

# Management Practices & Productivity in British Manufacturing Firms

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Global Forum on Productivity

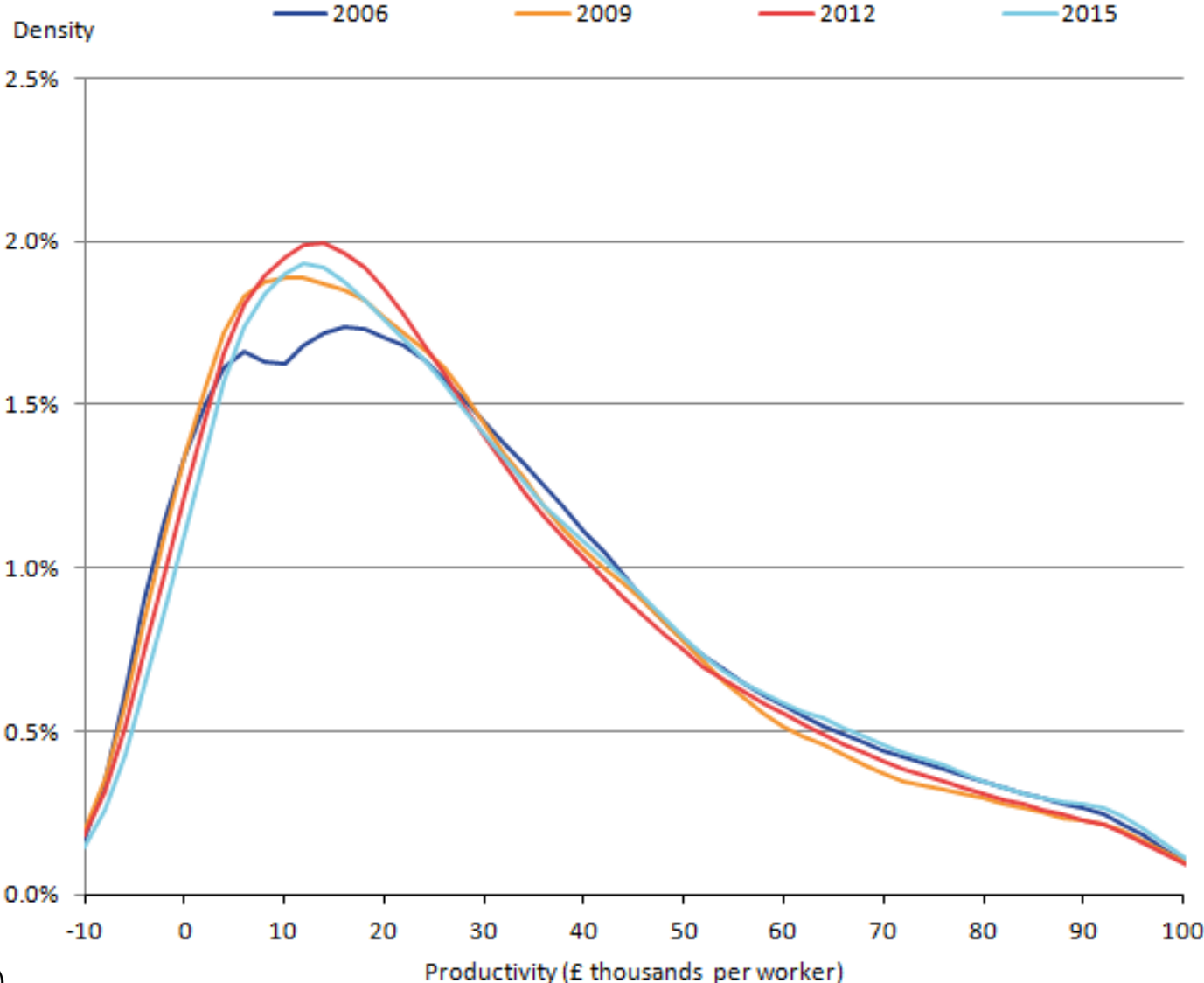
Budapest, Hungary

26 June 2017

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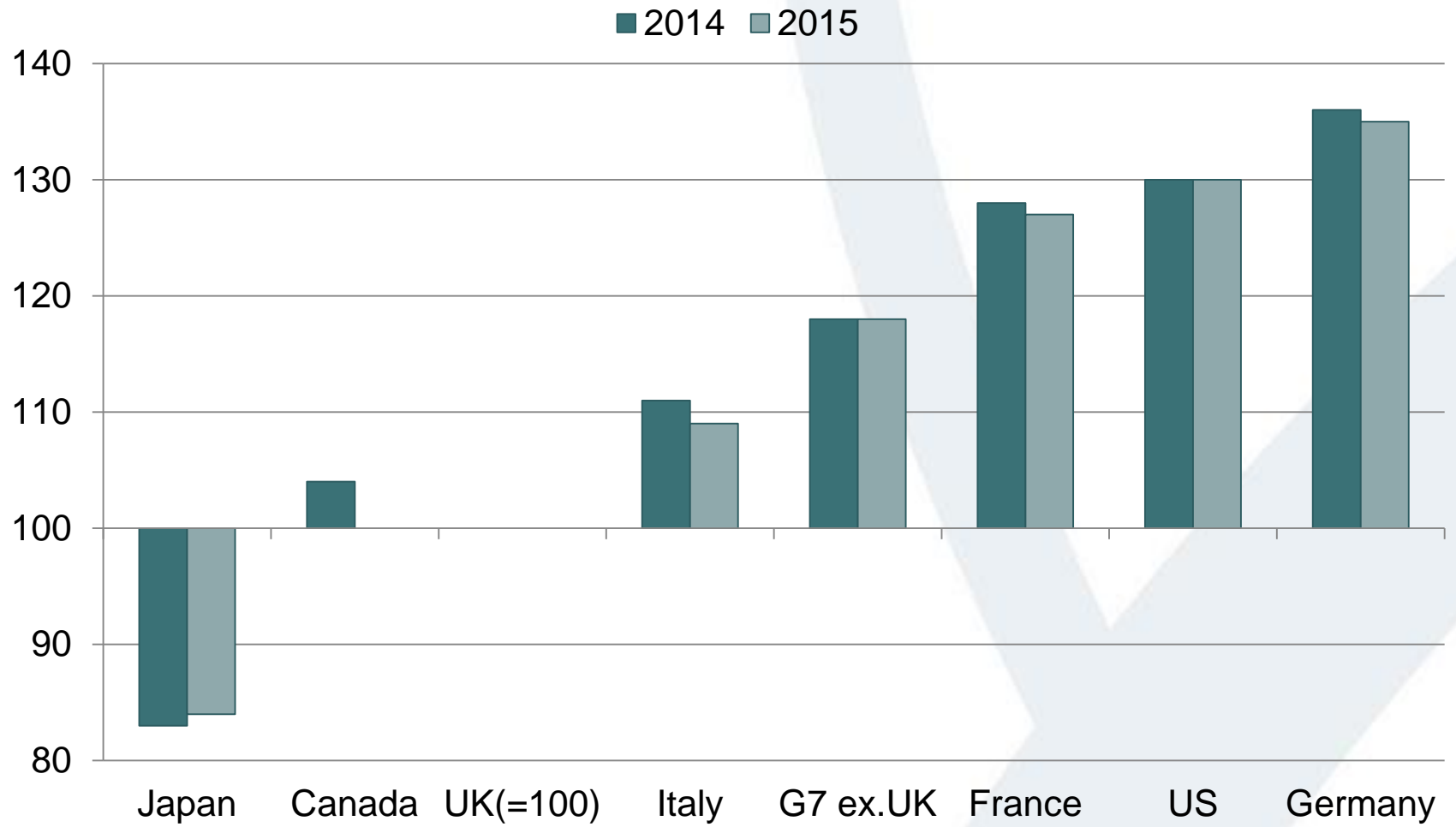
# Motivation

# Firm level productivity distribution, UK whole economy

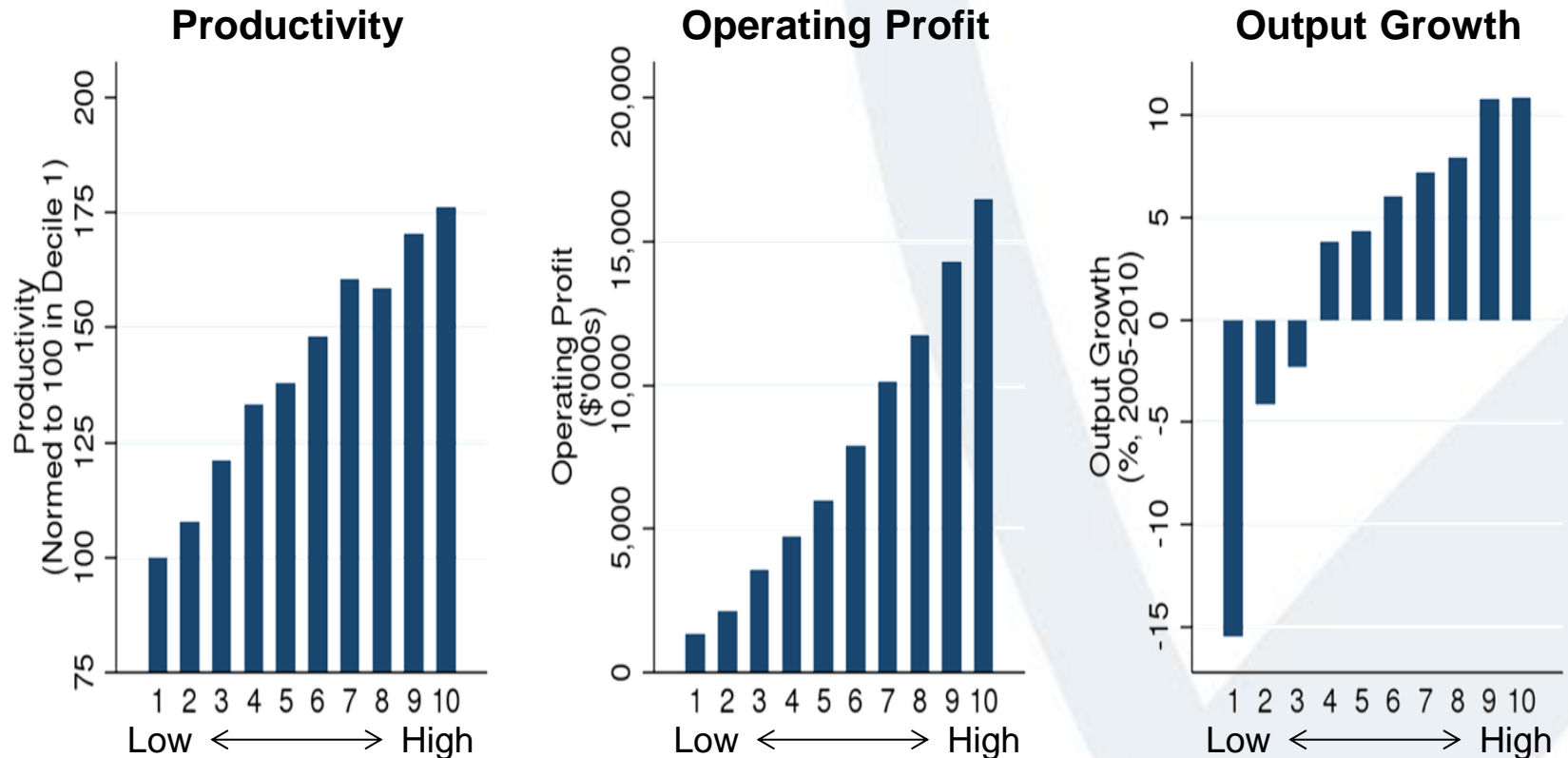


Source: ONS (ABS)

# Current Price GDP per hour worked, G7



# Management and Firm Performance - USA



**Decile of Management Practice Score**

Source: Bloom et al, 2013, "Management in America", Center for Economic Studies Working Paper, US Census Bureau

# Purpose of MPS pilot

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- Feasibility
  - Are UK businesses willing to answer these questions in a voluntary survey?
  - Can we find a long term approach for collecting data on management practices?
- Results
  - How much do responses vary?
  - Do we see an association between management practices and productivity?

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# **Designing a Management Survey Pilot**

# Management Practices Survey (MPS) pilot

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Selected 8 questions from US MOPS on key aspects of management practices including:

- Culture of continuous improvement
- Use and monitoring of Key Performance Indicators (KPIs)
- Setting stretching targets and related practices
- Employment practices, e.g. hiring, promotions and underperformance



# Survey Design - Sample

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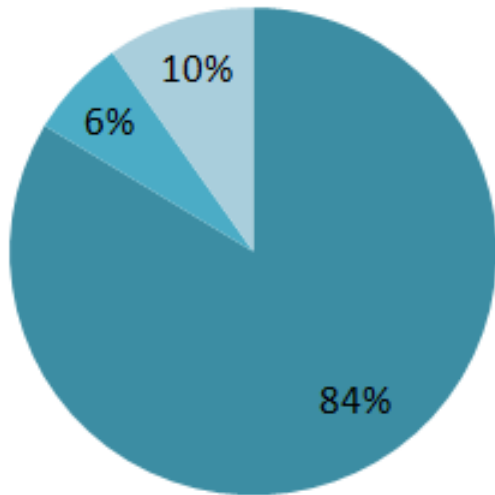
- 1,026 businesses from the Annual Business Survey's sample for 2015
- Coverage:
  - Great Britain
  - Reporting Units (businesses) with employment of at least 10, where employment is employees plus working proprietors
  - Manufacturing (SIC 2007 section C, divisions 10-33)
- Stratified using employment and industry
  - Employment bands of 10-49, 50-99, 100-249 and 250+
  - Industry at division level (two digit SIC code)
- Final response rate of 68% (702 businesses)

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# Results

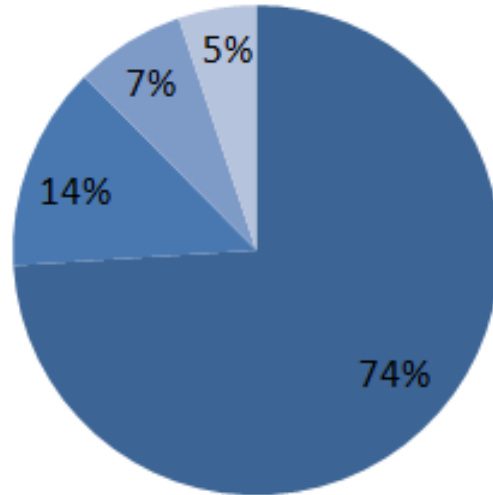
# Manufacturing environment in Great Britain

## Multinational Status



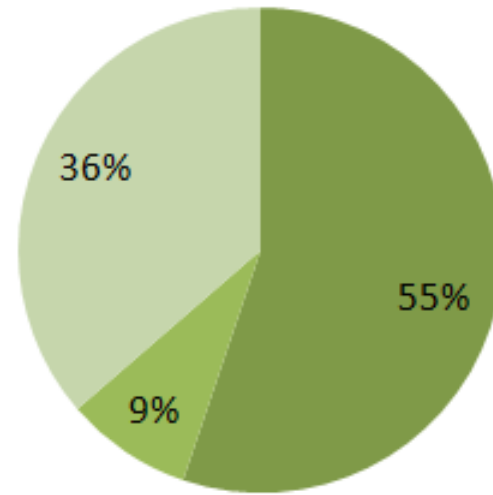
- Domestic
- UK Multinational
- Non-UK Multinational

## Size



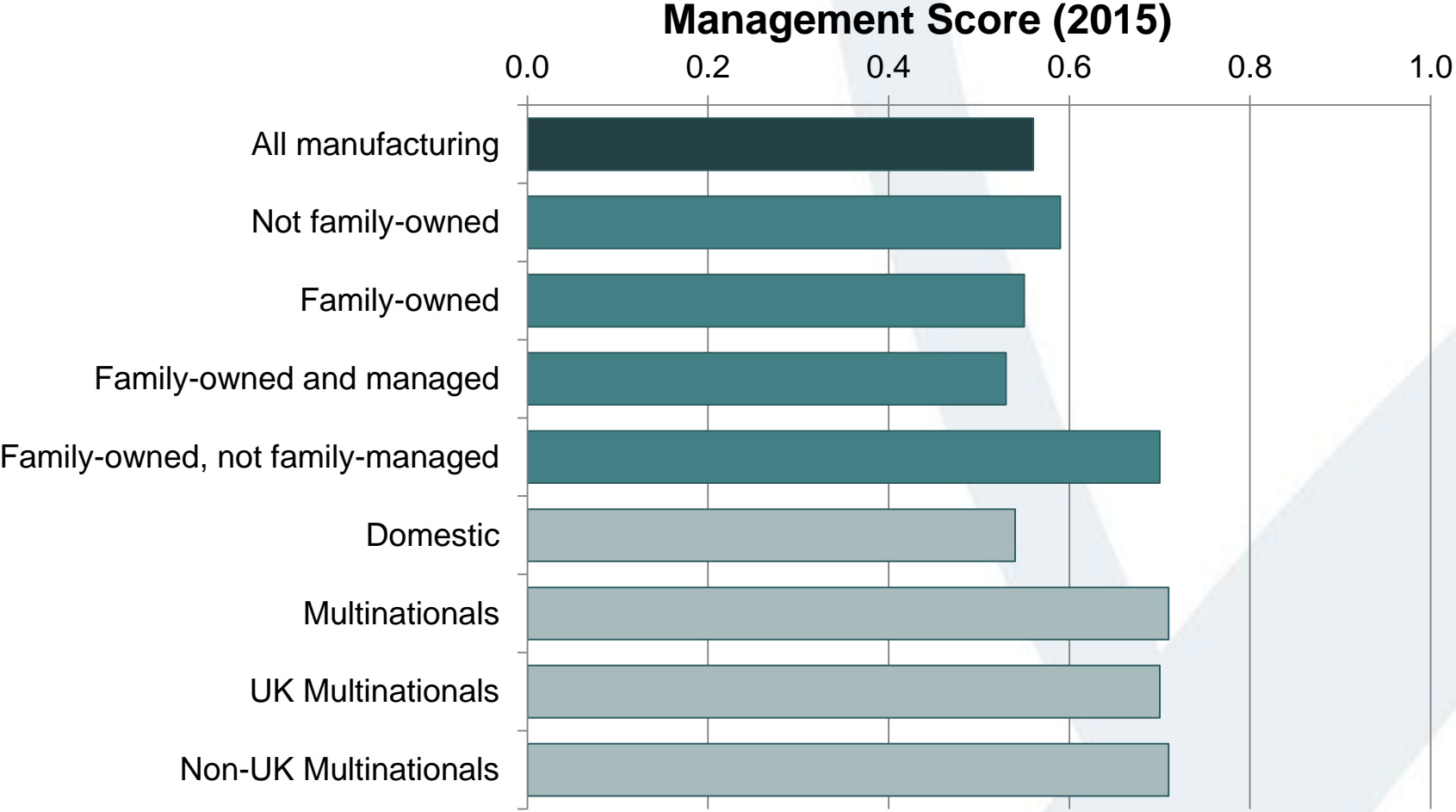
- 10 to 49 employment
- 50 to 99 employment
- 100 to 249 employment
- 250 or more employment

## Family Ownership



- Family-owned and family-managed
- Family-owned and non-family-managed
- Not family-owned

# Average score by business type



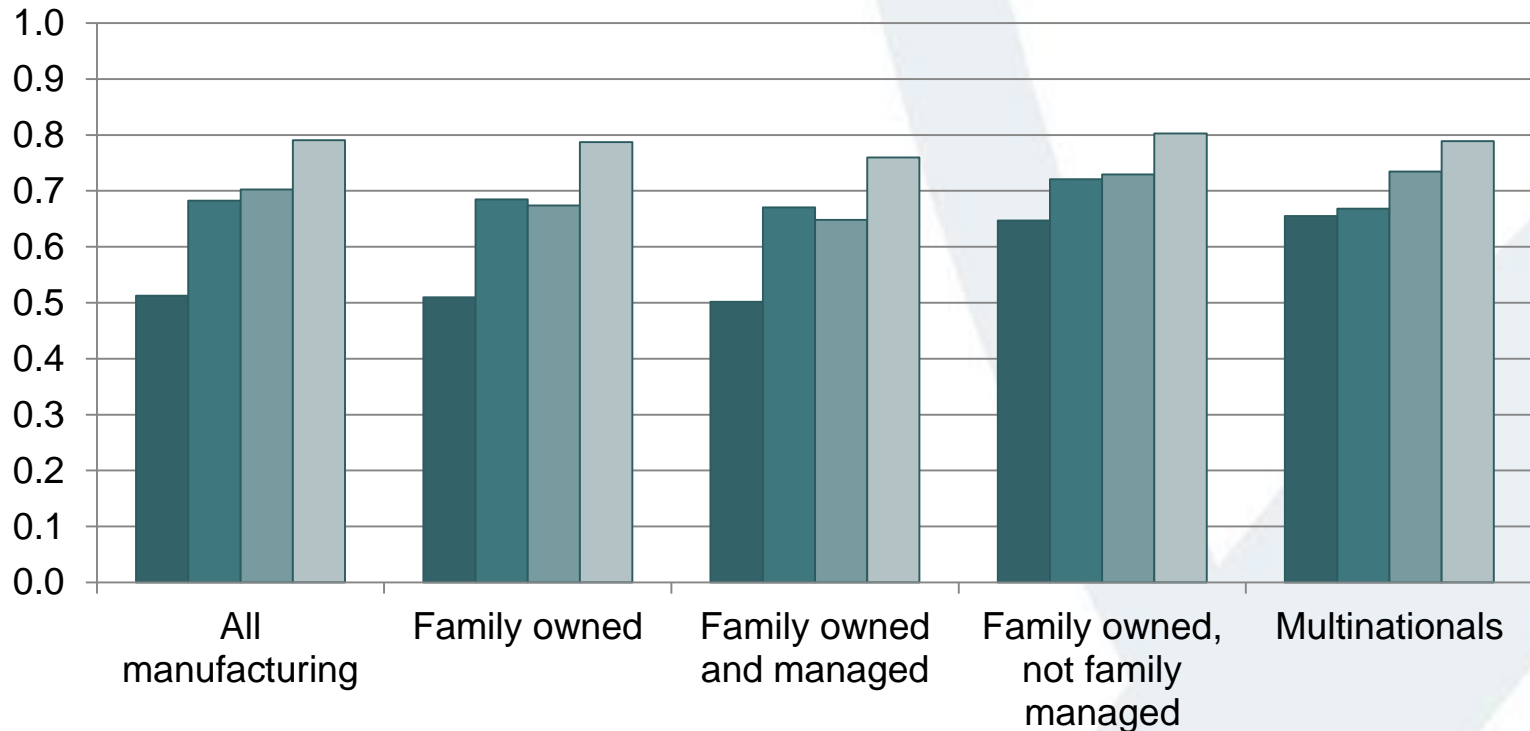
*All manufacturing includes all manufacturing businesses with employment of at least 10 in Great Britain*

Source: ONS

# Average score by employment size band

■ 10 to 49 employment   ■ 50 to 99 employment   ■ 100 to 249 employment   ■ 250+ employment

## Management Score (2015)



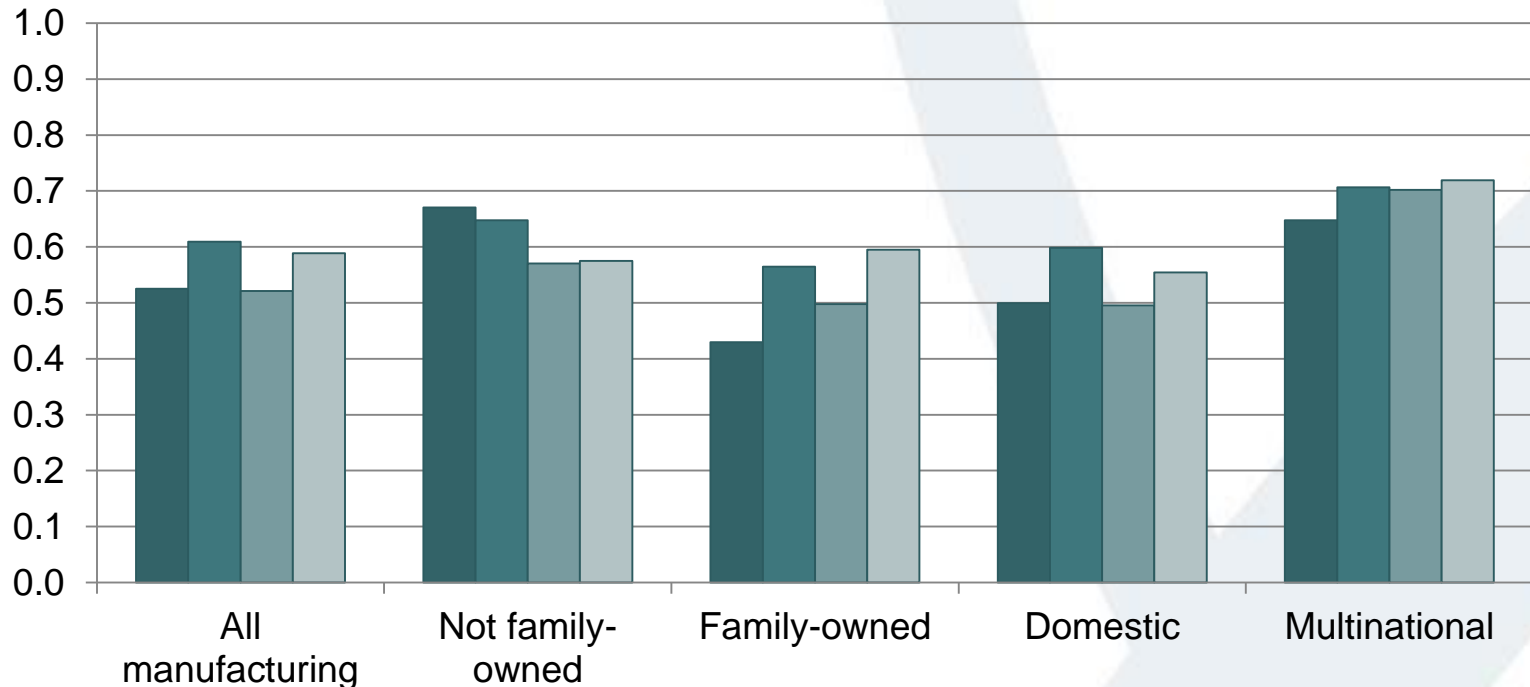
*All manufacturing includes all manufacturing businesses with employment of at least 10 in Great Britain*

*Source: ONS*

# Average management score by business age

■ Up to 5 years   ■ Over 5 years, up to 10 years   ■ Over 10 years, up to 20 years   ■ Over 20 years

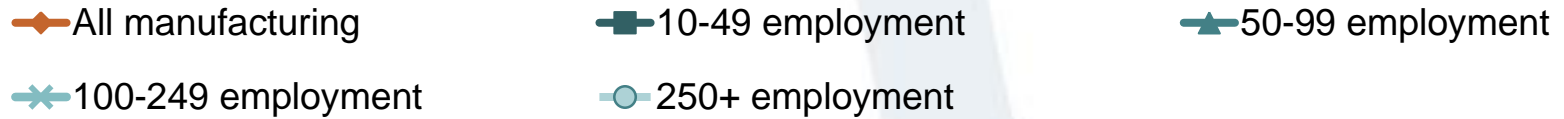
## Management Score (2015)



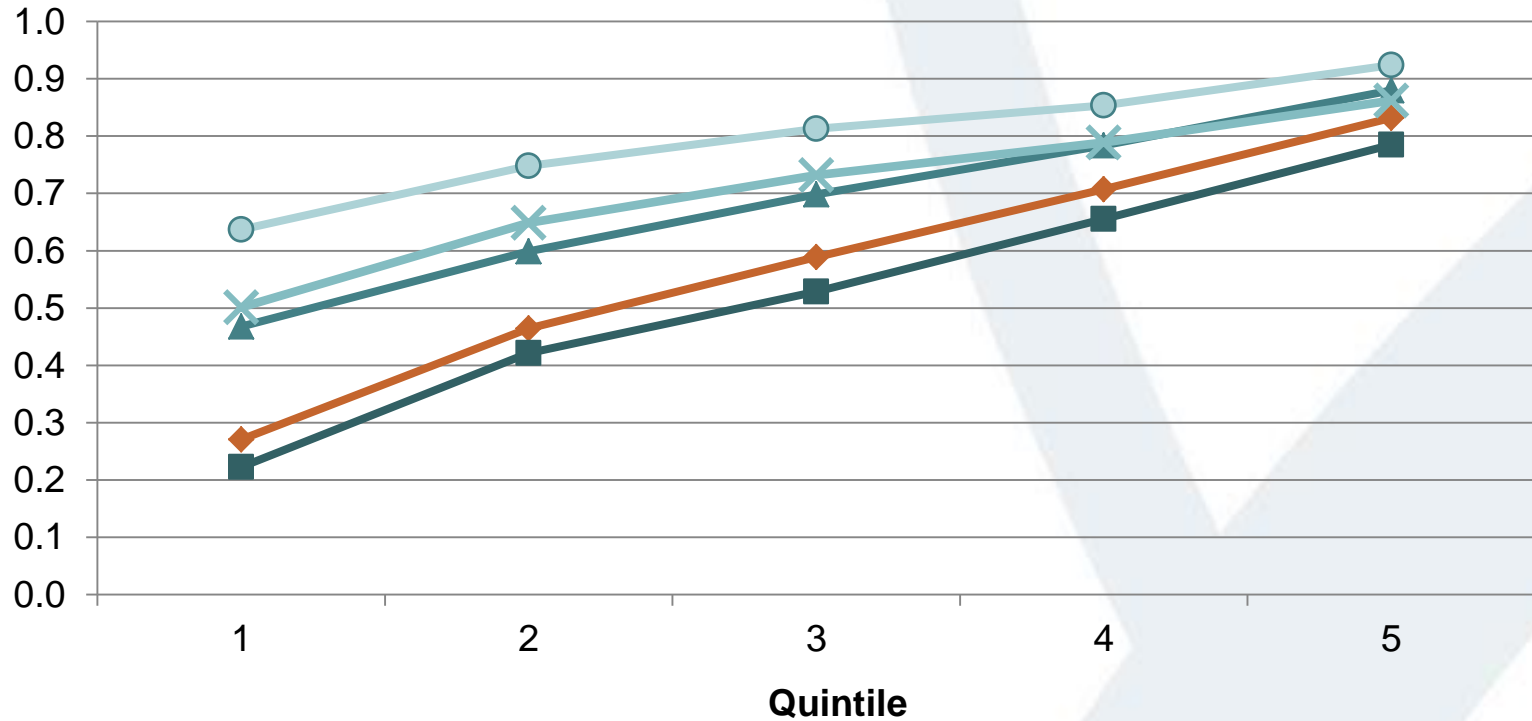
*All manufacturing includes all manufacturing businesses with employment of at least 10 in Great Britain*

Source: ONS

# Average score by quintile and size band



Management Score (2015)



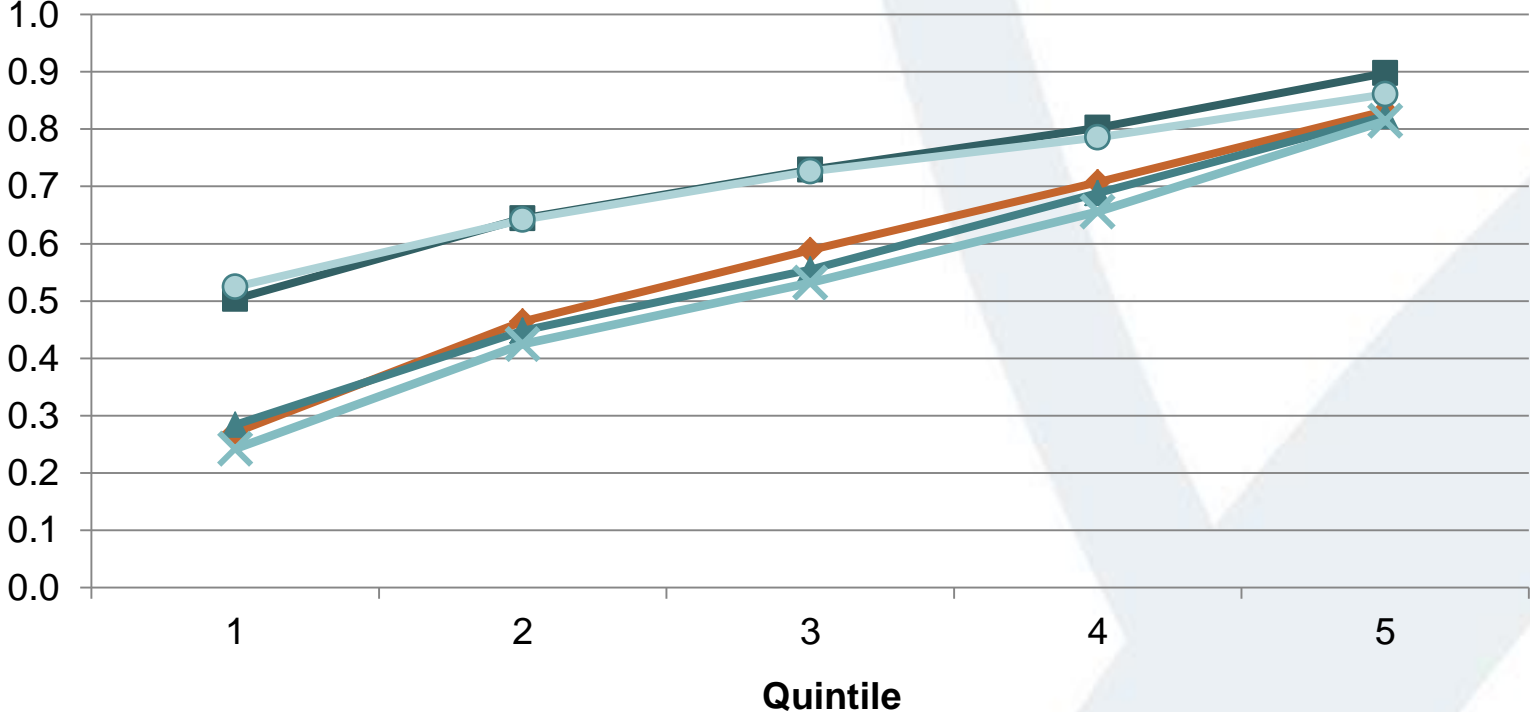
*All manufacturing includes all manufacturing businesses with employment of at least 10 in Great Britain*

Source: ONS

# Average score by quintile and type

- ◆ All manufacturing
- ▲ Family owned
- Family owned and non-family managed
- Multinationals
- ✕ Family owned and managed

Management Score (2015)



All manufacturing includes all manufacturing businesses with employment of at least 10 in Great Britain

Source: ONS



# Multivariate analysis of management score – Ordinary Least Squares

	Management score (1)	Management score (2)	Management score (3)	Management score (4)	Management score (5)
Log(employment)	0.110*** (0.015)	0.107*** (0.014)	0.108*** (0.016)	0.105*** (0.014)	0.108*** (0.014)
Family owned business	0.004 (0.049)	0.001 (0.051)	-0.005 (0.054)	-0.010 (0.056)	-0.006 (0.058)
Family-owned and non-family-run			0.047 (0.032)	0.057 (0.033)	0.053 (0.033)
Multinational	0.016 (0.032)	0.013 (0.032)	0.008 (0.043)	0.003 (0.042)	0.004 (0.043)
UK Multinational			0.002 (0.026)	0.002 (0.026)	0.002 (0.028)
Age (years)					-0.000 (0.012)
Age squared					-0.000 (0.000)
Industry dummies	No	Yes	No	Yes	Yes
$R^2$	0.299	0.328	0.303	0.332	0.337
Observations	694	694	694	694	694

Standard errors in parentheses, clustered by size band and industry. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: Office for National Statistics

Full results are available on request

# Multivariate analysis by employment size bands – Ordinary Least Squares

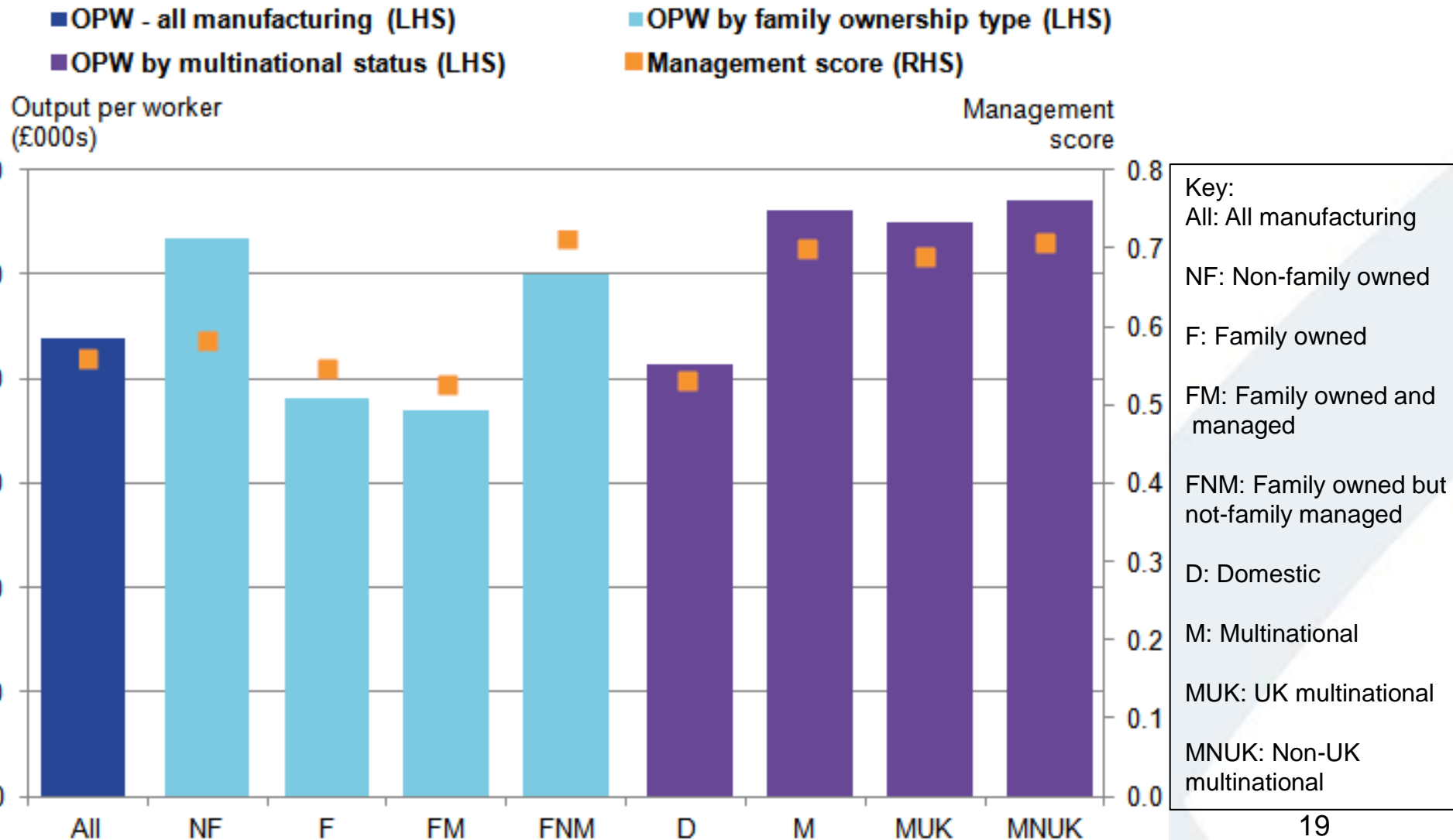
	Small businesses (10-49 employment)	Medium businesses (50-99 employment)	Medium businesses (100-249 employment)	Large businesses (250+ employment)
Log(employment)	0.201*** (0.034)	0.149*** (0.011)	0.117*** (0.015)	0.102*** (0.007)
Family owned business	-0.006 (0.072)	-0.033 (0.039)	-0.082 (0.067)	0.011 (0.038)
Family-owned and non-family-run	0.035 (0.045)	0.058 (0.026)	0.104 (0.069)	0.037 (0.032)
Multinational	0.056 (0.080)	-0.059 (0.068)	0.018 (0.034)	0.020 (0.035)
UK Multinational	-0.001 (0.081)	0.055 (0.059)	0.021 (0.053)	-0.038 (0.025)
Age (years)	0.002 (0.016)	0.014 (0.009)	0.012 (0.014)	0.024* (0.008)
Age squared	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.001)	-0.001* (0.000)
Industry dummies	Yes	Yes	Yes	Yes
$R^2$	0.902	0.959	0.972	0.982
Observations	190	178	172	154

Standard errors in parentheses, clustered by size band and industry. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

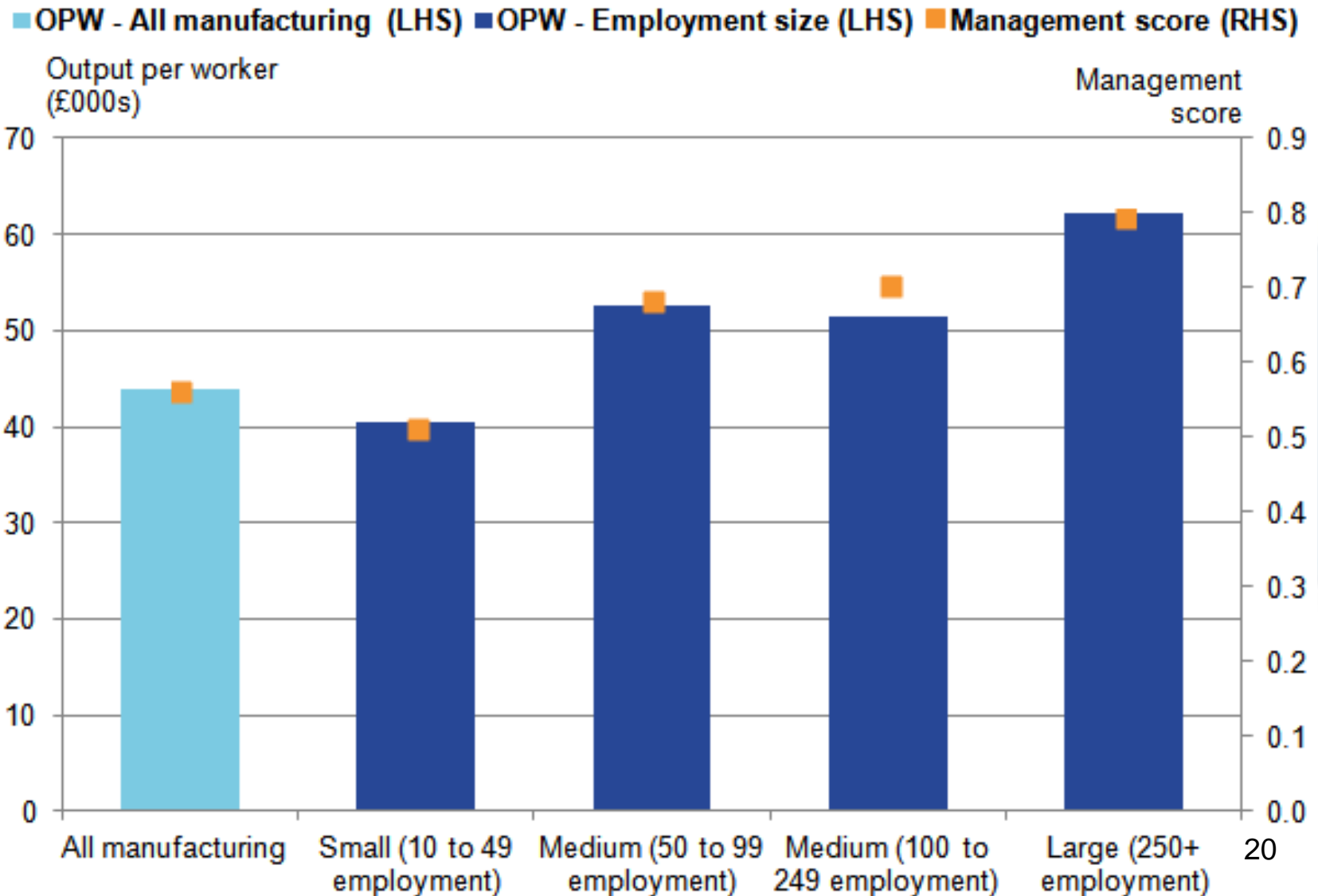
Source: Office for National Statistics

Full results are available on request.

# Management Practices and Productivity



# Management Practices and Productivity



# Multivariate Analysis of Management Score and Productivity

	(1)	(2)	(3)	(4)	(5)
	Log(OPW)	Log(OPW)	Log(OPW)	Log(OPW)	Log(OPW)
Management score	0.855** (0.312)	0.608** (0.290)	0.609** (0.223)	0.629** (0.239)	0.669*** (0.226)
Log(employment)		0.049* (0.027)	0.060 (0.038)	0.060 (0.037)	0.047 (0.042)
Family-owned business			-0.188*** (0.051)		
Family-owned and family-managed business				-0.162*** (0.055)	-0.184*** (0.067)
Family-owned and non-family-managed business				-0.271*** (0.094)	-0.265*** (0.095)
Multinational (MPS data)			-0.136 (0.124)	-0.086 (0.112)	-0.090 (0.105)
UK Multinational (MPS data)				-0.072 (0.114)	-0.080 (0.115)
Age (years)					0.017 (0.068)
Age squared					-0.000 (0.002)
Industry dummies	No	Yes	Yes	Yes	Yes
$R^2$	0.079	0.184	0.203	0.205	0.216
Adjusted $R^2$	0.077	0.171	0.188	0.187	0.195
Observations	591	591	591	591	591

Source: Office for National Statistics

Notes:

1. Standard errors in parentheses are clustered by industry and employment size band, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Conclusions

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- We find a higher prevalence of structured management practices among larger firms, multinationals and family owned but not-family managed firms.
- There is strong positive associations between management practice score and firm size (in terms of employment).
- There is strong positive correlation between management practice score and labour productivity, even when controlled for family ownership, multinational status, size and age.
- Family owned firms are around 20% less productive than others and there is no significant effects for multinationals.

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# Next Steps

# Management and Expectations Survey

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- The ONS has teamed up with the ESCoE to run an expanded set of questions on management practices and expectations
- Wider coverage of Manufacturing and Services
- Sample size of 25,000
- Data collection at Reporting Unit level, consistent with existing ONS business surveys
- Survey despatch in July 2017, and initial analysis planned for Q1 2018



# Other developments around productivity measurement

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- Development of quarterly regional labour input metrics
- Experimental annual industry-by-region labour metrics
- New quarterly regional output per hour and output per job
- Historical measures of output per job and hour since the 18<sup>th</sup> century
- Development of new quarterly Capital Productivity metrics
- Development of quarterly suite of growth accounting measures of productivity – QALI, VICS and MFP
- Linking administrative data on Trade to the Business Register to facilitate productivity research
- Developing new estimates of infrastructure capital

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- Any questions?

Contact details:

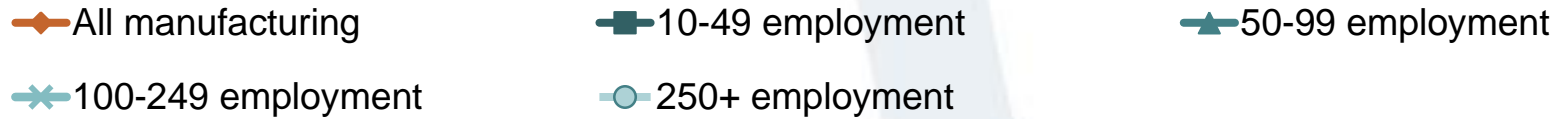
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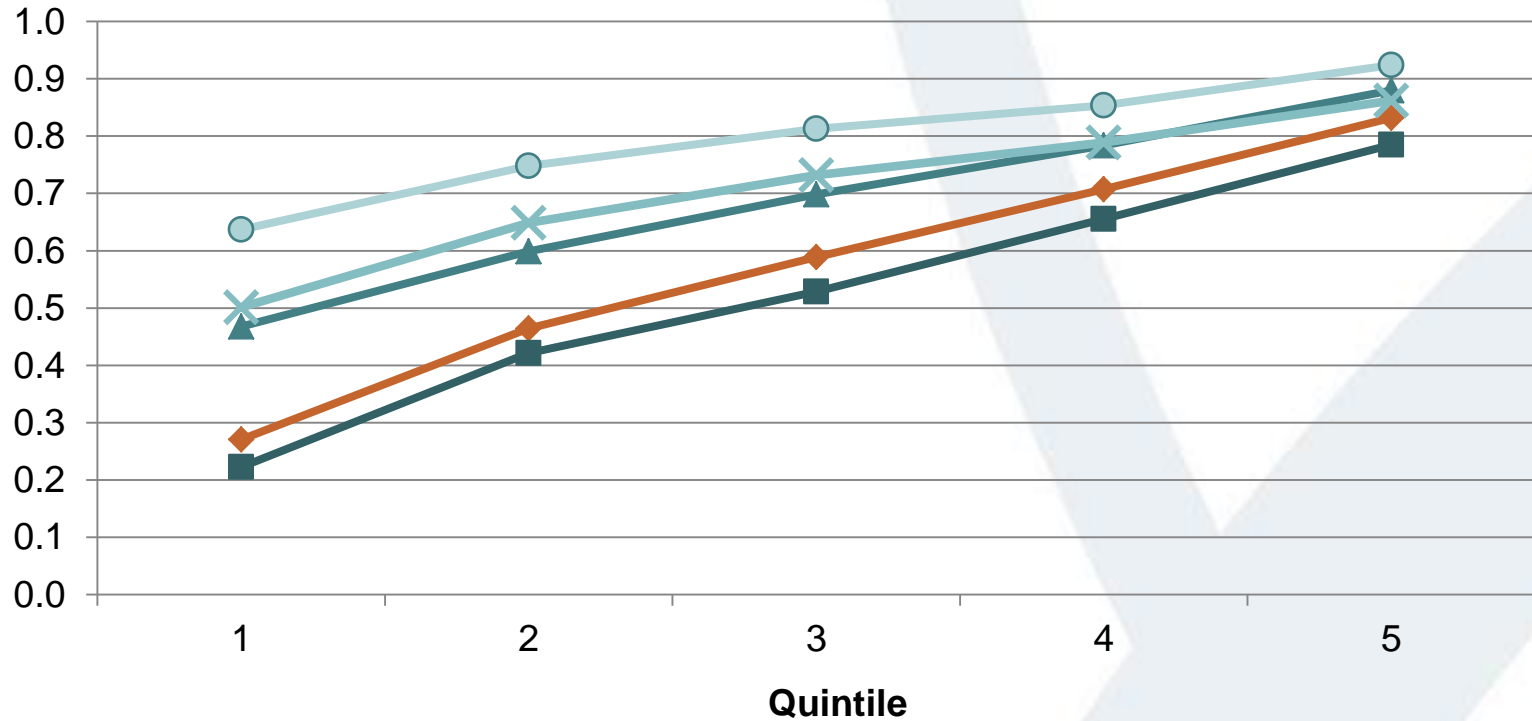
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# EXTRA SLIDES

# Average score by quintile and size band



Management Score (2015)



*All manufacturing includes all manufacturing businesses with employment of at least 10 in Great Britain*

Source: ONS

# MPS questions and scoring schedule

	Question	Score
<b>1</b>	<b>In 2015, what generally best describes what happened at this business when a production problem arose?</b>	
a	We fixed it but did not take further action	1/3
b	We fixed it and took action to make sure that it did not happen again	2/3
c	We fixed it and took action to make sure that it did not happen again, and had a continuous improvement process to anticipate problems like these in advance	1
d	No action was taken	0
<b>2</b>	<b>In 2015, how many key performance indicators were monitored at this business?</b>	
a	1 to 2 key performance indicators	1/3
b	3 to 9 key performance indicators	2/3
c	10 or more key performance indicators	1
d	No key performance indicators	0
<b>3</b>	<b>In 2015, how frequently were the key performance indicators reviewed at this business?</b>	
a	Annually	1/6
b	Quarterly	1/3
c	Monthly	1/2
d	Weekly	2/3
e	Daily	5/6
f	Hourly or more frequently	1
g	Never	0
<b>4</b>	<b>In 2015, what best describes the time frame of production targets at this business?</b>	
a	Main focus was on short-term (less than one year) production targets	1/3
b	Main focus was on long-term (more than one year) production targets	2/3
c	Combination of short-term and long-term production targets	1
d	No production targets	0

# MPS questions and scoring schedule cont'd

	Question	Score
<b>5</b>	<b>In 2015, how easy or difficult was it for this business to achieve its production targets?</b>	
a	Possible to achieve without much effort	0
b	Possible to achieve with some effort	1/2
c	Possible to achieve with normal amount of effort	3/4
d	Possible to achieve with more than normal effort	1
e	Only possible to achieve with extraordinary effort	1/4
<b>6</b>	<b>In 2015, how were employees usually promoted at this business?</b>	
a	Promotions were based solely on performance and ability	1
b	Promotions were based partly on performance and ability, and partly on other factors, such as tenure	2/3
c	Promotions were based mainly on factors other than performance and ability, such as tenure	1/3
d	Employees are normally not promoted	0
<b>7</b>	<b>In 2015, when was an under-performing employee moved from their current role?</b>	
a	Within 6 months of identifying employee under-performance	1
b	After 6 months of identifying employee under-performance	1/2
c	Rarely or never	0
<b>8</b>	<b>In 2015, who made decisions over the hiring of permanent full-time employees?</b>	
a	Only the owner(s)	0
b	Mostly the owner(s) with some input from other employees	1/3
c	Jointly the owner(s) and other employees	2/3
d	Other employees	1