Socioprofessional Dynamics in the 19th Century Geneva

Gilbert Ritschard

Dept of Econometrics and Laboratory of Demography and Family Studies
University of Geneva
http://mephisto.unige.ch

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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)

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 ($\rightarrow$ 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

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 !!!

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.

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 $\rightarrow$ 1822
  1822 $\rightarrow$ 1828
  1831 $\rightarrow$ 1837
  1837 $\rightarrow$ 1843
  including new comers and those who dropped out.

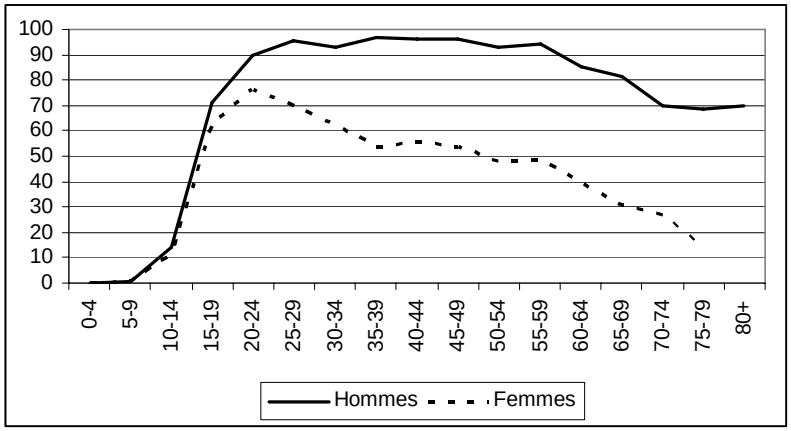
Transitions

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

Socioprofessional groups and social statuses (at t)

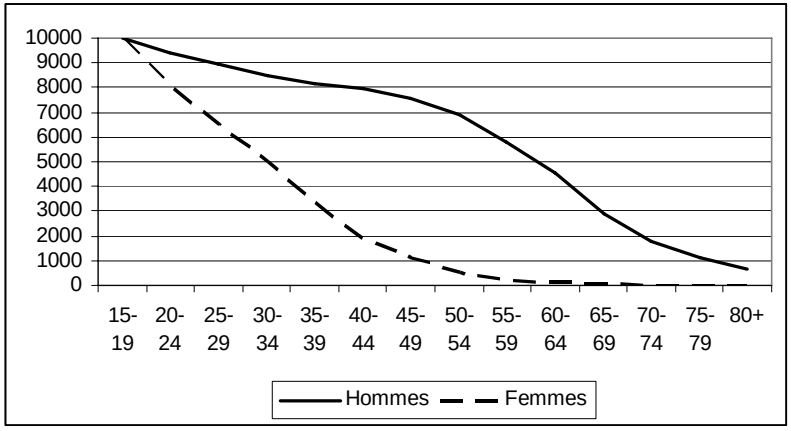
Social Status / GSP	Unknw	Unsk. worker	Skilled worker	White collar	P.M.B.	Elite	Total
Inactive	4467	23	0	79	1	344	4914
Unskilled	274	1672	96	118	3	0	2163
Clockmaker	0	71	1330	0	213	0	1614
Craftsmen, skilled	0	173	1527	3	80	0	1783
Business	0	112	64	21	537	7	741
Public/private serv.	0	28	18	37	156	82	321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

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



Leaving active life

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



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

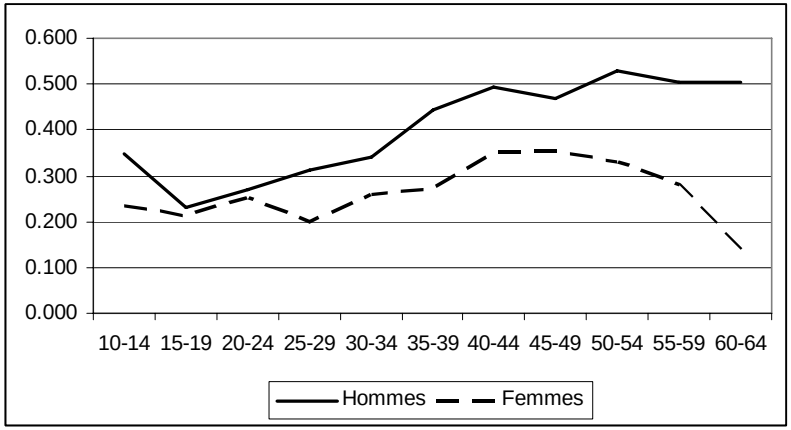
Changes between t and $t+6$, rates

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



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 :

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

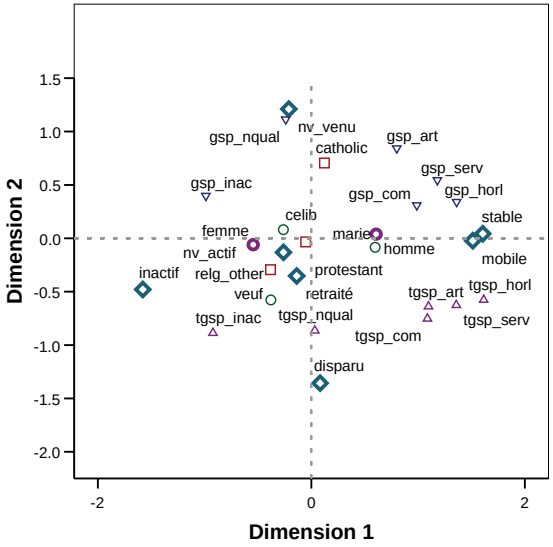
- $\exp(\beta)$ measures by how much the odd ratio is multiplied when x_1 increases by one unit.

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%

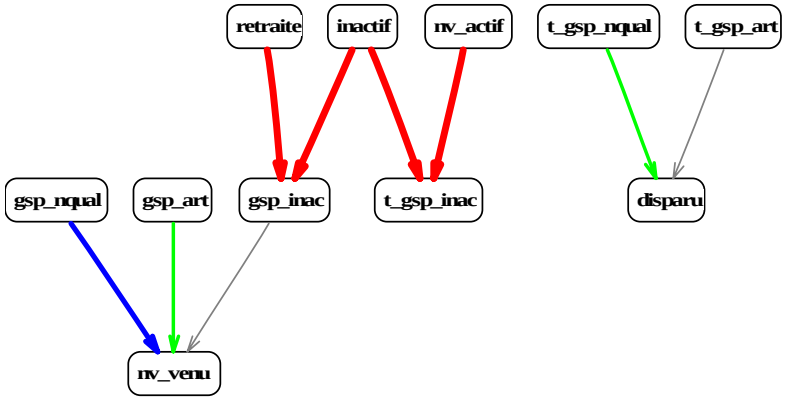
Multiple factorial correspondence analysis



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.

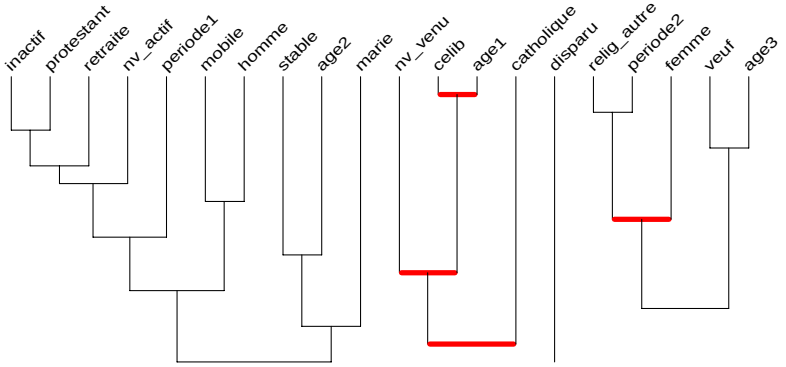
Transitions and socioprofessional groups



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

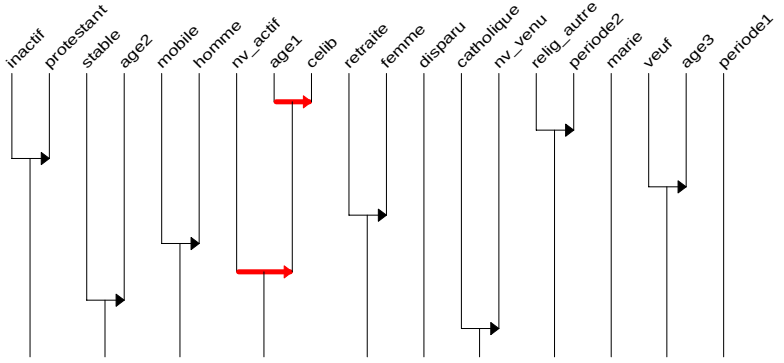
Transitions and demographic characteristics 1

Similarity tree (symmetrical measure)

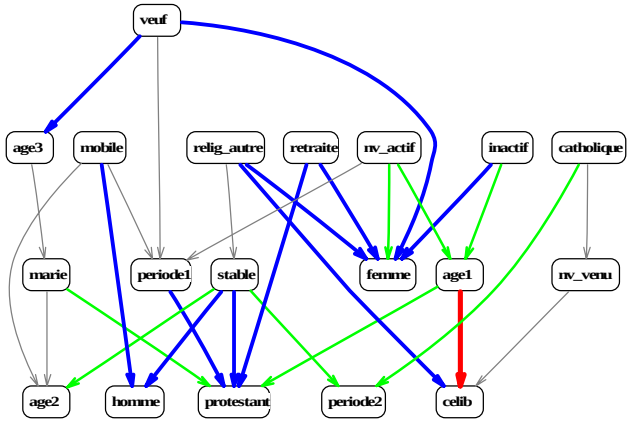


Transitions and demographic characteristics 2

Cohesive tree (asymmetrical implication measure)



Transitions and demographic characteristics 3



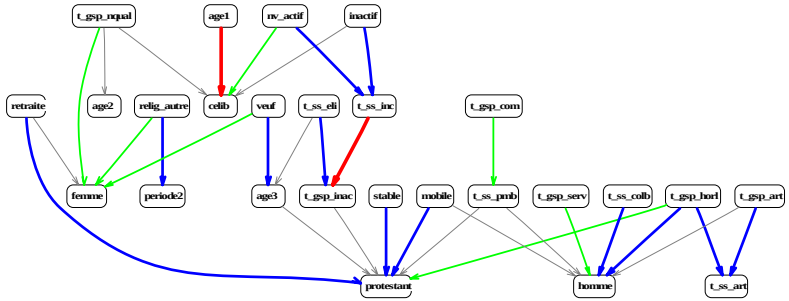
Entropic measure, thresholds 99%, 75%, 65%, 55%.

Typicality of social statuses for some paths

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

Socioprofessional groups and social statuses 1

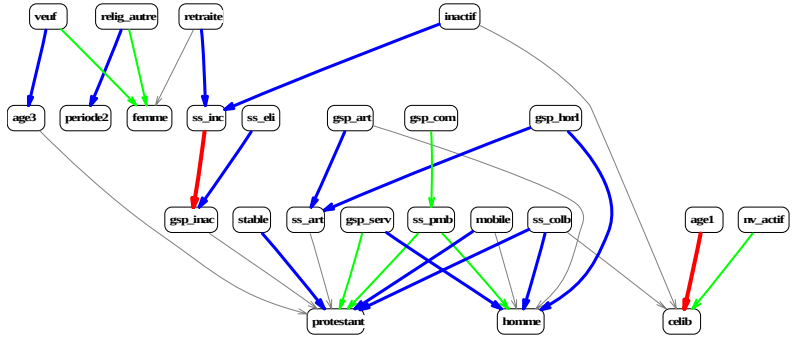
Groups and statuses in t



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

Socioprofessional groups and social statuses 2

Groups and statuses in t



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

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?

THANK YOU!

MERCI !

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