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# THE NORWEGIAN FIELD OF POWER ANNO 2000

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**ABSTRACT:** This article, in the line of Bourdieu (1989), belongs to the research domain about elites and the field of power. Using data from the Norwegian Power & Democracy survey on elites, conducted in 2000, it specifically seeks to uncover the main dimensions and fractions in the Norwegian field of power. Multiple Correspondence Analysis (MCA) has been used to address this issue. The three main findings are these: firstly, our results show that the three most important principal dimensions in the field are an economic capital axis, then an educational and social capital axis, and then an axis separating the judicial positions from positions in culture, organizations and politics. Secondly, the political positions are the most accessible. Thirdly, the public judicial group is the most homogeneous. **Key words:** field of power; Norway; geometric data analysis; multiple correspondence analysis

# 1. Introduction<sup>1</sup>

In studies of elites it has been common to separate between different types of power, and between different types of elites (Scott 1990; Suleiman and Mendras 1997). To objectify elite power structures and relations between elites in a given society, there are good reasons for turning to Bourdieu's thinking (see in particular Bourdieu 1989, 1991; Bourdieu and de Saint-Martin 1978). Firstly, Bourdieu's approach offers a theory of the social space and of fields as *multidimensional* objects of analysis. Secondly, Bourdieu's

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approach is relational: Field positions are objectified by geometric methods, and interpreted relative to each other. A *field of power* is defined whenever agents located in dominant positions in several fields are engaged in struggles that affect power relations within and between the different fields. In this line, we thus seek to uncover the structure of what we call 'the Norwegian field of power'. For fulfilling this aim we apply Multiple Correspondence Analysis (MCA) to the data from a survey of 1,710 persons holding leading positions in the Norwegian society, conducted by the Norwegian Power and Democracy Project during the autumn of 2000 (Gulbrandsen *et al.* 2002; Holt and Prangerød 2001).

### 2. The field of power

### 2.1. Historical sketch

The actual positions of the various agents and/or institutions depend on the capital accumulated in the previous struggles in the field, which also exerted formative power on position specific habituses. In the 19th century, after the break with Danish rule (1814) and the start of the political union with Sweden (1814–1905), the first Norwegian university, the State Bank, the Supreme Court and the Parliament were established. Both the state apparatus and the political institutions came to be dominated by a 'state nobility'; an integrated, well-educated group, further unified through a persistent opposition to being ruled from Sweden. This elite was to a substantial degree self-recruiting, and marriage patterns reveal that relations between academic and merchant families were dense (Aubert *et al.* 1960). In weberian terminology, the two formed a status group, with no marked opposition between cultural and economic capital.

Unlike most other European countries, the industrial capitalist development in Norway had neither resulted in large corporations, nor, with the exception of some shipping families, in the accumulation of important capital volumes in financial or industrial family dynasties. As the historian Sejersted (1993) has pointed out, the state would instead play an active, 'compensatory' role, acting at the same time as a legislator, entrepreneur and industrial strategist. National opposition to the dominant cultural, academic and political elite would therefore not come from industrial capitalists or the bourgeoisie, but rather from the farmers, who, in collaboration with religious leaders, teachers, urban liberals and workers, formed a coalition of what Rokkan (1987) coined the 'counter-cultures'. Four configurations of positions have thus been identified in the struggles that in 1884 resulted in parliamentarism: the

urban establishment, the urban intelligentsia, the rural 'counter cultures' and the labour movement.

In the years after 1900, the labour movement mobilized politically, organisationally and culturally, and the opposition between industrial/commercial groups and the labour movement became more dominant. Politically, persisting geographic, economic, cultural and religious issues resulted in an increasingly fragmented Liberal party; whereas within the Conservative party, the original coalition between state officials and merchants came under pressure. New industrialists favoured a *laissez-faire* liberalism over the Burke-inspired conservatism that had dominated the party (Rokkan 1987: 147).

However, both within politics and industrial relations, conflicts gave way to compromise; the first Basic Agreement between LO (employees) and NAF (employers) was reached in 1935. Key components of the current industrial and political system thus originated in the immediate pre- and post-war years. The Labour party, holding power from 1945 to 1965, extended co-operation and compromise, both in politics and in industrial relations. As late as in 1992, the Labour party government and the main organizations of capital and labour formed a tri-partite five-year agreement called the 'Solidarity Alternative' (described by Dølvik and Stokke (1998) as a 'revival of central concertation'). And, despite pushes for increasing privatisation of state-controlled enterprises, the State has continued to play an active compensatory or rescuing role, for instance in the early 1990s when the major private banks were close to bankruptcy, and its position in the oil sector has tended to reinforce the state-capitalist features of the Norwegian economy.

Historically, this resulted in a type of socioeconomic regulation coined 'negotiated economics and mixed administration' (Hernes 1978) in the first large Norwegian Power survey from the 1970s, which may seem to be reproduced. This type of regulation may, however, coincide with rather different patterns and degrees of mobility between sectors. And while earlier studies indicated a high degree of positional stability, individual trajectories of former politicians during the latest decades indicate much more blurred lines between business and politics. Also, the emergence of political dynasties with substantial amounts of inherited and personally acquired social capital assets, and exclusive, influential cross-cutting party networks (for instance the 'Oil network') gathering politicians and CEOs (all members of the Labour party), indicate a much more complex field structure that should warn against preconstructions of the field of power in terms of oppositions between political and economic capital. Not only may the central oppositions be structured along other capital dimensions. Also, the *internal* heterogeneity in each of the capital hierarchies may be considerable, and the structuring capacities of the capital types, e.g.,

cultural capital, therefore accordingly complex. And the issue is further complicated by the fact that the 'counter cultures' have demonstrated a remarkably historical perseverance, and repeatedly resulted in crosscutting oppositions and mobilizations both between and within configurations of positions (also in political parties), as for instance in the two EU referendums in 1972 and 1994.

### 2.2. Recent European studies

Recent comparative studies of the recruitment to European elite positions have been restricted to analyses of political, administrative, military and managerial positions (see, e.g., Suleiman and Mendras op. cit.: 244), and are mainly based on cross-national comparisons of the recruitment to selected positions, such as military or managerial positions; rather than analysing and comparing the relations between the elite positions within each country. These studies have revealed a considerable degree of variation across Europe, for instance, between the ways in which France, Great Britain and Germany recruit and educate the highest ranking officers. There are also major differences in the degree of elite centralisation, with Great Britain and France among the most and Italy and Germany among the least centralised states (ibid). Single-country case studies confirm these findings. In Germany, 'the nation state never [penetrated] as deeply into daily life as in the case of France or England' (Scheuch 2003: 129), and the overall picture that emerged from the Potsdam elite study (Bürklin and Rebenstorf 1997) confirmed a high degree of sectorial segmentation, i.e., a more diversified capital structure. In contrast, Scott (1991): 151) concluded that Britain was 'ruled by a capitalist class whose economic dominance is sustained by the operations of the state and whose members are disproportionately represented in the power elite which rules the state apparatus'.

Recent *Nordic elite studies* indicate a considerable variation among countries that usually are grouped together as 'social democracies'. Whereas the Swedish elite study (Demokrati och makt i Sverige 1990) concluded that there were two major elite configurations in Sweden, one centred around the labour movement and one around private businesses (i.e., an opposition between political and economic capital), a study of Finland found a far more integrated and also exclusive configuration of elite positions, the political elite being most open in terms of social mobility (Ruostetsaari 1993: 333). Finally, a recent Danish study has concluded that there are three major elite config-

urations in Denmark: business, higher civil servants, and politicians (Christiansen et al. 2001).

None of the above mentioned studies have taken Bourdieu's notion of a field as their theoretical and methodological point of departure. A full-scale comparison of these results with the results from our own study is outside the scope of this article.

# 2.3. Contemporary structures of the field of power: Key questions

Given the above outlined historically established multidimensionality of this field, and in particular the findings from the Nordic studies, we will address three interrelated main questions:

- 1. What are the characteristics of these different dimensions in terms of being capital structures? What are the different types of capital which separate the different fractions in the Norwegian field of power anno 2000?
- 2. What fractions of this field are the most open with respect to social mobility, and where is the intergenerational reproduction at its strongest?
- 3. Are there particularly homogeneous fractions with respect to capital profiles?

# 2.4. Data set

In addressing these questions, we will in this paper analyze survey data from the Norwegian Power and Democracy Survey on Norwegian elites already mentioned using multiple correspondence analysis (MCA) (see Appendix and Le Roux and Rouanet 2004) as a main statistical tool.<sup>2</sup> Where possible, data from public registers (income, property and educational level) have been merged with data from the survey.

The data set consists of 1,710 persons belonging to the institutions as shown in Table 1.

The data set is unique, including both generals, bishops, leading university officials, higher civil servants, top politicians, supreme court judges, leaders of Non-Governmental Organizations (NGOs) and the Chief Executive Officers (CEOs), Vice CEOs and chairmen of the largest private and public companies, including the cooperatives.

<sup>2.</sup> For a previous application of MCA in this journal, see Lebaron (2000).

TABLE 1. Numbers of persons of the institutions (in bold, groups studied in more detail)

Public and Private business	<b>51</b> +297
Public and Private cultural org./institutions	95 + 48
Political system (members of parliament + others)	<b>138</b> +62
Police and judicial system	66 + 12 + <b>60</b>
Research and higher educational institutions	146
Central administration	197
Defence/Military	68
Church	107
Cooperatives	42
Media	116
Organizations	215
Total	1,710

The data set is based on *institutional criteria*: Only persons holding positions in private and public institutions, in larger cooperations and firms and various types of organizations were included in the survey.<sup>3</sup> Thus, artists, painters, writers, scientists, doctors, former politicians, etc., which may all hold substantial capital assets and exert a considerable influence on their respective arenas, will not be included, *unless* they presently also hold formal positions. The same goes for CEOs and owners of smaller, but even so potentially highly influential companies, firms and institutions, both private and public.

The data set is gendered (85% are men). The position holders are well educated (62% have a higher university degree or an education at PhD-level, only 2.6% finished their education after compulsory education), their income levels are well above the average for the population (50% have an income > NOK 1,000,000<sup>4</sup>, 25% have a registered property > NOK 1,000,000, 8% have a capital income > NOK 200,000), and their educational and social background is also skewed (30% have a father and 11% a mother with a university degree, 40% have a father who holds/held a position as a leader at higher or intermediate levels, whereas 33% of the mothers work/worked in Goldthorpe's<sup>5</sup> 'non-manual routine jobs'

<sup>3.</sup> The survey was performed as a combination of personal (87%) and telephone (13%) interviews. The total response rate (87.3%) is 20–25 percentage points higher than what has been usual in Norwegian surveys in the 1990s. The highest non–response rate is found among the private business executives (25.2%), whereas it varies from 2.3 to 13.1% in the other groups. Despite this difference, the overall quality of the data set is therefore also regarded as excellent (Holt and Prangerød 2001: 16).

<sup>4.</sup> NOK 8 = approx. Euro 1 (NOK = Norwegian).

<sup>5.</sup> Kroner Erikson and Goldthorpe (1991).

category). Age ranges from 28 to 76 years (average 51.7 years, standard deviation 7.9).

There are multiple indicators of inherited and acquired social capital assets, but only three variables of economic capital (own income, property and income on shares, savings etc.), and we have mainly relied on the educational levels of the respondent and his/her parents as indicators of personal, inherited and family related cultural capital.

### 3. Statistical analysis

# 3.1. Construction of pertinent variables

After extensive analyses<sup>7</sup> and recoding of the data set, we have retained 31 variables for the construction of the space (cf. Table 2).<sup>8</sup> These can be grouped into six main headings.

Taking the first and third quartiles as indicative cutting values, the variables on *economic capital* have been recoded into three modalities, so that this heading has a contribution to the variance that is comparable to the other five headings (15.3 vs. 15.3, 19.6, 10.9, 17.4 and 21.7 percent).

The variables on *educational capital* have been put into two headings: (i) Personal; (ii) Inherited and Family related.

The variables on *social capital* have been constructed from information on the respondents' and parents' board memberships. Assuming that the father's or mother's (FM) board memberships (BM) at national levels either constitute a form of social capital that in part can be *inherited* by way of giving the respondent possibilities of access in networks, and thus also familiarity with the field of power (see Bourdieu 1986), we have included five binary coded variables on the parents' board memberships (coded Yes: One or both parents, No: None of the parents). In a similar way, the respondent's own board memberships the last five years are included as an indicator of *personal social capital*. Finally, we have included 10 binary coded variables on whether or not the respondent has spent part of his/her career in a specific sector, instead of a coding based

For further details see Holt and Prangerød (2001), Gulbrandsen (2002), Hjellbrekke and Korsnes (2003).

<sup>7.</sup> We have tested a wide range of coding alternatives. The chosen manages to grasp professional trajectories in an adequate way, and the contributions of the six headings to the variance of the cloud are fairly balanced (cf. Table 4).

<sup>8.</sup> The specific MCA was performed with ADDAD software, and the exploration of clouds with the EyeLID software (www.math-info.univ-paris5/ ~ lerb/).

TABLE 2. Thirty-one active variables relevant to six headings (subtables 2a through 2f). Seventy-seven active modalities, 11 passive modalities (indicated by p) with their absolute frequencies and percentages (left parts of subtables)

(a) Economic capital (▲, ♣, ►	)			Axis 1		Axis 2		Axis 3	
Variable Scarles	Modality	Freq	%	<i>y</i> <sub>1</sub>	Ctr	y <sub>2</sub>	Ctr	у <sub>3</sub>	Ctr
Personal e	≤ 421	459	26.8	- 0.366	0.011	+ 0.162	0.003	- 0.515	0.035
income (NOK in thousands) Income on Capital (savings, shares, etc.) (NOK in thousands)	$422 \leq \cdot \leq 784$	871	50.9	-0.351	0.019	-0.037	0.000	+0.137	0.005
(NOK in 불	> 785	366	21.4	+ 1.301	0.109	-0.110	0.001	+0.317	0.010
thousands) 💆	No info (p)	14	0.8						
Income on Capital	≤ 1.6	457	26.7	-0.488	0.019	-0.279	0.008	-0.561	0.041
(savings, shares, etc.) 🖺	$1.6 \leq \cdot \leq 35.8$	822	48.1	-0.221	0.007	+0.048	0.000	+0.127	0.004
(NOK in thousands) 🚆	≥ 35.8	359	21.0	+ 1.110	0.077	+0.256	0.005	+0.421	0.018
No.	negative	58	3.4	+0.156	0.000	-0.025	0.000	+0.003	0.000
Dow	No info (p)	14	0.8						
Registered	≤ 374	527	30.8	-0.531	0.026	-0.156	0.003	-0.571	0.049
Property	$375 \leq \cdot \leq 1{,}225$	799	46.7	-0.207	0.006	+0.016	0.000	+0.165	0.006
(NOK in thousands)	≥ 1,226	369	21.6	+ 1.214	0.095	+0.192	0.003	+0.457	0.022
	No info (p)	15	0.9						
(NOK = Norwegian crown) Tot	tal				0.369		0.024		0.190
(b) Personal educational capi	tal (*)			Axis 1		Axis 2		Axis 3	
Variable	Modality	Freq	%	<i>y</i> <sub>1</sub>	Ctr	<i>y</i> <sub>2</sub>	Ctr	уз	Ctr
Own Educational	No diploma (p	45	2.6						
level	Diploma	120	7.0	+0.217	0.001	-0.653	0.011	-0.678	0.014
	Univ 1-2 years	109	2.4	+0.367	0.009	-0.315	0.008	-0.419	0.018
	Univ 3-4 years	370	21.6	-0.053	0.000	+0.213	0.009	+0.428	0.044
	Univ 5-6 years	852	49.8	-0.534	0.011	+0.953	0.045	-0.033	0.000
	Phd or equivalent	213	12.5	-0.014	0.000	-1.265	0.044	-0.895	0.027
	No info (p)	1	0.1						

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Studies abroad	1 year	252	14.7	- 0.121		+ 0.683	0.027	+ 0.099	0.001
Δ+: 1	2 year	193	11.3	+ 0.425	0.006	+ 0.748	0.025	+ 0.370	0.008
	No No	1,265	74.0	- 0.041	0.000	- 0.250	0.018	- 0.076	0.002
Worked abroad	yes	604	35.3	+ 0.230	0.006	+ 0.429	0.026	+ 0.245	0.010
ď	No No	1,106	64.7	-0.125	0.003	-0.234	0.014	-0.134	0.006
Total					0.037		0.227		0.130
(2) Inherited and family re	ated educational capital (●)			Axis 1		Axis 2		Axis 3	
Variable g	Modality	Freq	%	<i>y</i> <sub>1</sub>	Ctr	<i>y</i> <sub>2</sub>	Ctr	<b>у</b> з	Ctr
Father's educational	Compulsory educ.	525	30.7	- 0.247	0.006	- 0.524	0.033	+ 0.041	0.000
level	Continuing (1–3 years)	494	28.9	+ 0.179	0.003	- 0.259	0.008	+ 0.003	0.000
level 58	University 1–2 years	166	9.7	+ 0.166	0.001	+ 0.136	0.001	- 0.173	0.001
4	University 3-4 years	163	9.5	+ 0.132	0.001	+0.272	0.003	+0.067	0.000
<u> </u>	University ≥ 5 years	354	20.7	- 0.010	0.000	+0.957	0.075	- 0.004	0.000
٤	No info (p)	8	0.5	-0.243	0.002	-0.044	0.000	-0.405	0.008
Partner's educational	No diploma	118	6.9	+0.027	0.000	-0.824	0.019	-0.186	0.001
level	Diploma	254	14.8	+0.324	0.005	-0.544	0.017	-0.012	0.000
	Univ 1-2 years	189	11.2	+0.286	0.003	-0.091	0.000	+0.127	0.001
	Univ 3-4 years	519	30.3	+0.017	0.000	+0.093	0.001	+0.018	0.000
	Univ $\geq$ 5 years	456	26.7	-0.233	0.004	+0.464	0.023	+0.136	0.002
	No info	174	10.2						
Total					0.024		0.179		0.015
(d) Personal social capital	(■:yes, □: no): Board member (B	M) of		Axis 1		Axis 2		Axis 3	
Variable	Modality	Freq	%	y <sub>1</sub>	Ctr	y <sub>2</sub>	Ctr	уз	Ctr
Private Company	Yes	852	49.8	+ 0.654	0.064	- 0.111	0.002	- 0.043	0.000
• • • •	No	858	50.2	- 0.649	0.063	+ 0.110	0.002	+ 0.042	0.000
General Assembly	Yes	218	12.7	+ 1.025	0.040	- 0.294	0.004	- 0.434	0.012
-	No	1,492	87.3	- 0.150	0.006	+0.043	0.001	+0.063	0.002

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Election Committee Public Company	g Yes	153	8.9	+ 1.319	0.047	-0.027	0.000	+0.352	0.005
, ·	No	1,557	91.1	-0.130	0.005	+0.003	0.000	-0.035	0.001
		597	34.9	-0.025	0.000	+0.311	0.013	-0.336	0.019
	<sup>2</sup> No	1,113	65.1	+ 0.014	0.000	-0.167	0.007	+0.180	0.010
Managerial organization  Branch Organization  Trade union  Voluntary Organization	Yes	374	21.9	+ 1.005	0.066	-0.100	0.001	-0.229	0.006
t	No No	1,336	78.1	-0.281	0.019	+0.028	0.000	+0.064	0.002
Branch Organization	g Yes	195	11.4	+0.782	0.021	-0.174	0.001	-0.593	0.019
-	No No	1,515	88.6	-0.101	0.003	+0.022	0.000	+0.076	0.003
Trade union	Yes	281	16.4	+ 0.095	0.000	-0.208	0.003	-0.670	0.036
	No No	1,429	83.6	-0.019	0.000	+0.041	0.001	+0.132	0.007
Voluntary Organization	Yes	356	20.8	-0.034	0.000	+0.333	0.009	-0.719	0.052
Ę	P. No	1,354	79.2	+0.009	0.000	-0.088	0.002	+0.189	0.014
Total				0.037		0.227		0.130	
(e) Inherited social capita	【●: yes, ○: no): Father/N	Mother board member (	FM:BM) of	Axis 1		Axis 2		Axis 3	
	Modality (●: yes, ○: no): Father/N	Mother board member ( freq	<i>FM</i> :BM) of %	Axis 1 y <sub>1</sub>	Ctr	Axis 2 y <sub>2</sub>	Ctr	Axis 3 	Ctr
		·	ŕ		Ctr <b>0.015</b>				Ctr 0.013
Variable	Modality	freq	%	y <sub>1</sub>		y <sub>2</sub>		у <sub>3</sub>	
Variable	Modality Yes	freq 491	% 28.7	y <sub>1</sub> + 0.417	0.015	y <sub>2</sub> + 0.802	0.073	<i>y</i> <sub>3</sub> - 0.306	0.013
Variable	Modality Yes No	freq 491 1,213	% 28.7 70.9	y <sub>1</sub> + 0.417	0.015	y <sub>2</sub> + 0.802	0.073 0.029	<i>y</i> <sub>3</sub> - 0.306	0.013
Variable Private/public company	Modality  Yes  No  NR/DK (p)	freq 491 1,213 6	% 28.7 70.9 0.4	y <sub>1</sub> + 0.417 - 0.167	<b>0.015</b> 0.006 <b>0.021</b>	y <sub>2</sub> + 0.802 - 0.324	0.073 0.029 0.067	<i>y</i> <sub>3</sub> - 0.306 + 0.128	<b>0.013</b> 0.006
Variable Private/public company	Modality  Yes  No  NR/DK (p)  Yes	freq 491 1,213 6 262	% 28.7 70.9 0.4 15.3	$y_1$ + 0.417 - 0.167 + 0.679	<b>0.015</b> 0.006 <b>0.021</b>	$y_2$ + 0.802 - 0.324 + 1.048	0.073 0.029 0.067	$y_3$ $-0.306$ $+0.128$ $-0.497$	0.013 0.006 0.018
Variable Private/public company	Modality  Yes  No  NR/DK (p)  Yes  No	freq  491 1,213 6 262 1,441	% 28.7 70.9 0.4 15.3 84.3	$y_1$ + 0.417 - 0.167 + 0.679	<b>0.015</b> 0.006 <b>0.021</b>	$y_2$ + 0.802 - 0.324 + 1.048	0.073 0.029 0.067 0.012	$y_3$ $-0.306$ $+0.128$ $-0.497$	0.013 0.006 0.018
Variable  Private/public company  Managerial company	Modality  Yes No NR/DK (p) Yes No NR/DK (p)	freq  491 1,213 6 262 1,441 7	% 28.7 70.9 0.4 15.3 84.3 0.4	$y_1$ + 0.417 - 0.167 + 0.679 - 0.122	<b>0.015</b> 0.006 <b>0.021</b> 0.004	$y_2 + 0.802 - 0.324 + 1.048 - 0.191$	0.073 0.029 0.067 0.012 0.060		0.013 0.006 0.018 0.003
Variable  Private/public company  Managerial company	Modality  Yes No NR/DK (p) Yes No NR/DK (p) Yes	freq  491 1,213 6 262 1,441 7 282	% 28.7 70.9 0.4 15.3 84.3 0.4 16.5	$y_1 + 0.417 - 0.167 + 0.679 - 0.122 + 0.304$	0.015 0.006 0.021 0.004 0.005	$y_2$ + 0.802 - 0.324 + 1.048 - 0.191 + 0.962	0.073 0.029 0.067 0.012 0.060	y <sub>3</sub> - 0.306 + 0.128 - 0.497 + 0.092 - 0.661	0.013 0.006 0.018 0.003
Variable  Private/public company  Managerial company	Modality  Yes No NR/DK (p) Yes No NR/DK (p) Yes No NR/DK (p) Yes No	freq  491 1,213 6 262 1,441 7 282 1,420	% 28.7 70.9 0.4 15.3 84.3 0.4 16.5 83.0	$y_1 + 0.417 - 0.167 + 0.679 - 0.122 + 0.304$	0.015 0.006 0.021 0.004 0.005	$y_2$ + 0.802 - 0.324 + 1.048 - 0.191 + 0.962	0.073 0.029 0.067 0.012 0.060	y <sub>3</sub> - 0.306 + 0.128 - 0.497 + 0.092 - 0.661	0.013 0.006 0.018 0.003
Variable  Private/public company  Managerial company  Trade union	Yes No NR/DK (p)	freq  491 1,213 6 262 1,441 7 282 1,420 8 408 1,295	%  28.7  70.9  0.4  15.3  84.3  0.4  16.5  83.0  0.5  23.9  75.7	$y_1 + 0.417 - 0.167 + 0.679 - 0.122 + 0.304 - 0.058$	0.015 0.006 0.021 0.004 0.005 0.001	$\begin{array}{c} & & & \\ y_2 & & \\ & + 0.802 \\ & - 0.324 & \\ & + 1.048 \\ & - 0.191 & \\ & + 0.962 \\ & - 0.193 & \\ \end{array}$	0.073 0.029 0.067 0.012 0.060 0.012	$\begin{array}{c} \hline y_3 \\ \hline -0.306 \\ +0.128 \\ \hline -0.497 \\ +0.092 \\ \hline -0.661 \\ +0.133 \\ \hline \end{array}$	0.013 0.006 0.018 0.003 0.035 0.007
Variable  Private/public company  Managerial company  Trade union  Voluntary organization	Modality  Yes  No  NR/DK (ρ)  Yes  No  NR/DK (ρ)  Yes  No  NR/DK (ρ)  Yes  No  NR/DK (ρ)	freq  491 1,213 6 262 1,441 7 282 1,420 8 408 1,295 7	%  28.7  70.9  0.4  15.3  84.3  0.4  16.5  83.0  0.5  23.9  75.7  0.4	$y_1 = 0.417 - 0.167 - 0.167 - 0.122 + 0.304 - 0.058 + 0.232$	0.015 0.006 0.021 0.004 0.005 0.001	+ 0.802 - 0.324 + 1.048 - 0.191 + 0.962 - 0.193 + 0.903 - 0.285	0.073 0.029 0.067 0.012 0.060 0.012	$\begin{array}{c} & & \\ y_3 & \\ & -0.306 \\ & +0.128 \\ & -0.497 \\ & +0.092 \\ & -0.661 \\ & +0.133 \\ & -0.455 \end{array}$	0.013 0.006 0.018 0.003 0.035 0.007
Variable  Private/public company  Managerial company  Trade union	Modality  Yes No NR/DK (p) Yes	freq  491 1,213 6 262 1,441 7 282 1,420 8 408 1,295 7 149	%  28.7  70.9  0.4  15.3  84.3  0.4  16.5  83.0  0.5  23.9  75.7	$\begin{array}{c} y_1 \\ + 0.417 \\ - 0.167 \\ + 0.679 \\ - 0.122 \\ + 0.304 \\ - 0.058 \\ + 0.232 \\ - 0.072 \\ + 0.065 \end{array}$	0.015 0.006 0.021 0.004 0.005 0.001 0.004 0.001	+ 0.802 - 0.324 + 1.048 - 0.191 + 0.962 - 0.193 + 0.903 - 0.285 + 0.829	0.073 0.029 0.067 0.012 0.060 0.012 0.077 0.024	$\begin{array}{c} \hline y_3 \\ \hline -0.306 \\ +0.128 \\ -0.497 \\ +0.092 \\ -0.661 \\ +0.133 \\ -0.455 \\ +0.147 \\ -0.832 \\ \end{array}$	0.013 0.006 0.018 0.003 0.035 0.007
Variable  Private/public company  Managerial company  Trade union  Voluntary organization	Modality  Yes No NR/DK (p)	freq  491 1,213 6 262 1,441 7 282 1,420 8 408 1,295 7	%  28.7  70.9  0.4  15.3  84.3  0.4  16.5  83.0  0.5  23.9  75.7  0.4	$y_1$ + 0.417 - 0.167 + 0.679 - 0.122 + 0.304 - 0.058 + 0.232 - 0.072	0.015 0.006 0.021 0.004 0.005 0.001 0.004 0.001	+ 0.802 - 0.324 + 1.048 - 0.191 + 0.962 - 0.193 + 0.903 - 0.285	0.073 0.029 0.067 0.012 0.060 0.012 0.077 0.024	$\begin{array}{c} & & \\ y_3 & \\ & -0.306 \\ & +0.128 \\ & -0.497 \\ & +0.092 \\ & -0.661 \\ & +0.133 \\ & -0.455 \\ & +0.147 \end{array}$	0.013 0.006 0.018 0.003 0.035 0.007 0.024 0.008

(NR = no reply; $DK = dor$	n'kknow) <i>Total</i>				0.056		0.382		0.147
(f) Professional experier	nce (■:yes, □: no):			Axis 1		Axis 2		Axis 3	
Variable	ه Modality مانته	Freq	%	y <sub>1</sub>	Ctr	y <sub>2</sub>	Ctr	у <sub>3</sub>	Ctr
Defence	yes Yes	301	17.6	- 0.076	0.000	+ 0.378	0.010	+ 0.296	0.007
	o No No	1,409	82.4	+0.016	0.000	-0.081	0.002	-0.063	0.002
<b>Organizations</b> (included NGOS)	Yes No Yes Yes No Yes Yes No Yes Yes Yes No Yes Yes Yes No Yes	378	22.1	- 0.124	0.001	- 0.081	0.001	- 0.873	0.082
	No No	1,332	77.9	+0.035	0.000	+0.023	0.000	+0.248	0.023
Church	iệ Yes	131	7.7	-0.740	0.013	+0.656	0.013	-0.524	0.010
	≥ No	1,579	92.3	+0.061	0.001	-0.054	0.001	+0.043	0.001
Media	Yes	210	12.3	+0.074	0.000	-0.231	0.003	-0.582	0.020
	g No	1,500	87.7	-0.010	0.000	+0.032	0.001	+0.081	0.003
Culture	¥ Yes	153	8.9	-0.293	0.002	+0.267	0.003	-1.105	0.053
	<sup>∆</sup> No	1,557	91.1	+0.029	0.000	-0.026	0.000	+0.109	0.005
Civil service	Yes	631	36.9	-0.327	0.012	+0.186	0.005	+0.242	0.011
	No	1,079	63.1	+0.191	0.007	-0.109	0.003	-0.142	0.006
Research	Yes	449	26.3	-0.329	0.009	+0.613	0.039	+0.163	0.003
	No	1,261	73.7	+0.117	0.003	-0.218	0.014	-0.058	0.001
Politics	Yes	291	17.0	-0.285	0.004	-0.512	0.018	-0.654	0.035
	No	1,419	83.0	+0.059	0.001	+0.105	0.004	+0.134	0.007
Justice	Yes	206	12.0	-0.548	0.011	+0.278	0.004	+0.961	0.054
	No	1,504	88.0	+0.075	0.001	-0.038	0.001	-0.132	0.007
Business	Yes	858	50.2	+ 0.620	0.058	-0.226	0.010	+0.009	0.000
	No	852	49.8	- 0.624	0.058	+0.227	0.010	- 0.009	0.000
Total					0.182	•	0.139		0.332

Results of MCA for the first three axes (right parts of subtables). For each axis, coordinates (y) and contributions (Ctr) of active modalities (in bold, contributions of modalities retained for interpretation) and contributions of headings. The symbols are those used in Figures 1–3.

TABLE 3. Variances of axes, modified rates and cumulated ones

	Axis 1	Axis 2	Axis 3
Variances of axes (eigenvalues)	0.108	0.082	0.066
Modified rates	44%	20%	11%
Cumulated modified rates	44%	64%	75%

on the number of years. This will not only permit a more detailed analysis of mobility between professional trajectories, but also serve as an additional indicator of social capital. The assumption here is that the network an agent can mobilize in a given situation will in part depend upon the time the same agent has spent in various sectors, i.e., in subfields of the field power.

### 3.2. Basic results

A specific MCA has been performed;<sup>10</sup> the basic results are the following: (i) the variances of axes (eigen values, see Table 3); (ii) the principal coordinates of 77 modalities and of the 1,710 individuals; (iii) the contributions of categories to axes (see Table 2); (iv) the geometric representation of the two clouds (modalities and individuals).

Looking at modified rates (the modified rates give a better assessment of the importance of axes than the raw rates), it is clear that one axis is not sufficient (44%), whereas taking three axes brings the rate up to 75%. In what follows, we will interpret the first three axes.

# 3.3. Interpretation of the first three Axes

As a baseline criterion for retaining modalities for interpretation of an axis we take the average contribution 100/77 = 1.3%; to better account for the questions with two modalities, we will lower the criterion to 1.2%.

# • Axis 1 ( $\lambda_1 = 0.108$ ), see Table 4 and Figure 1

There are 19 modalities (belonging to 13 variables involving four headings) that have contributions meeting criterion; to which we add the modality (Income  $\leq 421$ ) with contribution (1.1%) near criterion and close to modality (Income 422-784) on axis 1 (see Table 2). The subset

<sup>9.</sup> In this way, we have disposed of the problem of age.

<sup>10.</sup> At this point, the reader may have a look at Appendix.

TABLE 4. Interpretation of axis 1: 13 variables, 20 modalities most contributing to axis. Variables are ranked according to decreasing contributions (in%)

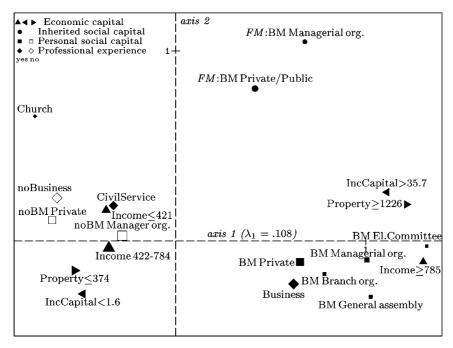
Variables	Ctr of variables	Modalities	Ctr of modalities		
	74.74.27.2	Left	Right	Left	Right
Personal income	13.8	( ≤ 421) +			
		$(422 \le \cdot \le 784)$	≥ 785	1.1 + 1.9	10.9
BM private company	12.7	No	Yes	6.3	6.4
Property	12.7	≤ 374	≥ 1226	2.6	9.5
Experience from business	11.6	No	Yes	5.8	5.8
Income on capital	10.4	≤ <b>1.6</b>	≥ 35.7	1.9	7.7
BM managerial organization	8.5	No	Yes	1.9	6.6
Member election committee of private company	5.1		Yes		4.7
Member general assembly of private company	4.6		Yes		4.0
FM:BM managerial organization	2.5		Yes		2.1
BM branch organization	2.4		Yes		2.1
FM:BM Private/Public company	2.1		Yes		1.5
Experience from civil service	1.9	Yes		1.2	
Experience from Church	1.4	Yes		1.3	
FM (Father/Mother), BM (Bo	ard member	·)		24.0	61.3
Total				85.3	

of these 20 modalities are depicted on Figure 1. They together account for 85.3% of the variance of axis 1.

On the left, there are nine modalities (24.0% of the variance of axis). They indicate low volume of economic capital, no business experience, no board membership of private business corporations or organizations; they indicate also experience of Civil service and of Church. On the right, there are 11 modalities (61.3% of the variance of axis). One finds the modalities that indicate high volume of economic capital (Property = 1,226 and Capital income > 35.7), and a high degree of familiarity with 'the business world' and economic executive power (experience in business, board membership of private company, managerial organization, membership of election committee in private business).

The opposition between lower and higher Capital income and Property modalities is strong. In addition, familiarity with the economic sector is in part transmitted through family relations (Father/Mother board member of Private/Public company, of managerial organization).

To sum up, axis 1 separates lower vs. higher volumes of economic capital assets, and is especially related to the business linked inherited social capital.



**Figure 1.** Plane 1-2. Interpretation of Axis 1: 20 modalities most contributiong to axis (belonging to 4 headings). Abbreviations: FM = Father/Mother, BM = Board Member. The sizes of markers are proportional to the frequencies of modalities.

# • Axis 2 ( $\lambda_2 = 0.082$ ), see Table 5 and Figure 2

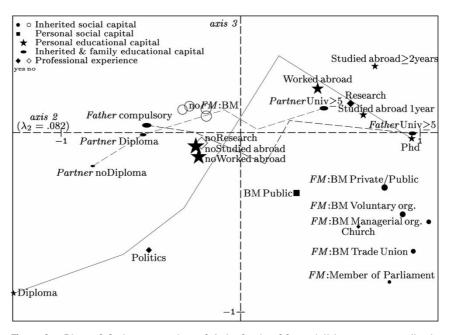
There are 26 modalities (belonging to 14 variables involving five headings) that have contributions to axis 2 meeting criterion; they account for 84.1% of the variance of axis.

These 26 modalities are depicted on Figure 2, putting axis 2 as horizontal axis.

The modalities of both personal, inherited and family related educational capital are ordered along axis 2 from low levels to high ones. There is a tight group of inherited social capital assets which are linked to trajectories that also depend upon the accumulation of substantial volumes of educational capital. On the right, we find the five modalities of inherited social capital, which leads to interpret axis 2 as an axis of field seniority and also the modality designating experience in research, opposed to experience in politics.

To sum up: axis 2 is mainly an axis of field seniority; it opposes high and low volumes of inherited social capital and of inherited (and personal) educational capital.

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「ABLE 5. Interpretation o∉ axis 2: 14 v	variables, 26 modalities m	ost contributing to axis				
Desc						
Variables e	Ctr of variables	Modalities		Ctr of modal	ties	
rsite Re		Left	Right	Left	Right	
Father's educational leve	11.9	compulsory	Univ ≥ 5 years	3.3	7.5	
Own educational level ਨੂੰ	11.7	Diploma	Phd	4.4	4.5	
FM:BM private/public company	10.3	No	yes	2.9	7.3	
FM:BM voluntary organization	10.2	No	yes	2.4	7.7	
FM:BM managerial organization	7.9	No	yes	1.2	6.7	
FM:BM trade union	7.3	No	Yes	1.2	6.0	
Studied abroad	7.0	No	$(1) + (\ge 2)$ years	1.8	2.7 + 2.5	
Partner educational level	6.0	No diploma + diploma	Univ ≥ 5 years	1.9 + 1.7	2.3	
Experience from research	5.3	No	yes	1.4	3.9	
Worked abroad	4.0	no	yes	1.4	2.6	
FM member of parliament	2.6		yes		2.4	
Experience from politics	2.2	yes		1.8		
BM public company	2.0		yes		1.3	
Experience in church	1.4		yes		1.3	
	abor)			25.4	58.7	
FM (Father/Mother), BM (Board men	inei)			20.1	00.1	



**Figure 2.** Plane 2-3. Interpretation of Axis 2: the 26 modalities most contributing to axis (belonging to 5 headings). FM = Father/Mother, BM = Board Member. The modalities of own, partner and father educational levels are joined by lines.

# • Axis 3 ( $\lambda_3 = 0.066$ ), see Table 6 and Figure 3

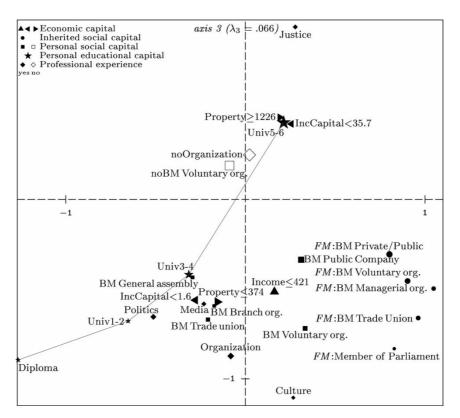
There are 25 modalities (belonging to 18 variables involving five headings) that have contributions to axis 3 above the criterion value

Together they account for 80.6% of the axis and are depicted on Figure 3.

Along axis 3, we find the modalities of personal educational capital that are ordered from bottom (diploma) to top (five to six years at University). Axis 3 complements the interpretation of axis 2. On one side of the axis (bottom), one finds inherited social capital, personal social capital (organization, trade union, public company) and experience in organizations, cultural sector, politics and media. On the other side (top), one finds experience in justice, and economic capital assets that may in part be inherited.

To sum up, axis 3 opposes social capital assets with experience in organizations, trade union, media and politics (linked to lower level of education) to economic capital with experience in justice (linked to higher level of education).

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÷	) variables OC medalitis	es most contributing to axis			
<u> </u>	7 variables, 26 modalitie	es most contributing to axis			
Variables	Ctr of variables	Modalities		Ctr of modalities	
Variables		Bottom	Тор	Bottom	Тор
Experience in organization	10.5	Yes	No	8.2	2.3
Own educational level Registered property BM voluntary organization	10.4	Diploma + Univ 1-2+3-4 years	Univ 5-6 years	2.7 + 1.4 + 1.8	4.4
Registered property	7.7	≤ 374	≥ 1,226	4.9	2.2
BM voluntary organization	6.6	Yes	No	5.2	1.4
Income on capital 🛗	6.3	< 1.6	> 35.7	4.1	1.8
Experience from justice	6.1		yes		5.4
Experience from justice Experience from culture Personal income	5.8	Yes		5.3	
Personal income	5.0	≤ 421		3.5	
BM trade union	4.3	Yes		3.6	
Experience from politics	4.3	Yes		3.5	
FM:BM trade union	4.2	Yes		3.5	
FM member of parliament	3.2	Yes		2.9	
FM:BM voluntary organisation	3.2	Yes		2.4	
BM public company	2.9	Yes		1.9	
Experience from media	2.2	Yes		2.0	
BM branch organisation	2.2	Yes		1.9	
FM:BM managerial organisation	2.2	Yes		1.8	
FM:BM Private/public company	1.9	Yes		1.3	
BM general assembly	1.3	Yes		1.2	
FM (Father/Mother), BM (Board me	ember)			63.1	17.5
Total				80.6	



**Figure 3.** Plane2-3. Interpretation of axis 3: 26 modalities most contributing to axis (belonging to 5 headings). The modalities of own educational level are joined by a line.

# 3.4. Comments

At this point, we may provide some answers to key questions 1 and 2.

With respect to the *characteristics* of the dimensions, axis 1 is primarily an economic capital axis, axis 2 is an educational and social capital axis, and axis 3 opposes social capital linked to judicial and to organizational experience.

From a *social mobility* perspective, the political sector is, relatively speaking, more easy to access than the others, and thus can be an important channel of social mobility into the field. This also indicates that axis 2 is in part an axis of *capital structure*, where political social capital and educational capital are opposed to each other: if educational capital assets are scarce or lacking, the accumulation of political capital may work as a compensatory strategy. However, modalities indicating *field seniority* (i.e., parents have been board members in companies, NGOS, Trade Union

representatives, or MPs) are consistently located in one sector of Figure 2, and modalities indicating the opposite are found in the other sector. Axis 2 is therefore also describing a polarity between the trajectories of 'the established' and 'the newcomers'. In other words, although the political field may be the most open, there are still limits to the flux. We shall return to this opposition in the exploration of the cloud of individuals (cf. section 2.5). Over two generations, inherited social capital is not only reproduced; it also seems readily convertible into educational and cultural capital. These intergenerational reproduction processes and capital conversion strategies may be of particular relevance to the political field, where a distinct opposition between a political 'dynasty', rich in both educational, cultural, personal and inherited social capital, and a figuration of 'newly arrived' is revealed. As we saw, axis 3 brings a refinement to axis 2: once agents embark on one of the two main trajectories, that is, the judicial one versus the organizational, media or political one, the field logic pull them even further away from each other.

# 3.5. Exploration of the cloud of individuals

A first examination of the cloud of 1,710 individuals shows that in plane 1-2 (Figure 4) there is a stronger concentration of points on the left (lower economic capital), and more scattering on the right. In plane 2-3 (Figure 5), the shape is triangular, with an edge on the top (experience in justice and higher level of education).

Let us assign to each individual his/her position, thus giving the position variable the status of *structuring factor*: for each of the 48 positions, we may consider the subcloud of individuals who share this position and construct the mean point of this subcloud. The derived cloud of 48 mean points is shown on Figure 6 (plane 1–2) and 7 (plane 2–3).

Looking at plane 1–2, and moving from the right to the left, we first find the private and then the public business positions ordered along axis 1. Thereafter, organizational positions are followed by positions in politics. Then moving from bottom to top, we find the politicians, then the civil servants and the cultural positions, followed by leading positions in universities and research, and then in the church. Looking now at axis 3 (Figure 7), we find an opposition between judicial and military positions (top), and a figuration of organizational, cultural and in part also political positions (bottom).

In what follows, we focus the examination on the following seven subgroups: Private ( $\blacksquare$ ) business, public ( $\blacksquare$ ) business, private ( $\spadesuit$ ) culture, public ( $\spadesuit$ ) culture, members of Parliament ( $\blacktriangle$ ), public judicial position (\*) and university/research institutions ( $\blacksquare$ ).

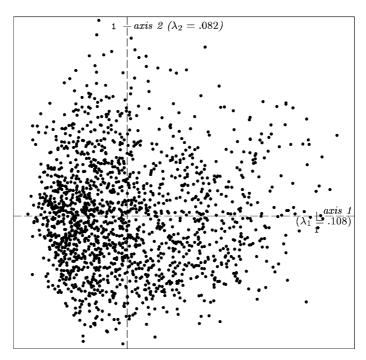


Figure 4. Cloud of 1710 individuals in plane 1-2.

On axis 1 we find a clear-cut opposition between the two groups 'Private business' and 'Members of Parliament' (the deviation between the two mean points amounts to 1.8 SD, a quite important deviation). The within-SDs range from 0.183 to 0.288, with the highest values for Private business, Public business and Private culture, and the lowest values for the members of Parliament and the Public judicial positions. Thus, the two latter are the most homogeneous along axis 1.

On axis 2 we find an opposition between the 'University/Research' group and the 'Parliament' one (1.65 SD). The within-SDs are comparable, ranging from 0.226 to 0.268.

On axis 3 we find an opposition between 'Public judicial' and 'Parliament' (1.64. sd), and even stronger opposition between 'Public judicial' and 'Public culture' (2.03 SD). Along axis 3, the public judicial positions are quite homogeneous (within-SD = 0.142), then we find Members of Parliament (within-SD = 0.182) and the group 'University/Research'

The seven subgroups can be summarized geometrically by concentration ellipses (see Figures 8 and 9).

In plane 1-2, two families of ellipses can be identified according to the direction of their major principal axes which is closer to that of axis 1 for

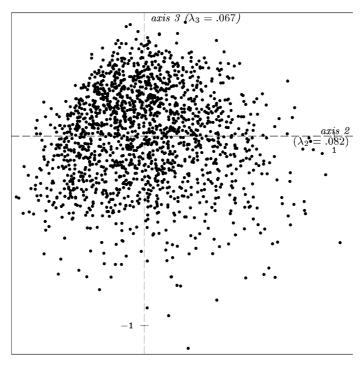
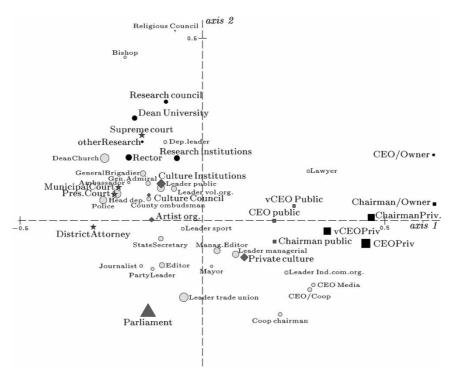


Figure 5. Cloud of 1710 individuals in plane 2-3.

the two 'Business' ellipses (private and public) and the 'Private culture' ellipse; closer to that of axis 2 for the four others. The two business ellipses are similar in shape and surface, their centres are located on axis 1. However, the 'Public business' ellipse is twice nearer of the centre of the overall cloud than the 'Private business' one. The opposition between the 'established' and the 'newcomers' is of particular relevance in the interpretation of the location of the two cultural ellipses. While the 'Private culture' ellipse is along axis 1, that is, strongly related to the structure in the economic/business field, the 'Public culture' ellipse is along axis 2, that is, related to inherited educational and social capital assets. In particular, the location of the 'Justice' ellipse indicates that the opposition between individuals with a 'popular' versus an 'established' social origin is relevant within this subgroup, whereas the location of the 'Parliament' ellipse is on the side of low economic capital (axis 1) and low to medium inherited social and educational capital (axis 2) clearly separate from the 'University' one (low economic capital and medium to high educational). In plane 1-2, the ellipses separate clearly three different forms of capital: economic capital, political capital and educational capital.



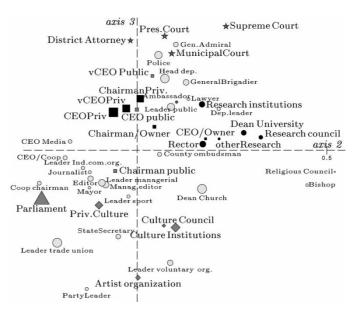
**Figure 6.** 45 mean points associated to positions in plane 1-2 (the scale is twice that of preceding figures). Seven groups are identified by different symbols: Public business ( $\blacksquare$ ), Private business ( $\blacksquare$ ), Public culture ( $\spadesuit$ ), Private culture ( $\spadesuit$ ), Parliament ( $\blacktriangle$ ), Justice (\*), University & Research ( $\blacksquare$ ), all others positions are written in smaller size letters and designated by ( $\blacksquare$ ).

In plane 2-3, the judicial positions are identified as a more homogeneous group, differing most from the public cultural positions and the 'Parliament' group. This result suggests that the profile of the judicial group is more distinct than the ones of the others, and that the group is more difficult to gain access to than the others. Last, in plane 2-3, the political ellipse is well separated from the 'judicial' and 'University/ Research' groups.

### 3.6. Concluding comments

Our answers to questions 1-3, are as follows:

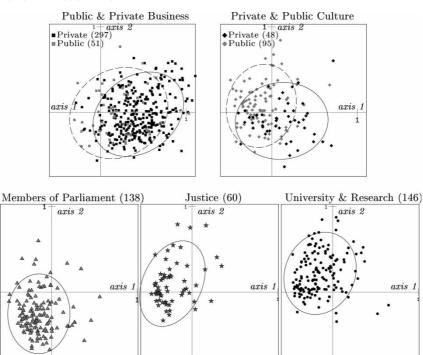
 The Norwegian field of power can be described by three principal dimensions: an economic capital axis, an educational and social capital axis, and an axis separating the judicial positions from positions in culture, organizations and politics.



**Figure 7.** 45 mean points associated to positions in plane 2-3 (the scale is twice that of preceding figures). Public business ( $\blacksquare$ ), Private business ( $\blacksquare$ ), Public culture ( $\spadesuit$ ), Private culture ( $\spadesuit$ ), Parliament ( $\blacktriangle$ ), Justice (\*), University & Research ( $\blacksquare$ ), all others positions are written in smaller size letters and designated by ( $\blacksquare$ ).

- There is a distinct opposition between the 'newcomers' and the 'established'. Whereas the political positions are the most accessible, the positions in the church and in research/universities are the least accessible.
- The most homogeneous group is that of public judicial positions, although the two subgroups of 'newcomers' and 'established' appear to be distinct.

Using the geometric approach in his analysis of the French field of power, Bourdieu has repeatedly found a structure based on economic, intellectual and seniority poles (see for example Bourdieu 1989). Our analysis of the Norwegian case has also revealed the importance of these poles. In France, there is a well-known domination of the 'grandes écoles' and 'grands corps' (the higher civil servants), especially alumni from ENA. Attempting to find Norwegian counterparts for such institutions would imply a mechanical and insensitive approach to the field of power. Instead, as pointed out by Wacquant (in Bourdieu 1995): 'One must, applying the relational mode of thinking encapsulated by the notion of field, set out in each particular case to uncover empirically the specific configurations assumed by the complexus of oppositions that structure



**Figure 8.** Concentration ellipses of subgroups of interest in plane 1-2 (Ellipses of public business and public culture are drawn as dashed lines.

social space, the system of education and the field of power, as well as their interconnections'. This is what we have tried to achieve in delineating the Norwegian field of power.

What our analysis suggests is that although the structuring forces may be universal, they combine in particular ways which tends to reproduce the conditions for maintaining specific national patterns of socio-economic systems of regulation – in the case of Norway a system of tri-partite regulation of industrial relations, and an extensive form of voluntary, negotiated corporatism. At the same time, it reveals that there are emerging patterns of mobility, especially within political elites and between business and political elites that may undermine the legitimacy of these forms of societal regulation. It is our view that one of the major strengths in Bourdieu's research program, as demonstrated in the analysis of the Norwegian field of power, is its ability to reveal such spatial-temporal specificities, by recognizing the dialectical relations between universal and societal factors in the structuring of the field.

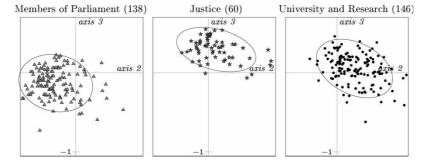


Figure 9. Concentration ellipses of subgroups of interest in plane 2-3.

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### 5. Appendix: note on multiple correspondence analysis (MCA)

The basic data set for (MCA) is an Individuals  $\times$  Questions table, where questions are *variables* with a finite number of categories, or *modalities*. MCA applies directly when for each question, each individual chooses one and only one modality, otherwise a preliminary coding is necessary. Denoting I the set of n individuals and Q the set of questions, the basic data table is thus an  $I \times Q$  table, with in cell (i, q) the modality of question q chosen by individual i. MCA provides a *geometric model of data*, that is, it represents the set of individuals by a *cloud of points*, for which principal directions are sought. A detailed presentation of MCA together with case studies are found in Le Roux and Rouanet (2004): chapters 5 and 9).

# **Principles of MCA**

Distance, cloud of individuals and cloud of modalities

The distance between two individuals is determined by their responses to the questions to which they give different answers. If for question q, individual i chooses modality k and individual i' a modality k' different from k; then letting  $n_k$  and  $n_{k'}$  be the numbers of individuals who have chosen k and k', respectively, the part of distance between i and

i' due to question q is defined by  $d_q^2(i,i') = \frac{1}{f_k} + \frac{1}{f_{k'}}$  (where  $f_{k} = n_k/n$  and  $f_{k'} = n_{k'}/n$ ).

The overall distance d(i,i') between i and i' is then defined by  $d^2(i,i') = \frac{1}{Q} \sum_{q \in Q} d_q^2(i,i').$ 

The distances between individuals determine the *cloud of individuals*, consisting of n points in a space with (at most) K - Q (overall number of modalities – number of questions) dimensions.

The *cloud of modalities* follows; if  $n_{kk'}$  denotes the number of individuals who have chosen both k and k', the distance d(k, k') is defined by

$$d^{2}(k,k') = \frac{n_{k} + n_{k'} - 2n_{kk'}}{n_{k}n_{k'}/n}$$

(number of individuals who have chosen k or k' but not both, divided by the familiar theoretical frequency).

Both clouds have the same number of dimensions and the same overall variance.

# Principal axes, eigenvalues and contributions

If one fits a cloud by orthogonal projection onto a line, such that the variance of the projected cloud is maximal, this line is called *the first principal axis* of the cloud, and the variance of the projected cloud is called the variance of the first axis, or first *eigenvalue*, denoted  $\lambda$ . The best fit by a two-dimensional cloud (plane), by a three-dimensional cloud, etc., define the sequence of principal axes, with decreasing eigenvalues  $\lambda_1 > \lambda_2 > \dots$  The principal axes of the cloud of individuals and of the cloud modalities are in a one-one correspondence.

Contributions are the main aid to interpretation. The proportion of variance of axis due to a point is called the contribution of point to the variance of axis. If  $y^k$  denotes the abscissa of modality k of weight  $f_k$  on the axis of variance  $\lambda$ , the contribution of k is

$$Ctr_k = (f_k/Q)(y^k)^2/\lambda$$

Contributions add up by grouping; which allows calculating contributions of questions, and contributions of headings. For a standard MCA, the contribution of question q to the cloud is

 $\operatorname{Ctr}_q = (Kq - 1)/(K - Q)$ ,  $K_q$  denoting the number of modalities of question q.

### Steps of analysis

Choosing active questions and encoding modalities: The first and crucial step of MCA is the choice of active questions, that is, the questions that create distances between individuals. The next step is the encoding of active questions. The contributions of the various headings to the total variance should be kept to the same order of magnitude.

The smaller the frequencies of modalities of active questions, the more they create distance. This property tends to enhance the importance of infrequent modalities, which is a desirable property – up to a certain point. Rare modalities (say, of frequencies less that 5%) need to be pooled with others whenever feasible, or alternatively be put as 'passive' ones (Specific MCA). Moreover, there may be modalities of active variables that one would like to discard (e.g., nonresponses, 'junk modalities') while preserving the structural properties of MCA; then, in the *specific* MCA devised for this purpose, they can be put as *passive modalities* (Le Roux and Rouanet 2004: 203).

Variables and/or individuals can be introduced without participating to the determination of axes; they are called *supplementary elements*.

### Interpreting axes

Basic output of MCA: Eigenvalues  $\lambda_1$ ,  $\lambda_2$ ...; principal coordinates of modalities and of individuals; contributions (Ctr) of modalities and of individuals.

To appreciate the relative importance of axes, and retain an appropriate subspace for interpretation, the use of *modified rates* is recommended (Benzécri 1992: 412; Le Roux and Rouanet 2004: 209).

The interpretation of axes will be conducted in the cloud of modalities and based on the modalities whose contributions to axis exceed some threshold, such as the average contribution.

# Exploring the cloud of individuals

Consider some modality k; the subset of individuals having chosen k determines a subcloud, whose mean point is called the *modality mean-point* denoted  $\bar{k}$ . For each axis, the coordinate of  $\bar{k}$  is equal to  $\sqrt{\lambda}y^k$ , where  $y^k$  is the coordinate of modality k. This fundamental property of MCA relates the two clouds of individuals and of modalities and is preserved in specific MCA.

Putting a variable as a *structuring factor* allows studying not only the associated mean points, but also the subclouds induced by the variable. Geometric summaries of subclouds in a plane are provided by *concentration ellipses* (Le Roux and Rouanet 2004: 97–9). The length of each half-

axis of the concentration ellipse is twice the standard deviation of the subcloud along this direction; for a normally-shaped cloud, the concentration ellipse contains about 86% of the points of the cloud.

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