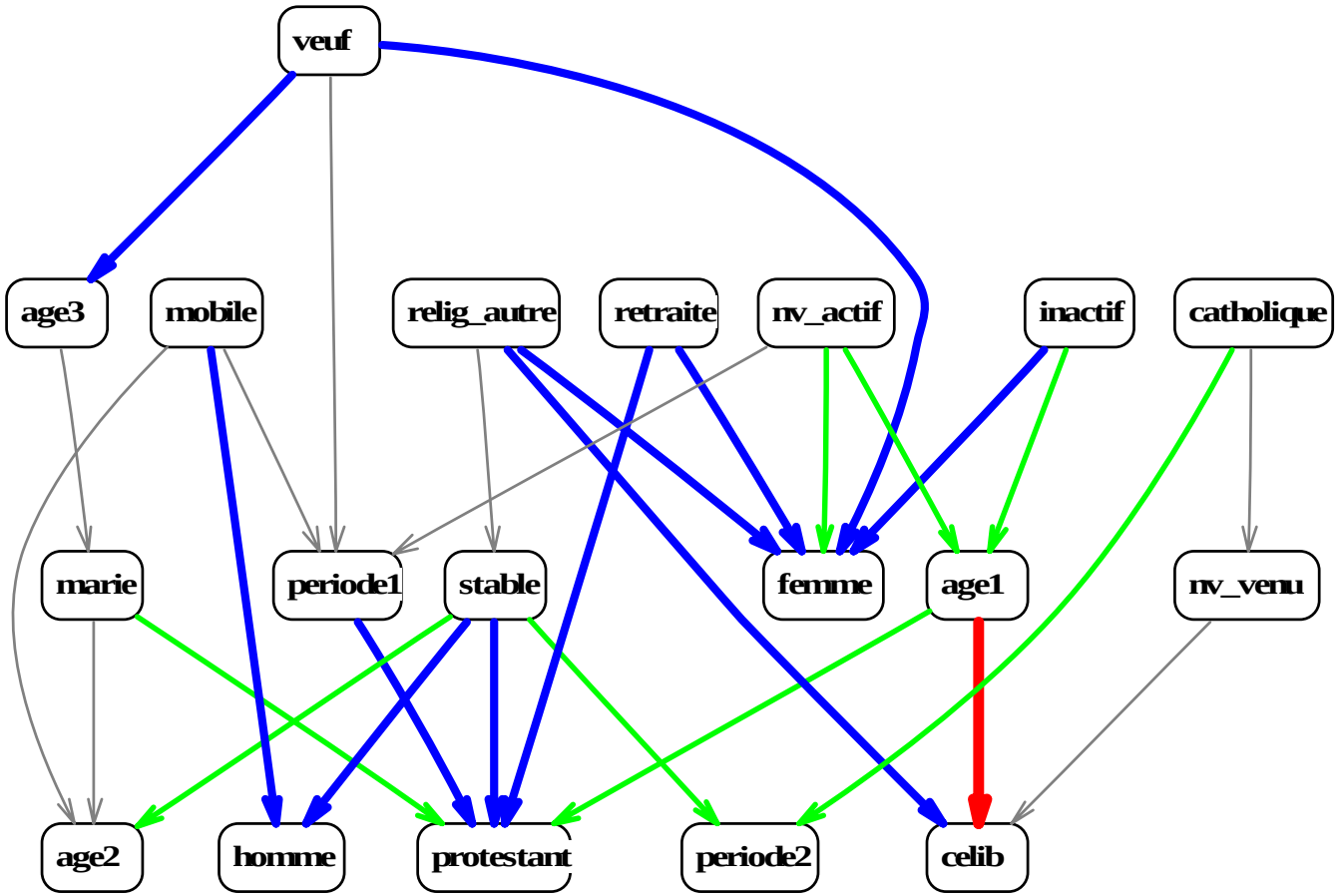


Transitions and demographic characteristics 2

Cohesive tree (asymmetrical implication measure)



Transitions and demographic characteristics 3



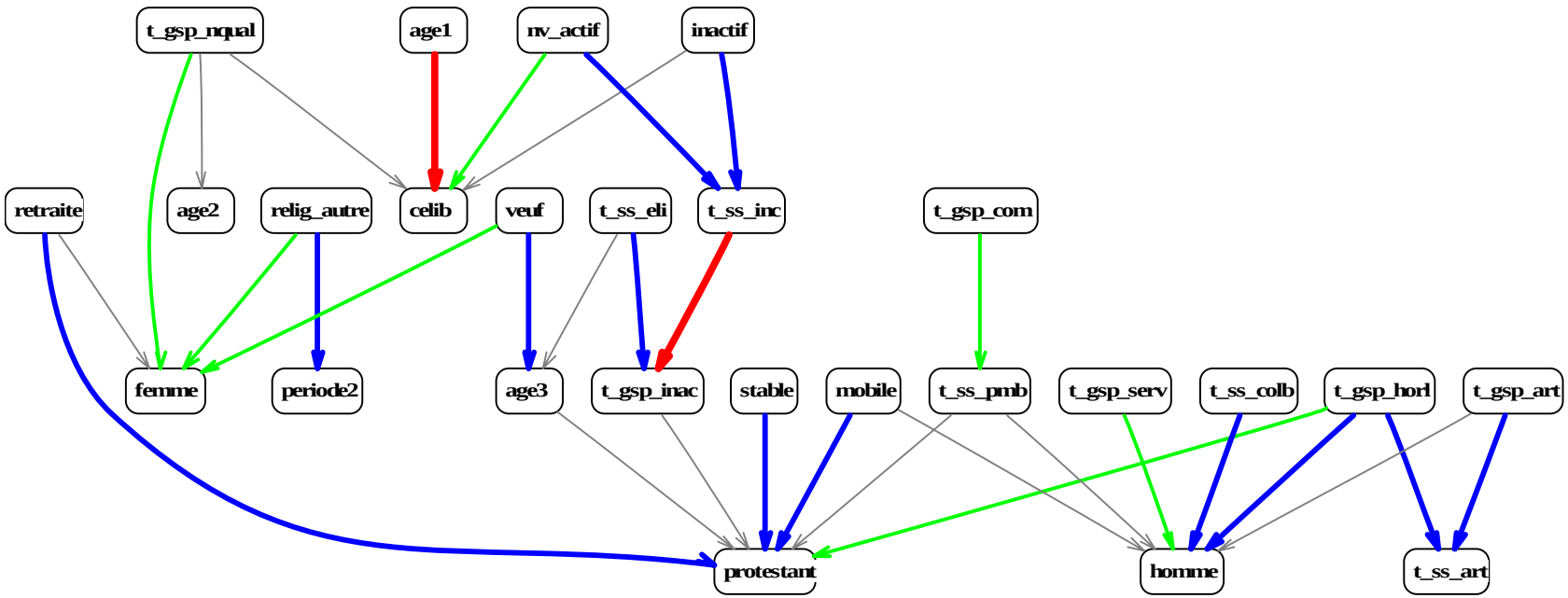
Entropic measure, thresholds 99%, 75%, 65%, 55%.

Typicality of social statuses for some paths

Path	Unkwn	Unskill. worker	Crafts skilled	White collar	P.M.B.	Elite
stable ⇒ protestant	.	x	x	x	x	.
stable ⇒ man	.	.	x	x	.	x
mobile ⇒ man	.	.	x	x	x	x
nv_actif ⇒ protestant	.	x	x	x	x	.
nv_actif ⇒ single	.	x	x	x	x	.
nv_actif ⇒ age1 ⇒ single	x	.	.	x	.	.
nv_actif ⇒ woman	.	x	.	.	.	.

Socioprofessional groups and social statuses 1

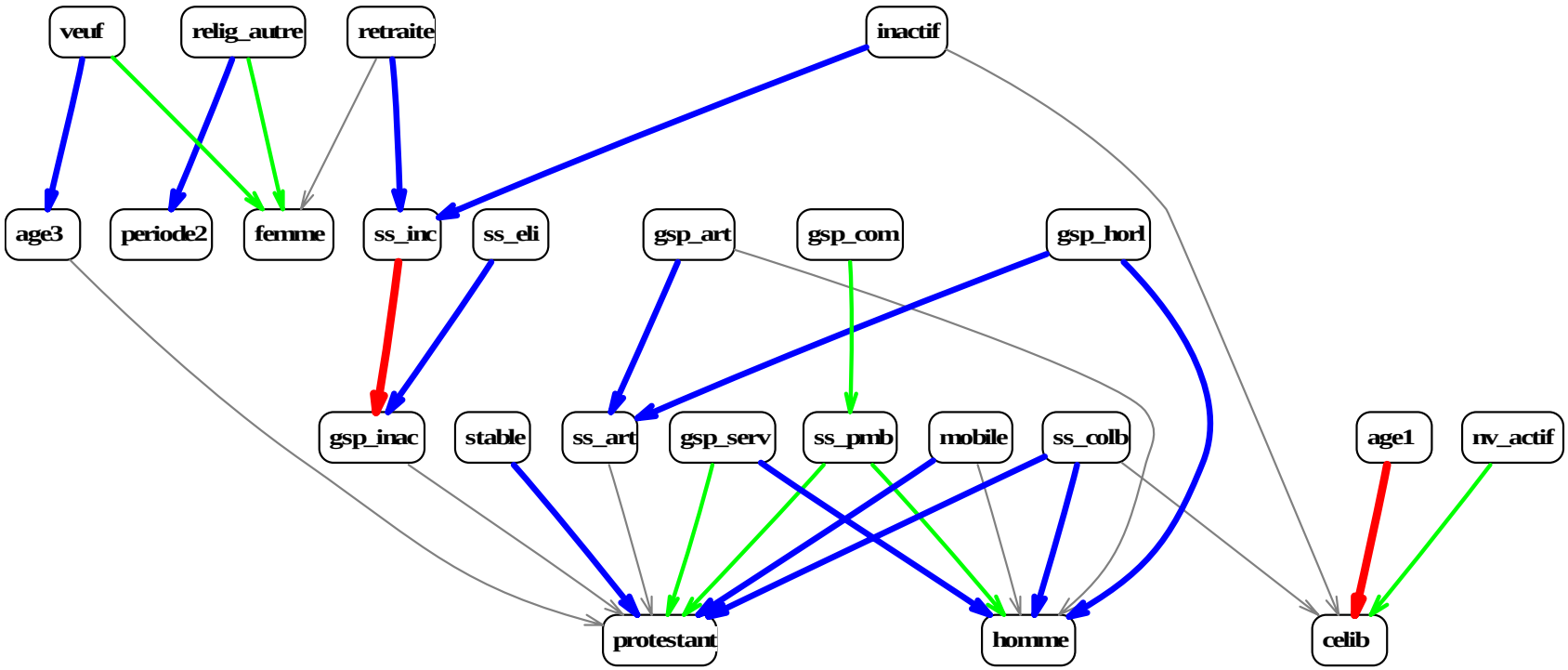
Groups and statuses in t



Entropic measure, thresholds 99%, 90%, 85%, 80%.

Socioprofessional groups and social statuses 2

Groups and statuses in t



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Outline

Conclusion 1: Learnings

Main Findings

- Structuring variables:
  celibacy, man, woman, widowed, protestant
- Unexpected: lack of structuring role for catholic
  (remember that proportion of catholics rises
  from 11% in 1816 to more than 28% in 1843)
- Catholics grew Different but Invisible

Conclusion 2: Scope and limits of SIA

Additional insights

- Synthetic and structured view
- Clarifies and complements findings obtained with
  - detailed analyses
  - classical synthetic methods such as logistic regression and factorial techniques

Issues with SIA

- Based exclusively on bivariate relationships
  Should we (could we) consider partial implication for controlling the effect of other incoming variables on a node?
- Lack of criterion for measuring the global information provided by any representation (tree, graph) !
  Could we define some pseudo R^2 or some deviance measure?

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THANK YOU!

MERCI !

References

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