Management practices and firm performance during the Great Recession

Evidence from Spanish survey data

Florian Englmaier (LMU Munich)
Jose E. Galdon-Sanchez (Universidad Publica de Navarra)
Ricard Gil (Queen's University)
Michael Kaiser (LMU Munich)

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Presented by: Florian Englmaier (LMU Munich)

Introduction

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Study of management has been part of Economics since day one (Adam Smith's *Wealth of Nations*; *Theory of Moral Sentiments*)

We want to know:

1. What is *good* management?
2. (How) does management affect firm productivity?
3. Does *good* management vary with circumstances?

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Difficult to pin down impact of specific management practices due to complementarities
Milgrom & Roberts, 1990 & 1995

Introduction (contd.)

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  4. . . . times of crisis (during the Great Recession).

Machine learning, really?

Machine learning, really?

We are aware of the drawbacks of ML

- Economists can be uncomfortable with ML because it's atheoretical & (almost always) about prediction
- Risk of ex-post rationalization of findings (a.k.a. data/story mining)

Why we are still doing it

- Does unsupervised ML work in this context?
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- Do these styles matter for firm productivity?
  $\rightarrow$ Yes, they correlate significantly with productivity prior to the Great Recession.
- What about during the Great Recession?
  $\rightarrow$ Correlation remains, but switches sign!

Data

Management practices data

- Comprehensive survey of HR management practices in representative sample of Spanish manufacturing establishments[1]
  - Representative of the population of establishments with 50+ employees
  - Computer-assisted personal interviews conducted in 2006
- Questionnaire structured along 8 dimensions of practices; focus on personnel management ▸ survey details
- Questions on different scales $\rightarrow$ recode into 272 binary indicators
- $\sim$ 80 (125) dimensions explain 75% (90%) of variation ▸ informativeness
- $N = 463$ single plant firms ▸ sample

[1] cf. Bayo-Moriones, Galdon-Sanchez, and Martinez-de-Morentin, 2017

Latent Dirichlet Allocations (LDAs)

Estimating latent management styles

- Estimation of distributions-of-interest via Latent Dirichlet Allocations (LDAs); *Blei et al. (2003)*
  in economics: *Bandiera, Hansen, Prat, and Sadun (2019)*
- Assumes that a firm's observed behavior is a mixture of a small number of underlying ("latent") styles
- Find latent styles by finding practices that appear together and discriminate across firms
- Note that this does NOT force practices to explain firm's performance (hence, unsupervised learning)

▸ details on LDA

What do we get?

- We obtain and analyze **two probability distributions** of interest:
  - A management style is a (probability) distribution over practices, i.e., "loadings of practices" ▸ loadings
  - A firm is described by a (probability) distribution over styles, i.e, "shares of styles" ▸ share distribution
- Benchmark model: **two latent management styles**
  - Model performance does not improve with more than two styles ▸ cross validation
  - Interpretability of results suffers with more than two styles (Blei, 2012)
- *"Cloud gazing"*: Any labeling of styles is necessarily subjective

How [can] we characterize management styles?

What is a Style?

- Survey also contains information on multi-plant firms ($N = 408$)
- These firms can benefit from economies of scale and tend to employ more structured management
  Bloom, Sadun, and Van Reenen (2012a,b)[2]
- Are Style 2 firms similar to multi-plant firms?

[2] Bloom, Sadun, and van Reenen (2012a) *The organization of firms across countries*. QJE; Bloom, Sadun, and van Reenen (2012b) *Americans Do IT Better: US Multinationals and the Productivity Miracle*. AER

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Also use multi-plant sample to estimate management styles

- 20 practice indicators specific to multi-plant firms dropped
- Analogous estimation of latent styles on joint sample
- Look at "Style 1" (Style 2 weight < 0.5) vs. "Style 2" (Style 2 weight > 0.5) firms separately

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Comparing single-plant and multi-plant styles

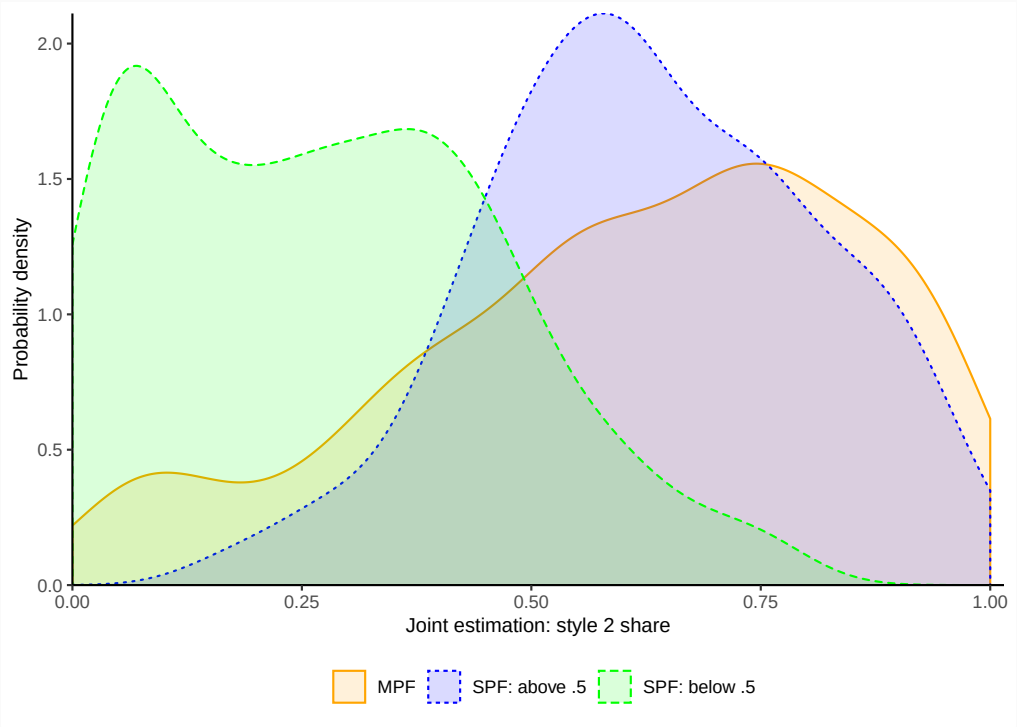

Figure 1: Summarizing styles in joint estimation

$\Rightarrow$ Multi-plant firms (*more structured management*) are similar to single-plant Style 2 firms

▸ more MPF

How [can] we characterize management styles

Rank the most salient practices per style:

Style 1	Style 2
B.5 : recruitment pers. interview	F.3 : dedicated HR department
C.11 : no formal eval system	F.5 : HR part of management
G.1 : white collar recruitment, pers interview	F.4 : HR has other functions
D.8 : $>50\%$ manual tasks	F.6 : HR reports to plant director
G.9 : $<50\%$ white collar in mgt, admin, technical	H.2 : manager tertiary educ

Table 1: Top distinct questions entering latent styles

$\Rightarrow$ consistent with Style 2 $\approx$ more structured management

▸ 15 most differentiated practices

Management style is not simply a proxy for . . .

- . . . firm size measured by employees ▸ style vs employees,
- . . . firm size measured by sales ▸ style vs sales,
- . . . firm age ▸ style vs firm age,
- . . . share of firm output for export ▸ style vs % export, or
- . . . region of residence ▸ style vs regions.

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- While they (somewhat) correlate with style, the combined survey data correlates explain only $\sim 30\%$ of variation in management style. ▸ explain style variation

Firm performance

Firm performance data

SABI data – Sistema de Análisis de Balances Ibéricos

- Independently collected financial firm performance data
- Collected by commercial providers: INFORMA D&B, Bureau Van Dijk
- Unbalanced panel 2001-2010: $N \sim 350$ depending on specification
- Firm matching is based on plant names, sector, and geographical location
- We use
  - Revenue, labor force and assets to construct productivity measures
  - Measures of profit and revenue as financial outcomes
- Financial indicators prior to 2005 explain only 10% of variation in management style. ▸ table

Correlating styles and productivity: Setup

- We employ the *unbalanced* SABI firm panel to estimate income shares of labor and capital in firm i in year t

$$\text{sales}_{it} = \beta_0 + \beta_1 \text{n\_employees}_{it} + \beta_2 \text{tot\_assets}_{it} + \alpha_i + \varepsilon_{it}$$

- Dependent and independent variables in logs
- The predicted firm fixed effect $\widehat{\alpha}_i$ is our estimate of firm productivity
- Then estimate (variations of)

$$\widehat{\alpha}_i = \beta_0 + \beta_1 \text{Style 2}_i + \alpha_r + \alpha_s + \varepsilon_c$$

- Region (r) and sector (s) FE, 3-digit industry clustered SEs (c)

TFP and Management Style prior to the Great Recession

	Firm productivity 2001 to 2005		Firm productivity 2001 to 2005 not winsorized	
	(1)	(2)	(3)	(4)
Mgt style 2	.25***	.25***	.25***	.24**
	(.077)	(.076)	(.09)	(.096)
Sector FE	No	Yes	No	Yes
Region FE	No	Yes	No	Yes
P-val: mgt style	.00165	.00196	.00682	.0143
Adj R-squared	.02	.14	.014	.11
N. of cases	386	386	386	386

Table 2: Firm productivity 2001-2005

▸ Financial Performance: Procedure ▸ Financial Performance: Results

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Effect size: Moving from 75th – 25th percentile changes TFP by $\sim 1/4$ of a standard deviation

Effects of Management Style prior to the Great Recession

Summing up:

> Prior to the Great Recession, Style 2, i.e. more structured management, is positively related to TFP (and financial performance).

The Great Recession – Spain

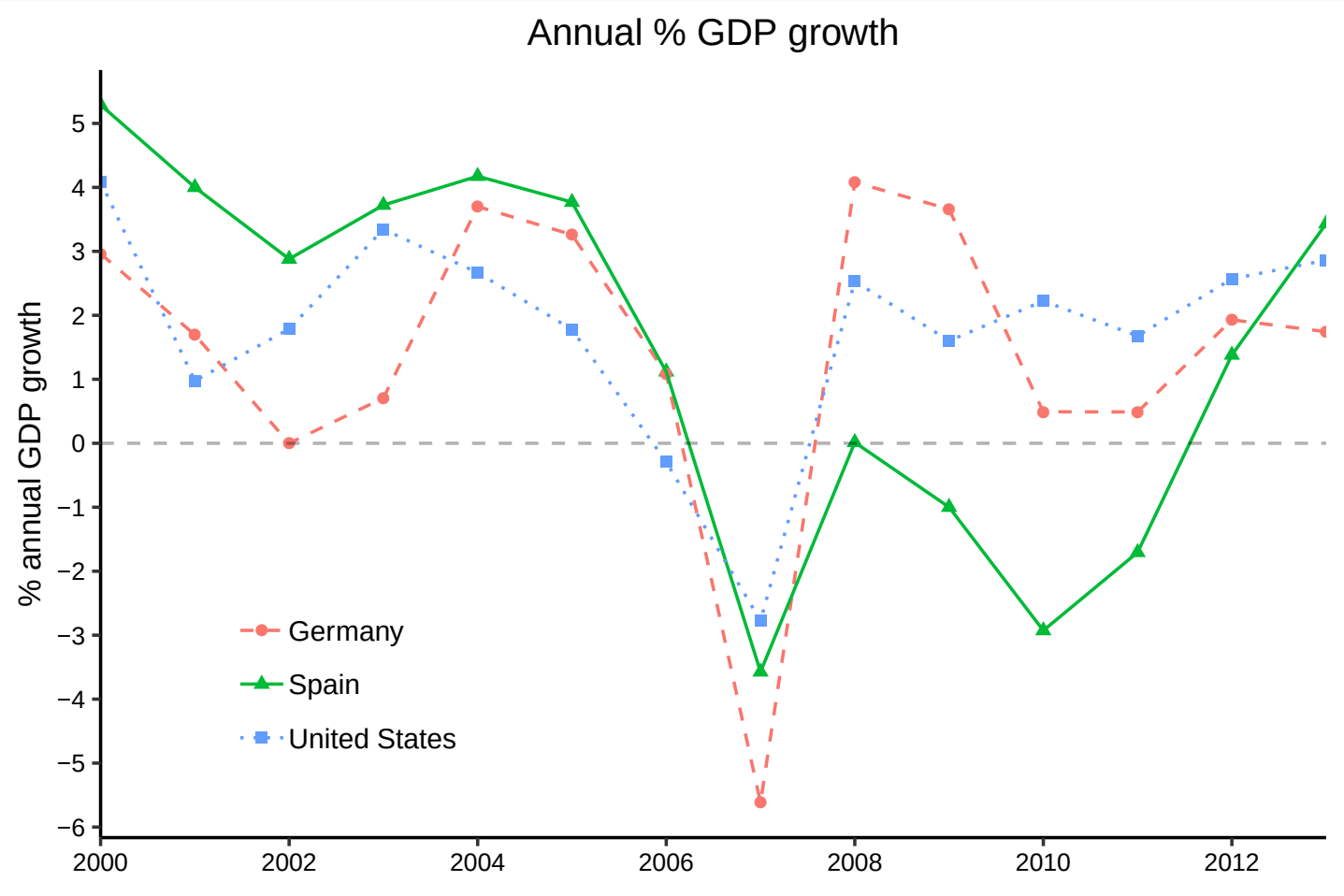

Figure 2: The impact of the Great Recession - Spain suffered for a long time

Data from the World Bank's World Development Indicators.

Firm exit

- Spanish firms faced a severe and protracted crisis
- This may have led to selective attrition
- Firm-exit as potentially relevant outcome

Firm exit

	Firm is shutdown post 2006				Firm is shutdown or absorbed post 2006			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt style 2	-.047	-.079	-.043	-.074	-.021	-.057	-.023	-.051
	(.052)	(.059)	(.059)	(.063)	(.056)	(.064)	(.058)	(.064)
Net profit in '05 [1 mio EUR]			-.0063	-.0037			-.021	-.018
			(.022)	(.024)			(.024)	(.027)
Equity in '05 [1 mio EUR]			-.0063*	-.006			-.0063	-.0062
			(.0036)	(.0039)			(.0038)	(.0043)
Personnel costs in '05 [1 mio EUR]			.014	.017*			.023**	.026**
			(.0091)	(.0099)			(.0093)	(.0098)
Sector FE	No	Yes	No	Yes	No	Yes	No	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes
P-val: mgt style	.37	.187	.466	.244	.705	.378	.697	.427
Adj R-squared	-.0011	.017	.013	.018	-.002	.0018	.023	.021
N. of cases	451	451	411	411	451	451	411	411

Table 3: Firm exit (OLS)

▸ Survival Logit

Inprecisely estimated, though not negligible in size: Moving from 75th – 25th percentile changes the exit probability by 12% of the mean of 14%

Performance during the Great Recession

TFP

	Firm productivity ('07 to '09) winsorized		Firm productivity ('07 to '09) not winsorized	
	(1)	(2)	(3)	(4)
Mgt style 2	-.15**	-.15**	-.1	-.086
	(.074)	(.069)	(.086)	(.084)
Firm productivity '04-'06	.49***	.47***	.42***	.41***
	(.052)	(.055)	(.074)	(.076)
Sector FE	No	Yes	No	Yes
Region FE	No	Yes	No	Yes
P-val: mgt style	.0485	.0355	.227	.304
Adj R-squared	.38	.4	.36	.38
N. of cases	331	331	331	331

Table 4: TFP 2007 to 2009

▸ TFP post survey (long window) ▸ TFP no control ▸ Financial indicators

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So far

Summing up

- Results in cross-section indicate a positive correlation of Style 2, i.e. more structured management, and productivity prior to the Great Recession.
- During the Great Recession, Style 2 appears to be negatively related to productivity.

Mechanisms

Diggin' deeper - what are the mechanisms?

Why is this the case?

Can we tell a story about ease of adjustment & flexibility?

- Employment
- Assets

Mechanism: employment

Less structured firms may be better able to adjust the workforce in the short term

- Measure the *absolute* change in the # of employees between 2006 and 2009 (2010)
- Conditional on correlates[3], a higher Style 2 share correlates with lower workforce reduction

▸ table

[3] employment, profitability in 2006, sector, and region

Mechanism: Assets

SABI data allows to distinguish between fixed and non-fixed assets

- Construct outcome as $\frac{\text{tot assets - tot fixed assets}}{\text{tot assets}}$, i.e., the fraction of non-fixed assets
- Conditional on correlates, higher Style 2 share correlates with holding relatively more fixed assets

▸ table

Conclusion

Conclusion

- Tons of [qualitative] data that are often not fully exploited.
  ML may allow us to leverage these data more effectively.
- Results in line with prior results in the literature
  - Finding meaningful styles is in line with complementarities between practices
  - Management (style) matters
  - "Good" management in good times differs from good management in bad times
- Taking the results literally - and using subjective labels:
  - Formality and structure may fit stable economic conditions but . . .
  - . . . in time of crisis flexibility (informality) may strive.

Appendix

Appendix: Data

Dimensions of Survey

- Plant Characteristics
- Human Resources
- Compensation in 2005
- Task and Work Organization
- More on Human Resources
- HR Department
- Other Workers in the Plant (White-Collar)
- Characteristics of Plant Manager

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Effective Sample Size - Survey

	Total # of firms (1)	With style measure (2)
Single-plant firms	534	463
With any pre-crisis performance	413	386
With performance during crisis	399	350
Intersection set	389	341

Table 5: Explaining management styles with survey data

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Appendix: More on LDA

Details on LDA

- LDA is a "topic modeling" algorithm, i.e., designed to find topics in text data
- This procedure implies that firms' management is a mixture of a small (2) number of "pure" styles
- A management style is a distribution over all practices β_k; each entry in β_k gives a probability of exercising the respective practice when adopting style k
- A firm's management is then a weighted (w_k) combination of the styles with weights $0 < w_k < 1$ with $\sum w_k = 1$ and k being the number of latent styles
- LDA is a Bayesian technique that estimates these distribution - β_k and w_k^i - by placing Dirichlet priors on those distributions
- We place symmetric Dirichlet priors on these distributions (following Bandiera et al., 2019)
  - $\delta = .1$ on β_k: this fosters a sparse distribution, placing more weight on some practices and little weight on a lot of practices
  - $\alpha = 1$ on the weights fostering equal mixtures of styles
- Estimation via Markov Chain Monte Carlo (MCMC) (Griffiths and Steyvers, 2004)

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Estimated style-over-practice distribution

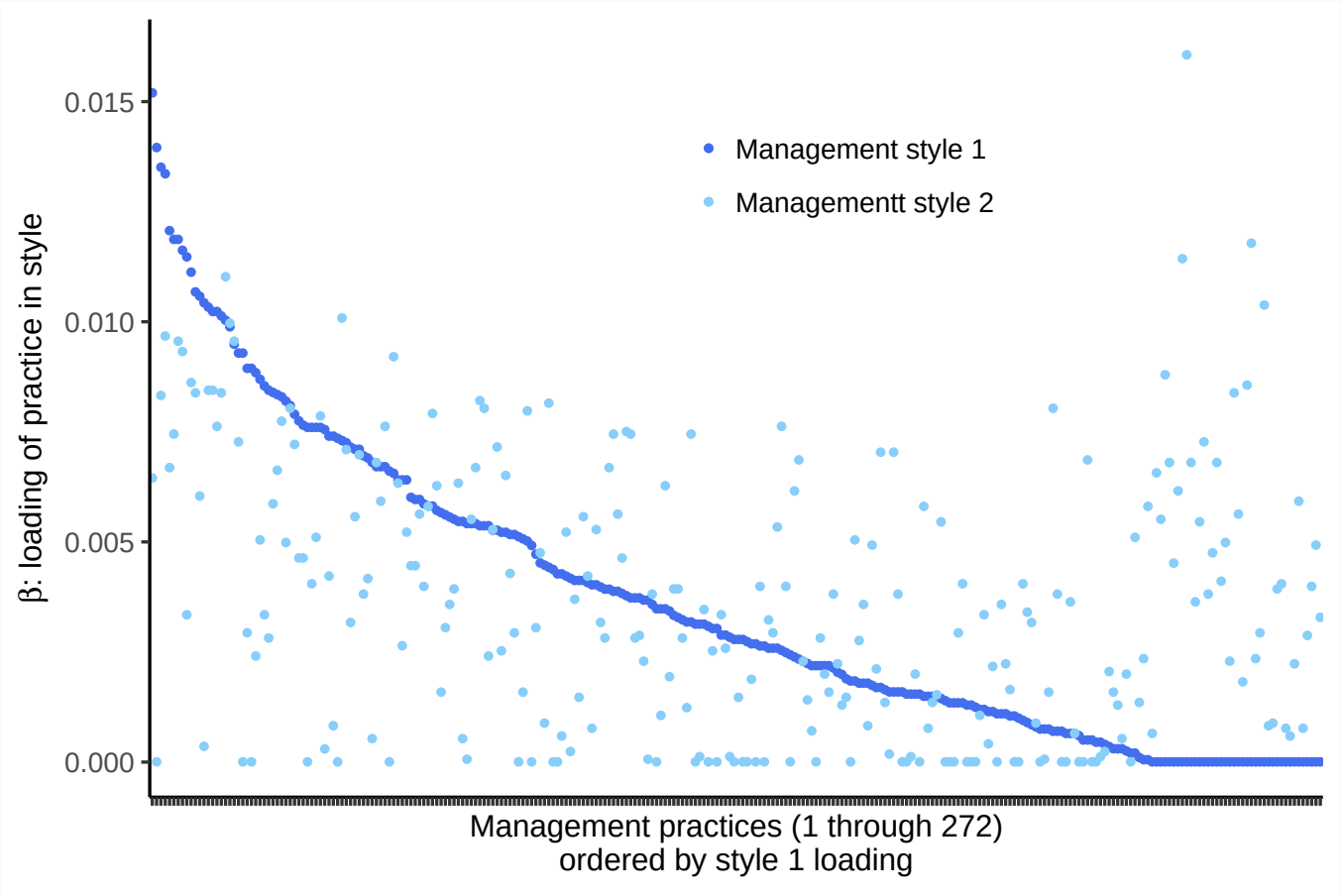

Figure 3: Style over practice distributions

This figure shows the "loadings" of all practices in the two latent styles. The non-ordinary practices are ordered along the x-axis according to their loading in Style 1.

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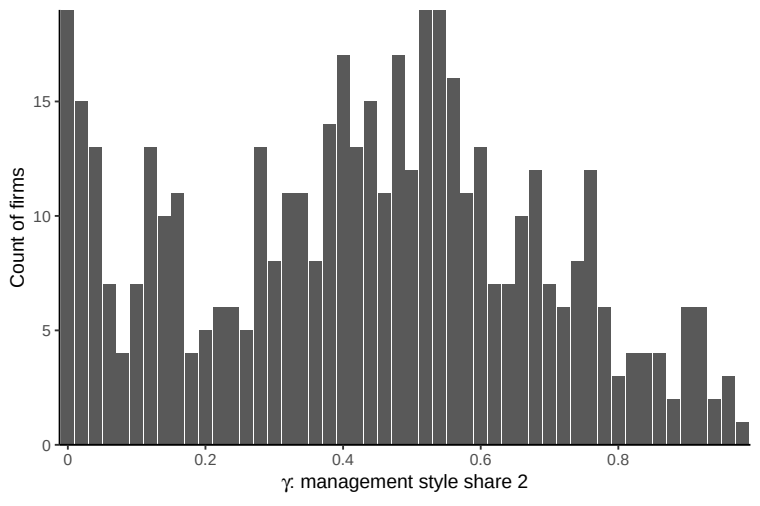
Two management styles



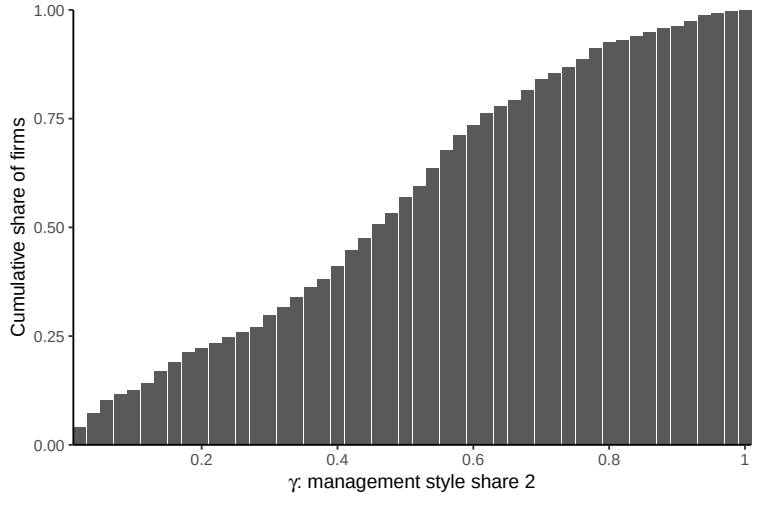


Figure 4: Firm over styles distributions

The left panel shows the fraction of firms with a given Style 2 share. The 0-1 continuum was divided into 50 equidistant bins. The right panel shows the corresponding cumulative fraction.

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Informational content of management practices is concave

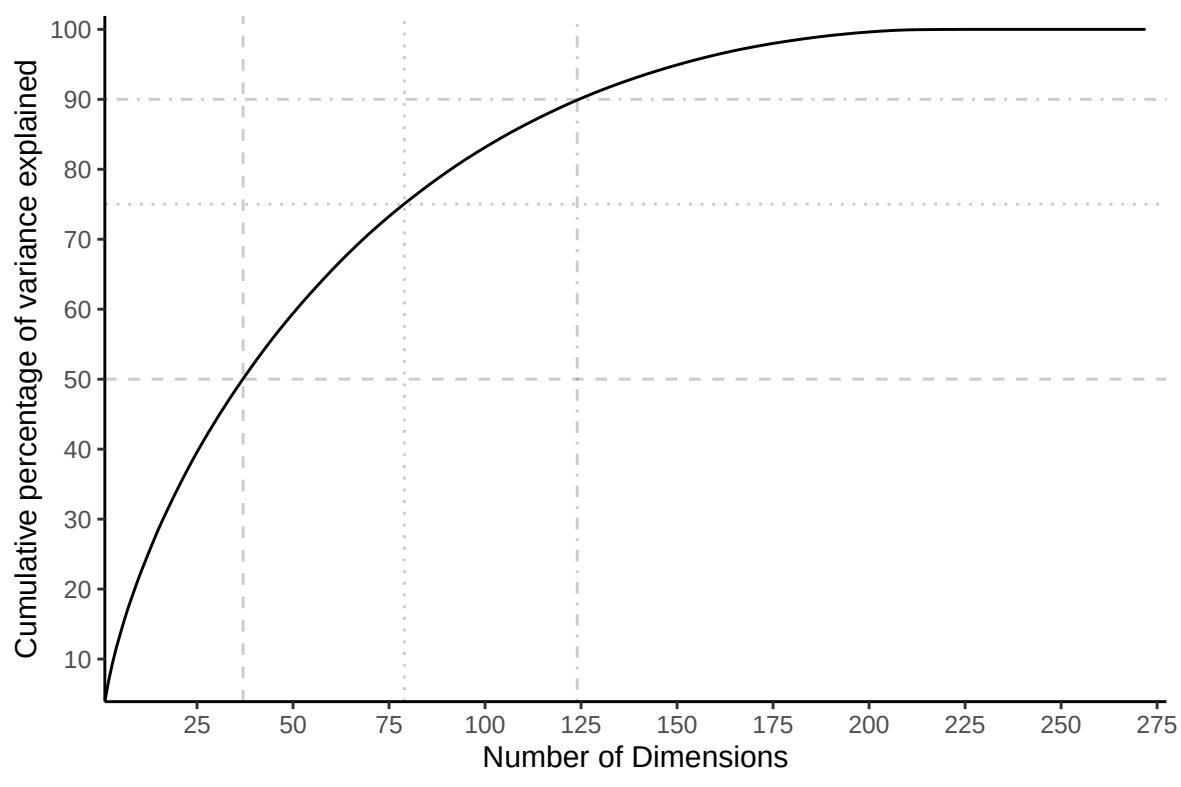

Figure 5: Cumulative % of variance explained (MCA)

This figure shows the cumulative percentage of variance – calculated using Multiple Correspondence Analysis – explained by a given number of dimensions using our 272 binary management practice indicators.

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Cross-validating the number of styles

Holding hyperparameters constant

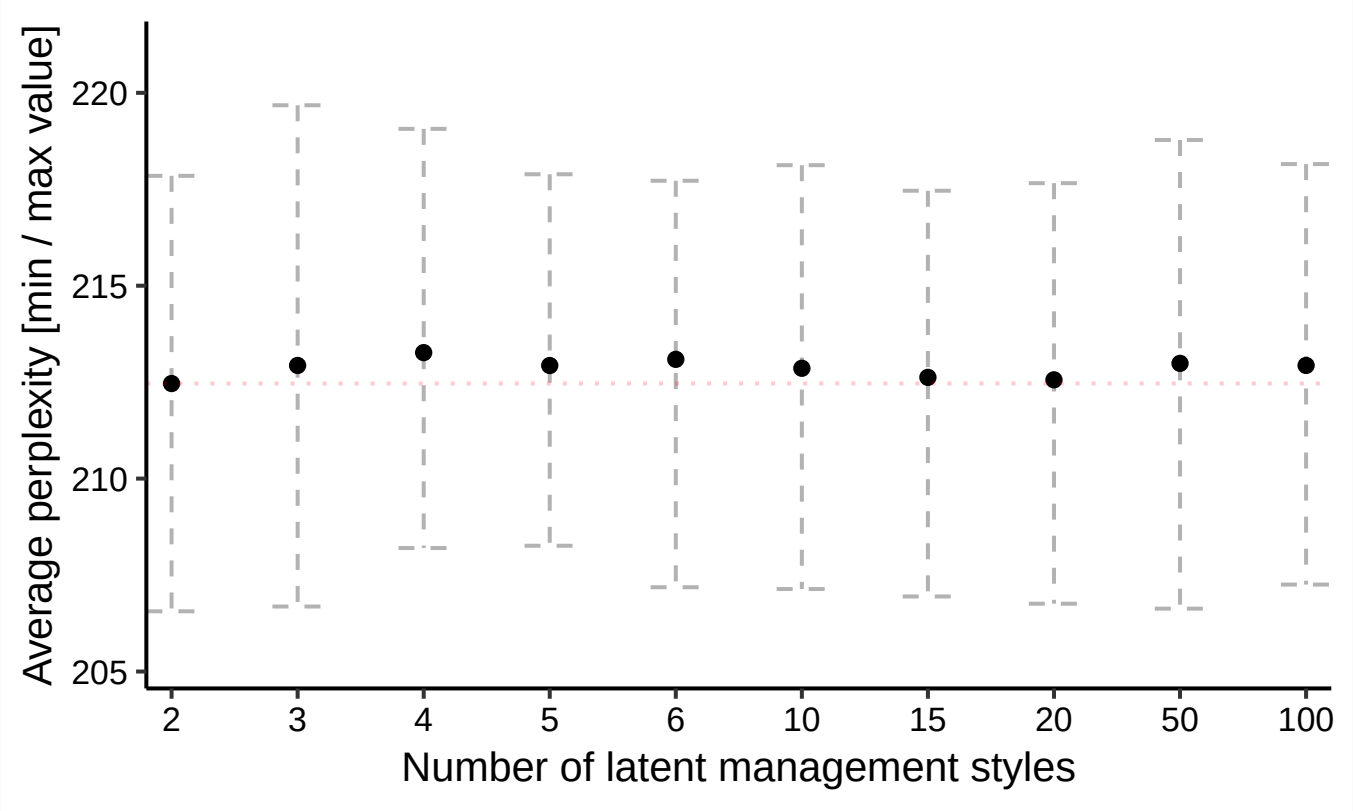

Figure 6: Finding the optimal number of latent management styles

The dashed red line shows the mean level of perplexity for $k = 2$ which serves as the benchmark.

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Appendix: Styles vs. Firm Characteristics

Management is not simply a proxy for firm size

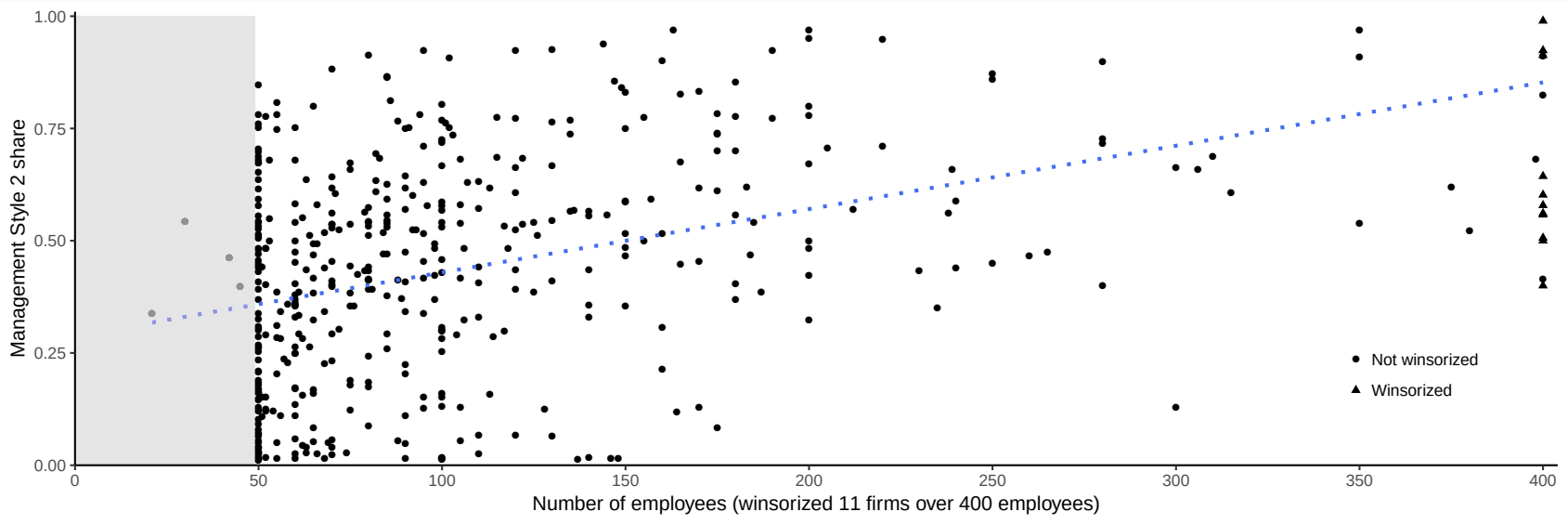

Figure 7: Style 2 share and number of employees

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Management style by firm size - revenues

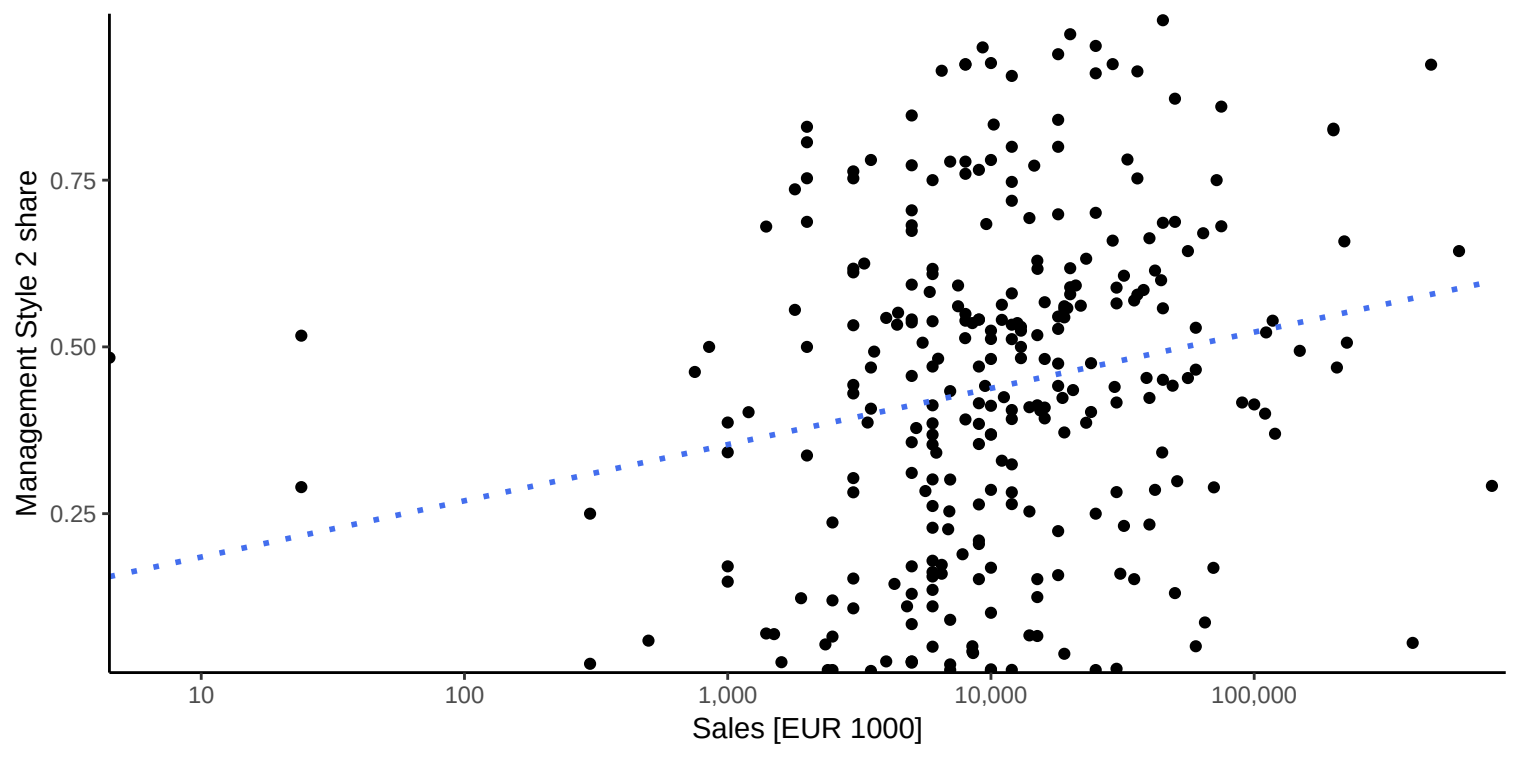

Figure 8: Style 2 share and firm sales in 2006

back

Management style by firm age

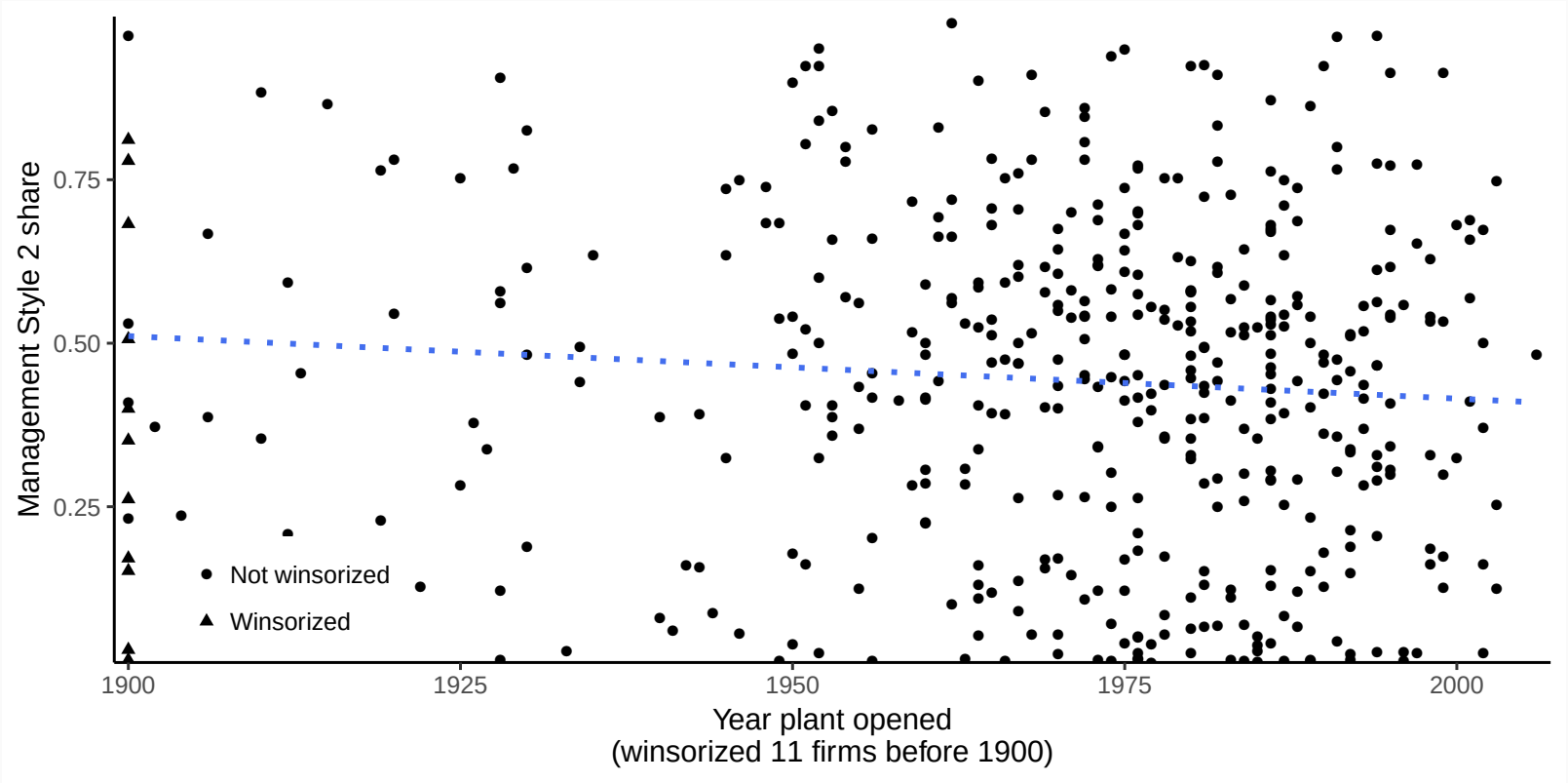

Figure 9: Style 2 share and year of plant opening

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Management style by export orientation

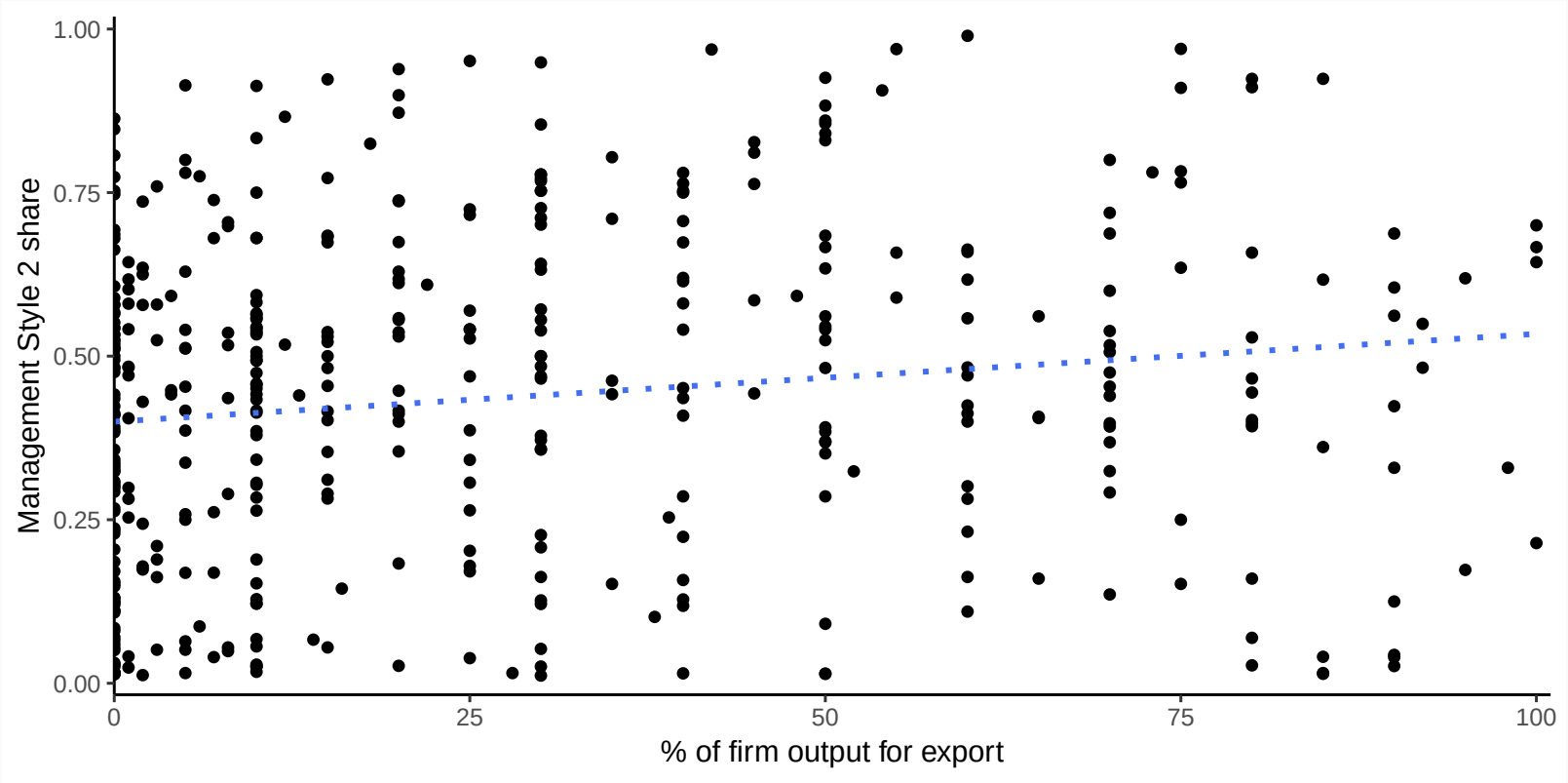

Figure 10: Style 2 share and firm's output share for export

back

Firms choose styles within sectors

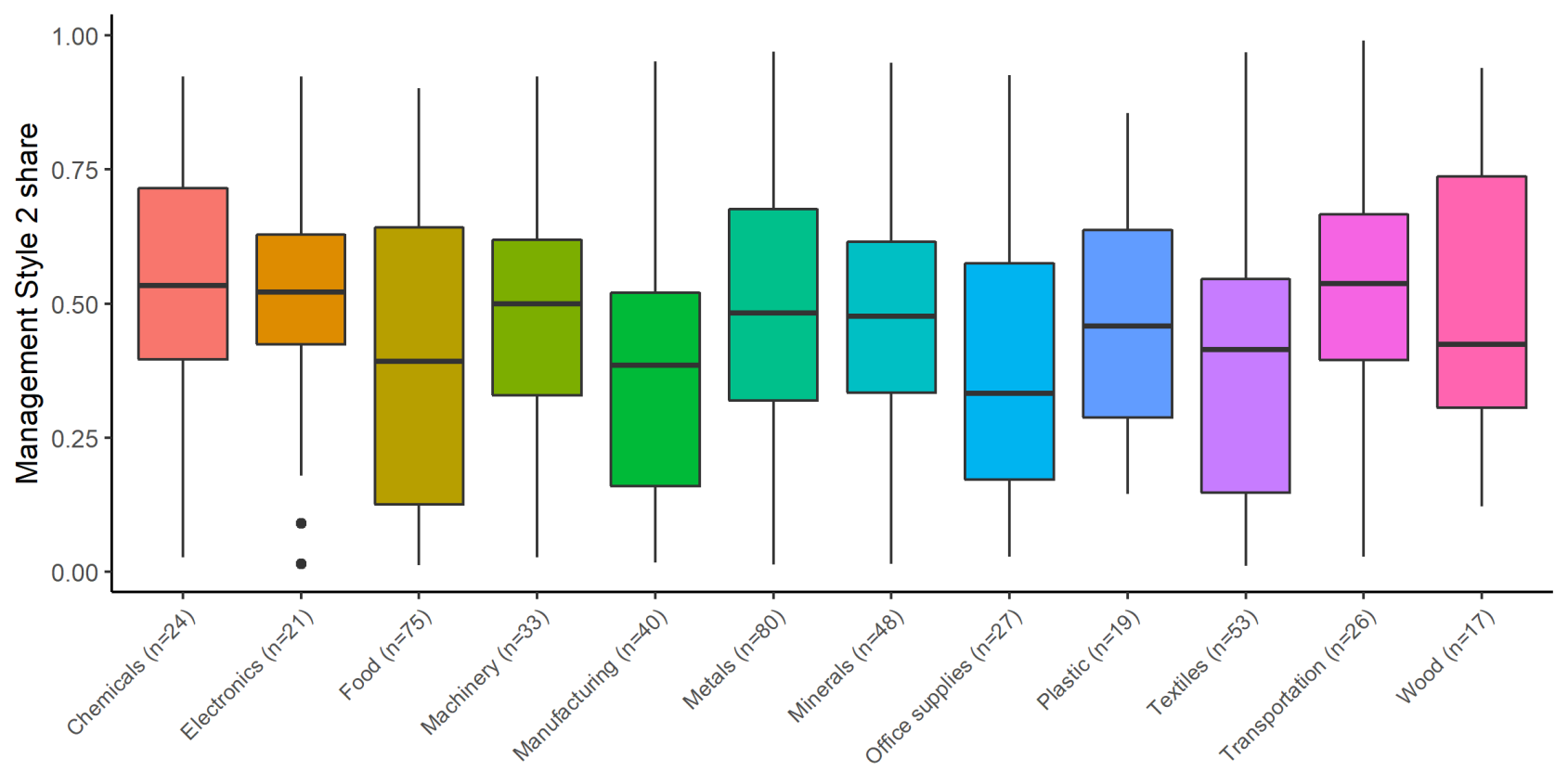

Figure 11: Economic sector and Style 2 share

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Geographic management style distribution

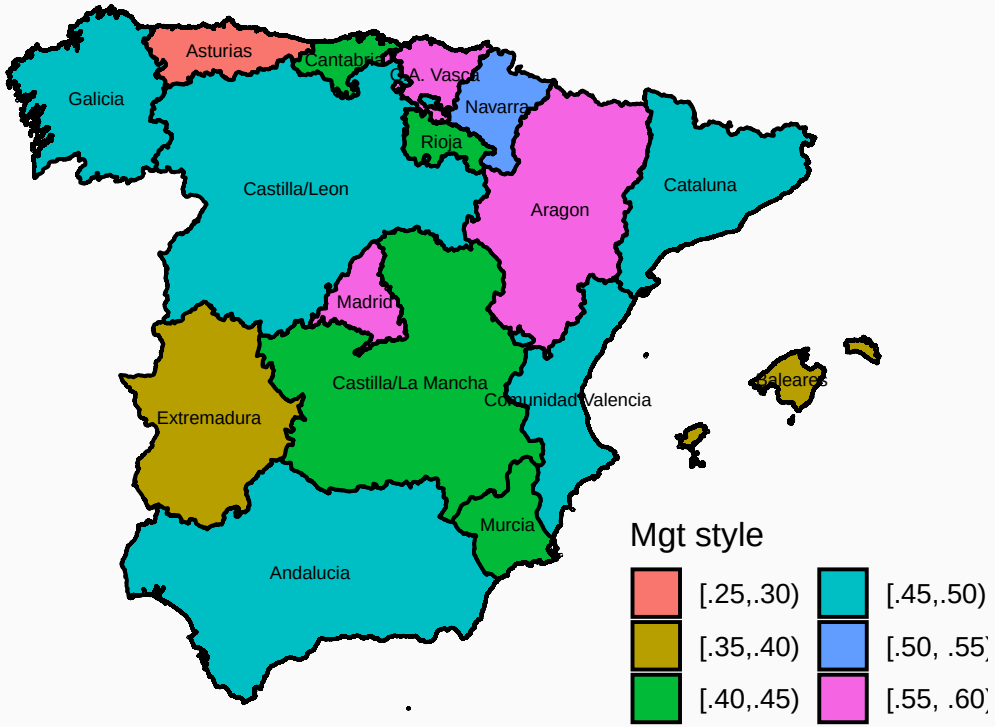

Figure 12: Average Style 2 share across regions in the sample

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Regression correlates of management style from survey

	Dependent variable: mgt style 2 (θ^2_i)				
	(1)	(2)	(3)	(4)	(5)
Log # employees			.18	.18	.21
			(.016)	(.017)	(.024)
Year plant opened				.00029	.00069
				(.00048)	(.0006)
% for export				.00066	.00083
				(.00041)	(.00051)
Log sales ['000 EUR]					-.0073
					(.011)
Sector FE	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	Yes	Yes	Yes
R-sq	.043	.08	.24	.27	.32
Adj R-sq	.02	.023	.19	.21	.24
N. of cases	463	463	463	433	284

Table 6: Explaining management styles with survey data

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SABI firm data & management style

While firm characteristics certainly correlate with management style, they

- are heavily correlated with one another
- can explain less than 10% of variance in management styles

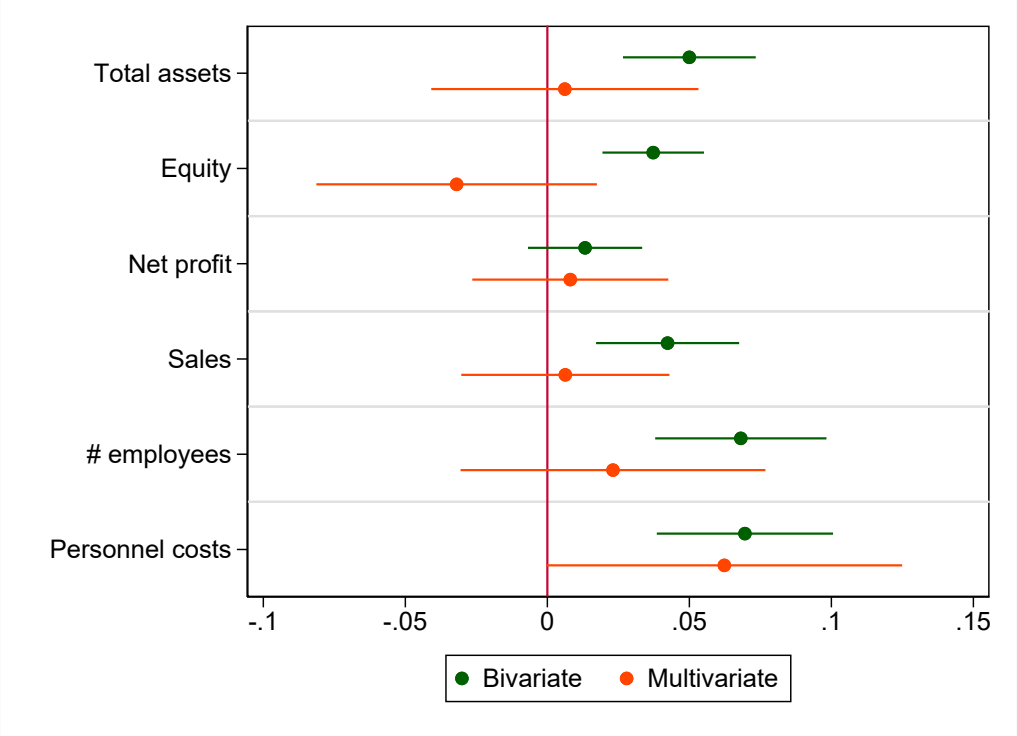

Figure 13: Correlates of Style 2 from Sabi data

Appendix: What is a style?

MPF projected onto SPF styles

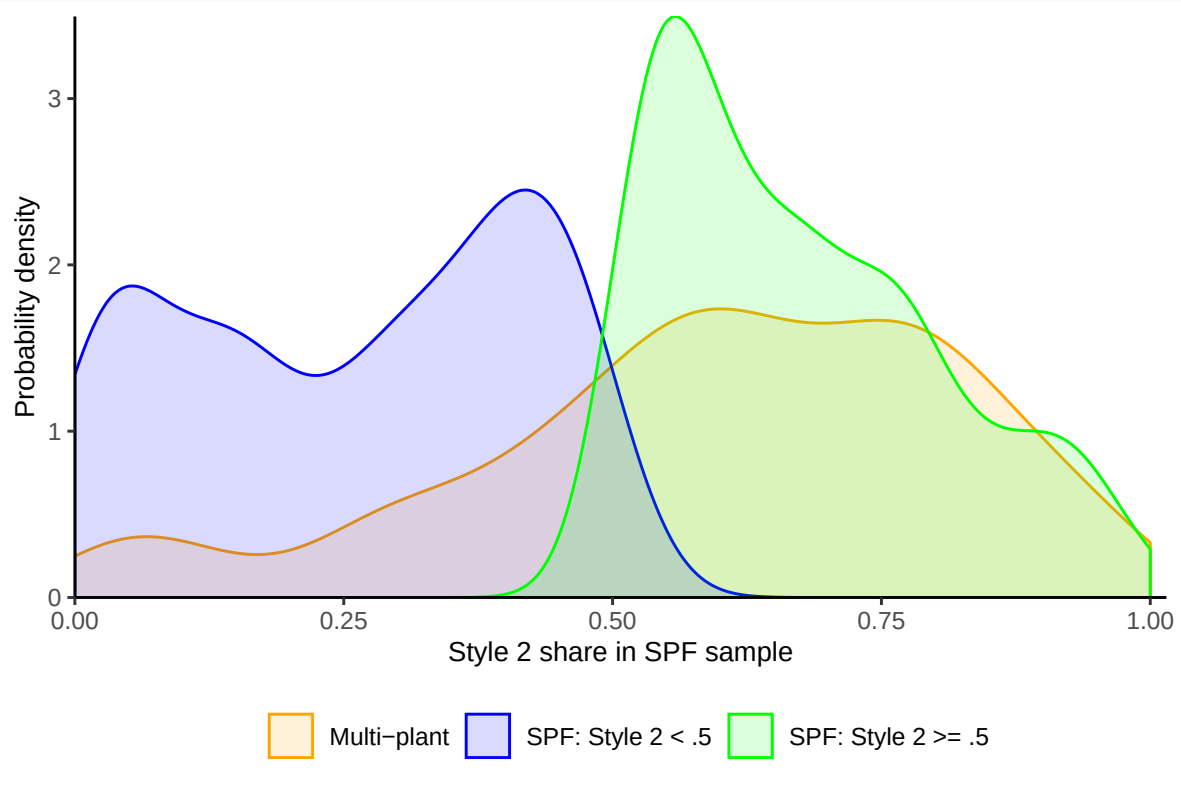

Figure 14: Projecting MPFs on SPF styles

$\Rightarrow$ Multi-plant firms are similar to single-plant Style 2 firms

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Main differences between Styles

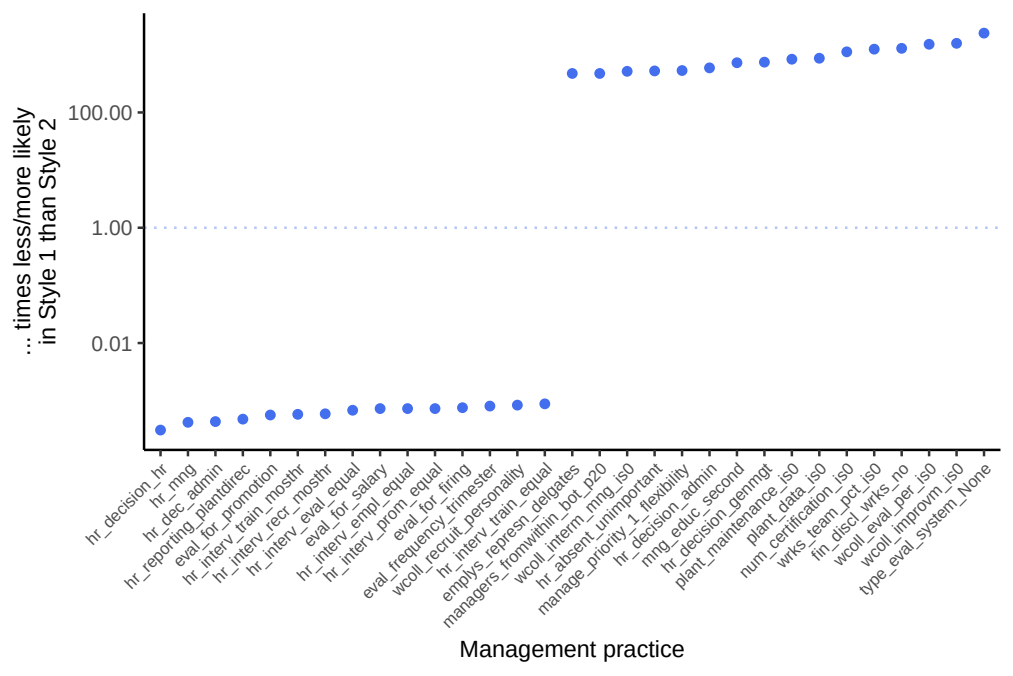

Figure 15: The 15 most and least likely practices in Style 1 vs Style 2

Survey questions generating practices least likely in Style 1 vs Style 2:
F3 (dedicated HR), F5, F4, F6 (plantdirector), C15 (promotion), F7 (solely HR deals with training & recruitment, higher-ups have equal say in evaluations), C15 (salary), F7 (higher-ups have equal say in retention or firing, and promotions), C.15 (firing), C.13 (trimester), G.1 (personality), F7 (high-upers have equal say in training)

Vice versa: B9 (less than 20% managers from within), B13 (delegates) G9 (no white collar in intermediate mgt), E8 (absenteeism unimportant), A10 (flexibility), F3 (HR decisions in admin/finance), H2 (mgt seconday educ), F3 (HR decision in general mgt), D7 (prepare/maintain equipment, analyze data; both none), A18-A20 (no certification, D6 (none), B12 (none), G2 (none), G8 (no white-collar in process improvement), C11 (no system)

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Appendix: Performance prior to the Great Recession

Firm performance prior to the Great Recession: Estimation

$$y_{irsc} = \beta_0 + \beta_1 \text{Style 2}_{irsc} + \text{Size}'_{irsc}\delta + \alpha_r + \alpha_s + \varepsilon_{rsc}$$

- Firm i in region r, sector s and industry c
- Levels of financial indicators (y_i) as outcomes
- The coefficient of interest is β_1 which measures the effect of Style 2 intensity
  - A higher Style 2 share means a firm uses increasingly more practices associated with Style 2
- Control for firm size by including personnel cost, total assets and equity (measured in 2006)
- Region and sector (12) fixed effects; standard errors are clustered at 3-digit industry level ($\sim$ 70 clusters)

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Mgt. style and performance prior to the Great Recession

	Net profit '05 [1.000 EUR]		Avg net profit '04-'06 [1.000 EUR]		Operating rev '05 [1.000 EUR]		Avg operating rev 04-'06 [1.000 EUR]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt style 2	675*	65	496	-34	24694***	2059	24919***	2233
	(349)	(298)	(298)	(281)	(5333)	(3397)	(5032)	(3083)
Tot Assets [1 Mio EUR]		-.018		-.019		.78*		.85**
		(.022)		(.022)		(.4)		(.42)
Equity [1 Mio EUR]		.22***		.23***		.19		-.06
		(.048)		(.05)		(.68)		(.72)
Personnel costs [1 Mio EUR]		-.22***		-.25***		1.6**		1.9**
		(.075)		(.077)		(.77)		(.76)
Sector FE	No	Yes	No	Yes	No	Yes	No	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes
P-val: mgt style	.0569	.828	.1	.903	.000015	.546	4.41e-06	.471
Adj R-squared	.0018	.6	-.0003	.65	.027	.66	.031	.69
N. of cases	354	351	365	362	351	351	362	362

Table 7: Net profit and revenue prior to the Great Recession

▸ in logs ▸ 95% winsorized ▸ back

Management style and performance before the Great Recession

Dependent variables in logs

	Log net profit '05		Log avg net profit '04-'06		Log operating rev '05		Log avg operating rev '04-'06	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt style 2	1.2***	.24	1.3***	.14	1***	-.13	1.1***	-.083
	(.36)	(.34)	(.28)	(.25)	(.19)	(.084)	(.18)	(.086)
Log tot Assets [1 Mio EUR]		.11		.25*		.62***		.67***
		(.15)		(.14)		(.071)		(.048)
Log equity [1 Mio EUR]		.97***		.8***		-.1***		-.099***
		(.1)		(.091)		(.037)		(.03)
Log personnel costs [1 Mio EUR]		-.14		-.084		.54***		.48***
		(.12)		(.1)		(.12)		(.069)
Sector FE	No	Yes	No	Yes	No	Yes	No	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes
P-val: mgt style	.0011	.482	.0000125	.581	1.57e-06	.137	3.47e-08	.339
Adj R-squared	.025	.5	.036	.54	.055	.82	.066	.86
N. of cases	304	300	309	307	351	348	362	358

Table 8: Net profit and revenue before the Great Recession

▸ back

Management style and performance before the Great Recession

Dependent variables 95% winsorized

	Net profit '05		Avg net profit '04-'06		Operating rev '05		Avg operating rev '04-'06	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt style 2	740***	-22	569**	-213	20197***	-1282	20619***	-499
	(276)	(184)	(221)	(153)	(3759)	(2421)	(3661)	(2229)
Tot Assets [1 Mio EUR]		-.012		-.0081		.8***		.85***
		(.0085)		(.0082)		(.17)		(.15)
Equity [1 Mio EUR]		.15***		.13***		-.11		-.13
		(.02)		(.018)		(.3)		(.26)
Personnel costs [1 Mio EUR]		-.022		-.011		2.3***		2***
		(.041)		(.036)		(.49)		(.42)
Sector FE	No	Yes	No	Yes	No	Yes	No	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes
P-val: mgt style	.00904	.906	.0122	.169	8.40e-07	.598	2.94e-07	.823
Adj R-squared	.016	.63	.01	.65	.052	.79	.056	.82
N. of cases	354	351	365	362	351	351	362	362

Table 9: Net profit and revenue before the Great Recession

back

Appendix: Performance during the Great Recession

Firm exit II

	Firm is shutdown post 2006			Firm is shutdown or absorbed post 2006				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt style 2	-.37	-.77	-.48	-.98	-.16	-.52	-.32	-.7
	(.41)	(.53)	(.55)	(.67)	(.41)	(.51)	(.5)	(.6)
Net profit in '05 [1 mio EUR]			-.057	.037			-.19	-.13
			(.26)	(.31)			(.26)	(.32)
Equity in '05 [1 mio EUR]			-.11	-.12			-.094	-.1
			(.072)	(.085)			(.06)	(.07)
Personnel costs in '05 [1 mio EUR]			.17	.23*			.22**	.26**
			(.11)	(.14)			(.097)	(.12)
Sector FE	No	Yes	No	Yes	No	Yes	No	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes
P-val: mgt style	.37	.144	.383	.148	.704	.304	.52	.247
Pseudo R-squared	.0013	.081	.04	.12	.00024	.064	.051	.12
N. of cases	451	425	411	386	451	431	411	392

Table 10: Firm exit (logit)

Performance during the Great Recession

TFP long window

	Firm productivity ('06 to '10) not winsorized		Firm productivity ('06 to '10) winsorized	
	(1)	(2)	(3)	(4)
Mgt style 2	-.073	-.078	-.023	-.019
	(.069)	(.062)	(.08)	(.074)
Firm productivity '01-'05	.68***	.64***	.6***	.56***
	(.057)	(.063)	(.1)	(.099)
Sector FE	No	Yes	No	Yes
Region FE	No	Yes	No	Yes
P-val: mgt style	.294	.21	.775	.8
Adj R-squared	.45	.5	.41	.46
N. of cases	341	341	341	341

Table 11: TFP 2006 to 2009

back

TFP w/o controlling for pre-crisis TFP

	Firm productivity ('07 to '09) winsorized		Firm productivity ('07 to '09) not winsorized	
	(1)	(2)	(3)	(4)
Mgt style 2	.09	.079	.091	.093
	(.082)	(.075)	(.083)	(.078)
Sector FE	No	Yes	No	Yes
Region FE	No	Yes	No	Yes
P-val: mgt style	.278	.292	.277	.24
Adj R-squared	.000092	.062	-.00025	.052
N. of cases	340	340	340	340

Table 12: TFP w/o control

back

Estimation setup - Heckman selection models

- When analyzing firm performance during the Great Recession, firms are not missing at random
- Analyze firm performance within a Heckman selection model (Heckman, 1979)
- Outcome is the difference in firm performance indicators during (t_2) and before (t_1) the Great Recession

Target parameter β_1

$$y_{i,t_2} - y_{i,t_1} = \beta_1 \text{Style 2}_i + X_{1i}\beta_2 + \varepsilon_i$$

which we only observe if

$$Y_i = X_{2i}\gamma + u_i > 0$$

- $Y_i < 0$ for firms: i) selectively choosing to not report bad results during Great Recession
  ii) get shut down
- Estimate jointly by maximum likelihood

Performance during the Great Recession

Selection models with firm productivity differentials

	Δ TFP after vs before 95% winsorized				Δ *TFP* after vs before not winsorized			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt Style 2	-.15	-.077	-.085	-.089	-.12	-.03	-.015	-.015
	[-.28,-.025]	[-.2,.043]	[-.21,.035]	[-.21,.031]	[-.29,.043]	[-.19,.13]	[-.17,.14]	[-.17,.14]
LDV	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Sector FE	No	No	Yes	Yes	No	No	Yes	Yes
Region FE	No	No	No	Yes	No	No	No	Yes
P-val: mgt style	.057	.38	.36	.18	.29	.87	.97	.97
Mean DV	-.016	-.016	-.016	-.016	-.0077	-.0077	-.0077	-.0077
StDev DV	.3	.3	.3	.3	.38	.38	.38	.38
# not selected	43	43	43	43	43	43	43	43
N. of cases	378	378	378	378	378	378	378	378

95% confidence intervals in brackets

Table 13: Δ firm productivity before and after the Great Recession

back

Performance during the Great Recession

SABI Financial indicators (simple OLS)

	Δ net profit '09-'06 [1.000 EUR]				Δ operating revenue '09-'06 [1.000 EUR]			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt style 2	-1433***	-1129**	-613	-538	-13113***	-3217	-1600	-2681
	(540)	(454)	(374)	(425)	(3397)	(4789)	(3191)	(3418)
DV in 2006		-.74***	-.76***	-.76***		-.35***	-.91***	-.93***
		(.14)	(.15)	(.16)		(.13)	(.25)	(.25)
Personnel costs 2006 [Mio EUR]			-.13	-.12			.18	.27
			(.11)	(.11)			(1)	(.98)
Tot Assets 2006 [Mio EUR]			-.021	-.023			.89***	.9***
			(.019)	(.02)			(.26)	(.27)
Equity 2006 [Mio EUR]			.041	.039			-.43	-.44
			(.026)	(.026)			(.35)	(.33)
Sector FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Region FE	No	No	No	Yes	No	No	No	Yes
P-val: mgt style	.00975	.0152	.105	.21	.000238	.504	.618	.435
Mean DV	-757	-757	-764	-764	-4603	-4603	-4616	-4616
Adj R-squared	.0083	.5	.54	.53	.015	.26	.56	.57
N. of cases	336	336	334	334	335	335	334	334

Table 14: SABI key indicators 2006 to 2009

Performance during the Great Recession

Selection models with financial indicator differentials

	Δ net profit '09-'06				Δ operating revenue '09-'06			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt Style 2	-1553	-1231	-717	-784	-14033	-4053	-2264	-3819
	[-2816,-291]	[-2176,-286]	[-1440,6.6]	[-1639,71]	[-21509,-6558]	[-11903,3796]	[-7912,3385]	[-9975,2337]
LDV	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Sector FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Region FE	No	No	No	Yes	No	No	No	Yes
Firm size	No	No	Yes	Yes	No	No	Yes	Yes
P-val: mgt style	.051	.037	.13	.0083	.00065	0	.54	.34
Mean DV	-658	-658	-663	-663	-4080	-4080	-4092	-4092
# not selected	61	61	59	59	59	59	59	59
N. of cases	406	406	402	402	403	403	402	402

Table 15: Δ Net profit and operating revenue before and after the Great Recession [in '000 EUR]

▸ Heckman 95% winsorized ▸ non-Heckman

Performance during the Great Recession

Heckman models, winsorized data

	Δ net profit '09-'06				Δ operating revenue '09-'06			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mgt Style 2	-1067	-792	-428	-326	-10277	-364	-1330	-1225
	[-1989,-144]	[-1417,-167]	[-898,41]	[-745,93]	[-15796,-4759]	[-3515,2787]	[-4390,1731]	[-4028,1578]
LDV	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Sector FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Firm size	No	No	Yes	Yes	No	No	Yes	Yes
P-val: mgt style	.061	.044	.15	.15	.00075	.91	.59	.69
Mean DV	-616	-616	-622	-622	-4707	-4707	-4718	-4718
# not selected	61	61	59	59	59	59	59	59
N. of cases	406	406	402	402	403	403	402	402

Table 16: 95% winsorized difference in net profits and revenue ('09-'06)

▸ back

Appendix: Mechanisms

Employee adjustment during the financial Great Recession

	|Δ # employees '09-'06|			|Δ # employees '10-'06|		
	(1)	(2)	(3)	(4)	(5)	(6)
Mgt style 2	-3.1	-4.1	-4.9	-12*	-13**	-14**
	(5.5)	(6)	(5.7)	(6.4)	(6.8)	(6.7)
# employees '06	.18***	.18***	.2***	.26***	.26***	.27***
	(.024)	(.022)	(.022)	(.032)	(.03)	(.03)
Net profit '06 [Mio EUR]			-2.4**			-1.5
			(1.2)			(1.4)
Sector FE	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes
Mean DV	23	23	23	26	26	26
StDev DV	31	31	31	37	37	37
Adj R-squared						
N. of cases	310	310	310	304	304	304

Table 17: Absolute change in firm level employment during the Great Recession

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Fraction of non-fixed assets prior to the Great Recession

	Fraction non-fixed assets '06			Avg fraction non-fixed assets '04-'06		
	(1)	(2)	(3)	(4)	(5)	(6)
Mgt style 2	-.07**	-.081**	-.079**	-.086***	-.094***	-.093***
	(.032)	(.032)	(.031)	(.029)	(.029)	(.029)
Same period tot assets [1000 Mio EUR]	.038	.12	-.46	-.17	.0046	-.33
	(.39)	(.33)	(.43)	(.37)	(.38)	(.45)
Avg net profits '01-'06 [Mio EUR]			.017*			.0089
			(.0091)			(.0092)
Sector FE	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes
Mean DV	.64	.64	.64	.63	.63	.63
StDev DV	.18	.18	.18	.17	.17	.17
Adj R-squared	.0048	.12	.13	.013	.15	.15
N. of cases	416	416	416	431	431	431

Table 18: Fraction of non-fixed assets prior to the Great Recession

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