

Management practices and business labour productivity

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ABSTRACT

This study examines the impact of management practices on business labour productivity, taking into account the externalities of intangible capital endowment of the country in which the firms are located. Management practices are also analysed to see which are more likely to explain productivity differences between firms. For this purpose, a sample of European firms from France, Germany, Greece, Portugal, Spain and the United Kingdom is used. Data of management practices comes from the World Management Survey. The main empirical results show that management practices have a strong positive and economically significant impact on the labour productivity of firms. Differences in the labour productivity of firms and therefore, of countries can be explained, in part, by differences in the score given for their management practices and by differences in local intangible capital endowment. Finally, incentives management and target setting prove to be the most relevant management practices in improving firms' labour productivity.

Introduction

Management practices play an important role in explaining the heterogeneity in business performance (Bloom et al., 2014). However, until recently, empirical literature has been scarce and research findings inconclusive (Siebers et al., 2008). As Bloom and Van Reenen (2007) point out, empirical economic research to date has not focused on management practices as determinants of labour productivity differences across firms, sectors and countries. The lack of data on management practices could explain why empirical literature has so far been sparse. Bryson and Forth (2018) indicate that the proposal that management practices could explain differences in business performance is not a new idea. In fact, the more recent development of datasets on management practices has enabled analysis of the relationship between management practices and business performance with a greater degree of formal scrutiny.

The World Management Survey (WMS) Project collates management practices data at firm level across different sectors and countries (Bloom and Van Reenen, 2007; Bloom et al., 2014). One of its objectives is to show that

management practices can explain the growth of output per worker that the capital factor cannot. Solow (1957) found that around 88% of the growth of output per worker in the US was due to factors other than capital accumulation. Among these factors, management practices play a significant role. As Bruhn et al. (2018) points out "capital alone cannot explain the entirety firm growth; 'managerial capital' is needed to know how to employ the capital best" (p. 635). In recent years, a growing body of evidence has emerged which shows a positive link between management and business performance (Bloom et al., 2014). In fact, recently, the literature has been focusing on employers' interest in investing in management practices and services aimed at creating and maintaining a happy workforce, leading to better business results (Bellet et al., 2019; Oswald et al., 2015).

This research uses data collated through the WMS, specifically, a sample of firms from France, Germany, Greece, Portugal, Spain and the United Kingdom (UK). The aim of this study is to analyse whether there are differences in the response of labour productivity to management practices between countries. As the external environment affects firms' behaviour, this study takes into account the characteristics in terms of intangible capital of the country where the firm is located. Finally, this study also analyses which

management practices are the most relevant for business labour productivity.

The contribution of this study is to examine the impact of management practices on firms' labour productivity by considering the externalities of the production process, such as technological endowment, human capital and entrepreneurship where the firm is located. Those spillovers are factors that act as catalysts for firms' labour productivity. The theory is that the presence of high endowments of intangible assets in a specific area enhances productivity since they generate positive externalities to the localized firms. In general, the empirical literature encounters a serious weakness in the lack of connection between the micro and the macro approach, and this study aims to consider both. In addition, in Spain, the empirical evidence on management practices that uses data from Spanish firms is scarce. Therefore, this study analyses whether Spanish firms behave differently in terms of management practices in relation to other countries. Furthermore, the effects of different areas of management practices on business productivity are examined separately. Most of the literature focuses on management practices as a whole, making no distinction between the different areas into which management practices can be divided. In this regard, this study considers the areas proposed by Bloom and Van Reenen (2007): operations management, performance monitoring, target setting, and incentives management. Broszeit et al. (2019) group's management practices into just two areas: incentives and targets (I&T) and data driven performance management (DDPM), and these are also considered in this study. Finally, given the relevance that innovation has for business labour productivity, this study also takes into account management practices related to innovation, technical innovation and process innovation.

The paper is laid out as follows. Following this introduction, section 2 presents the theoretical framework and proposes the hypothesis. Section 3 outlines the methodology. Section 4 analyses the data used and definition of the variables. Section 5 presents the empirical results and, finally, section 6 discusses the main findings and presents conclusions.

Theoretical Framework

Management Practices

Management practices can be defined as organizational and control activities that aim to improve the productivity and competitiveness of the firm. As Riley and Robinson (2011) indicate, "intangible assets are those inputs into the production process for which there is little evidence in a standard accounting sense" (p. 5). Therefore, intangible

assets include knowledge and organisational characteristics that might affect the firm's productivity. Shahzad et al. (2016) conclude that the processes of knowledge management lead to organizational creativity and enhanced business performance.

According to Bryson and Forth (2018), there are two lines of research. The first line of research focuses on the impact of human resource management (HRM) practices on business performance (Arthur, 1994; Guthrie, 2001; Huselid, 1995; Ichniowski et al., 1997; Koch & McGrath, 1996; Lin & Shih, 2008; MacDuffie, 1995; Michie & Sheehan, 2005; Sels et al., 2006). This strand of literature argues that improvement in HRM practices can maintain, or even increase, a high level of business performance.

Arthur (1994) is one of the first to provide empirical evidence of the effects of human resource systems on manufacturing performance and turnover. Huselid (1995), with a cross-sectional sample of US firms, finds a positive relationship between HRM practices and firm productivity. MacDuffie (1995), using a comprehensive international sample of 62 automotive assembly plants, provides strong statistical evidence of a positive relationship between innovative HRM practices and economic performance. Koch and McGrath (1996) show that investments in HRM practices are positively associated with labour productivity. Ichniowski et al. (1997) demonstrates that manufacturing lines using a set of innovative HRM practices achieve higher levels of productivity than do lines with a more traditional approach. Guthrie (2001) demonstrates, for a sample of New Zealand firms, a positive relationship between the application of high-involvement work practices and productivity. Michie and Sheehan (2005) show positive relationships between HRM practices and objective financial performance. Sels et al. (2006), focusing on small businesses, show both productivity and profitability enhancing effects as well as a cost increasing impact of HRM intensity. Finally, Lin and Shih (2008) investigate the mechanisms through which strategic HRM promotes firms' competitive advantage.

The second line of research focuses primarily on operations management practices and performance incentives (Bryson & Forth, 2018). In this strand, the research studies carried out by Bloom and Van Reenen (2007, 2010) and Bloom et al. (2012a, 2013, 2014 and 2017b) are notable. Bloom and Van Reenen (2007, 2010) and Bloom et al. (2012a, 2013, 2014 and 2017b) focus on the performance effects of 18 management practices that can be grouped into four headings: operations management, performance monitoring, target setting, and incentives management. These management practices are viewed as being akin to "a technology", being an intangible capital input that increases productivity (Bloom et al., 2014, 2017b).

Using data from the WMS, Bloom and Van Reenen (2007, 2010) show that firms with better management practices tend to have better performance. These results are confirmed by Bloom et al. (2012a), who use a sample of the same survey, and by Bloom et al. (2012b), who look at developing countries of Central Asia. These papers use different measures of business performance such as labour productivity, profitability, probability of survival, Tobin's Q, and sales growth.

In 2010 the Census Bureau carried out the Management and Organizational Practices Survey (MOPS) for over 30,000 firms in the United States. Using this survey, Bloom et al. (2013, 2017a) show a strong positive correlation between management practices and business performance. Using data collected by the Census Bureau for 2005 and 2010, Brynjolfsson and McElheran (2016) focus on what they call data driven decision making practices (DDD). They find that firms that adopt DDD practices show a better performance than those that do not.

Broszeit et al. (2019) carried out a similar survey to MOPS among firms in Germany and they show a robust positive and economically significant association between management practices and labour productivity. McKenzie and Woodruff (2017) focus on the relationship between management practices and small business performance in developing countries and show that variation in management practices explains variation in business performance. Finally, Bryson and Forth (2018) examine the impact of management practices on business performance among SMEs in Britain over the period 2011-2014. They conclude that management practices help firms to grow and to increase their productivity.

As can be seen, recent research studies use surveys that consider a wide range of management practices such as operations management, performance monitoring, target setting, and incentives management. However, empirical evidence usually only uses the average of all these management practices. This study looks at the different areas, separately, with the aim of analysing if some of them are more advantageous than others. In addition, intangible assets that characterise the local external environment where the firm is located are taken into account.

Local External Environment

According to Marrocu et al. (2012), business performance can be affected by the local external environment. Therefore, it is crucial that the role, and impact, of the local environment in labour productivity of firms is taken into account. The endowment of intangible assets generates positive externalities that enhance business productivity. The

higher the local endowment of intangible assets, the more productive the local firms are. This study considers that the endowment of intangible assets includes human capital, technological capital and entrepreneurship capital.

A nation's human capital endowment includes the knowledge, skills, capabilities and experience of the workers. As such, human capital endowment is one of the most important determinants of a nation's long-term economic success (Benhabib & Spiegel, 1994; Kato & Honjo, 2015; Mankiw et al., 1992; Sevilir, 2010; Vila et al., 2015). The existence of a skilled workforce in an economic area enhances firms' productivity. Lynch and Black (1998) show that firms that recruit better-educated workers have appreciably higher productivity. Dearden et al. (2000), (2006) state that increasing the proportion of trained workers increases the added value per worker. Sala and Silva (2013) find that training invested in each employee is associated with an increase in the rate of productivity growth.

Knowledge is valued as public good but, as Jaffe (1986) points out, its impact is geographically bounded. Therefore, only firms located in the region benefit from a locally available higher knowledge level. According to Riley and Robinson (2011), technological externalities may be regarded as knowledge spillovers. Rosenthal and Strange (2004) recognize that identifying knowledge empirically can be difficult. Likewise, Griliches (1992) points to the difficulty of directly measuring knowledge and presents a review of the literature that quantifies knowledge using indirect methods. Investment in R&D has been one of the most widely used variables as a proxy for knowledge or innovation. Goodridge et al. (2017) present an extensive literature that shows the spillover effect of investment in R&D, but also argue that it is widely recognised that expenditure on R&D is only part of what is considered investment in knowledge. Rico and Cabrer-Borrás (2019), using regional data from Spain, find that total factor productivity of Spanish firms is affected by R&D expenditure in the region. In this study, technological capital is measured by the expenditure on R&D in the country.

With respect to entrepreneurship, Block et al. (2017) provide a comprehensive review of the literature on innovative entrepreneurship. They point out that the benefits of entrepreneurship are linked to so-called Schumpeterian entrepreneurs, referring to Schumpeter's early theory on creative destruction (Schumpeter, 1934). Innovative entrepreneurship turns new ideas into marketable products and services and can be a source of individual and regional generation of wealth (Acs et al., 2009, 2013; Block, et al., 2013). Evidence supports the knowledge spillover theory of entrepreneurship (Acs et al., 2009, 2013; Audretsch, et al., 2012; Eisingerich et al., 2012; Holtz-Eakin & Kao, 2003),

which argues that knowledge spillovers from innovative activities create entrepreneurial opportunities. This study uses the opportunity entrepreneurship activity index, with the view that an opportunity entrepreneur can be considered a Schumpeterian entrepreneur.

Method

Management and Firm Productivity

According to Bloom et al. (2017b), a Cobb-Douglas production function for firm *i* is considered:

$$Y_i = A_i K_i^\alpha L_i^\beta e^{\gamma X_i} e^{\delta M_i} \quad (1)$$

Where: Y_i is real production, A_i is productive efficiency (excluding management practices), K_i is the physical capital, L_i is the labour, X_i is a vector of additional factors, and M_i is the score of management practices. The score of management practices and X_i control variables appear as simple exponential functions so that after taking logarithms they are in levels rather than logarithms. Furthermore, α is the elasticity of production for the physical capital factor and β the elasticity of production for the labour factor.

Dividing by labour and taking logarithms, equation (1) is rewritten as the following econometric model:

$$\ln\left(\frac{Y_i}{L_i}\right) = \theta + a \ln\left(\frac{K_i}{L_i}\right) + (\beta + \alpha - 1) \ln L_i + \gamma X_i + \delta M_i + \varepsilon_i \quad (2)$$

Where the dependent variable is the natural logarithm of labour productivity, calculated as sales per worker. The productive efficiency term (A_i) has been substituted for a constant term and a stochastic residual ε_i . After a review of the literature, the hypothesis proposed is:

H₁. Management practices have a positive influence on labour productivity.

Location and Firm Productivity

The characteristics of each country in terms of intangible assets are added to the model shown in the previous section. These characteristics include technological endowment, human capital and entrepreneurial capital of each country. The productive efficiency term (A_i) is now substituted for a vector that includes intangible capital (I_i) variables and a stochastic residual ε_i :

$$\ln\left(\frac{Y_i}{L_i}\right) = \theta + a \ln\left(\frac{K_i}{L_i}\right) + (\beta + \alpha - 1) \ln L_i + \gamma X_i + \delta M_i + \vartheta I_i + \varepsilon_i \quad (3)$$

The aim is to verify if the location has an impact on the labour productivity of firms and if the effect of management practices is still detectable after including these variables. The following hypotheses are proposed:

H₂. Human capital endowment positively affects labour productivity.

H₃. The higher the R&D expenditure, the greater the labour productivity.

H₄. Entrepreneurship has a positive impact on labour productivity.

Areas of Management Practices and Firm Productivity

The score of management practices is also analysed by its components. The score is based on 18 questions related to four aspects of management: operations management, performance monitoring, target setting, and incentives management (Bloom & Van Reenen, 2007). Furthermore, in line with Broszeit et al. (2019), the practices are also divided up into two broad aspects: I&T and DDPM. Technical innovation and process innovation are also considered. The aim is to analyse their individual impact on productivity. In order to do so, different econometric models are estimated to test the following hypothesis:

H₅. Different types of management practices have different effects on firm productivity.

Finally, differences between countries in the response of labour productivity to management practices are also considered. For this purpose, dummy variables of the countries, using a multiplicative approach with the different areas of management practices, are included in second equation. The hypothesis to be tested is:

H₆. There are significant differences in the response of labour productivity to management practices between countries.

Data and Variables

A sample of firms from six European countries (France, Germany, Greece, Portugal, Spain and the UK) is used, with the data being obtained from a range of institutions. The data of management practices come from the WMS that collates firm-level data across different sectors and countries. The WMS methodology is described in detail in Bloom and Van Reenen (2007). WMS uses an interview-based evalu-

ation tool that defines and scores from 1 (worst practice) to 5 (best practice) across 18 key management practices. The management practices are grouped into four areas: 1) Operations Management, 2) Performance Monitoring, 3) Target Setting, and 4) Incentives Management. The operations management section focuses on how the firm handles a process problem, for instance a machinery breakdown. In addition, this section also includes any modern manufacturing processes which have been introduced by the management team. The performance monitoring section focuses on how well firms monitor what happens within the firm and how they use this for continuous improvement. The target setting section examines the type, legitimacy, transparency, range and interconnection of targets. Finally, the incentives management section includes promotion criteria, pay and bonuses, and the remedying or dismissal of underperformers. Data from the most recent surveys for France, Germany, Greece, Portugal, Spain and the UK are used for this database.

Broszeit et al. (2019) classify management practices into two groups: I&T and DDPM. The first group refers to incentives and targets. Incentives refer to the use of performance bonuses, promotions and how underperforming employees are managed (Broszeit et al, 2019). Targets are communication of production objectives to managers and non-managers, the time frame of the objectives and the degree of effort required to achieve them. The second group, DDPM, refers to the recording and reviewing of key performance indicators, the use of production displays boards and problem solving in the production process. In this study, the 18 WMS management practices are also grouped in line with Broszeit et al. (2019). Likewise, technical innovation and process innovation are also considered, and these incorporate the first and second practices, respectively, of the 18 key management practices considered by WMS. Technical innovation refers to introduction of modern manufacturing techniques. Process innovation refers to motivation and impetus behind changes to operations.

The ORBIS database provides information on the economic and financial accounts of the sample firms. After eliminating the observations with no information, the sample consists of 767 observations. For each of the firms in the sample, ORBIS gives information on the number of employees, assets, sales, profitability and the productive sector to which the firm activity belongs. The assets of the firms are used as a proxy for physical capital in the production function.

The dependent variable in the specified model is the logarithm of annual sales per worker for 2014. Variables that characterize the firms include the age of the firm which is the period in years since its establishment until the date of

the WMS survey. This variable is provided by the WMS survey. Another variable, provided by the WMS survey takes the value 1 if the firm is a multinational company. Profitability is measured through the return on capital employed (ROCE), which is defined as the quotient between the profit before interest and taxes and the total capital employed.

Finally, data from Eurostat, Global Entrepreneurship Monitor (GEM) and World Economic Forum (WEF) are also used. Eurostat gives information on the R&D expenses per GDP of each country. WEF, in its Human Capital Report, provides the Human Capital Index (HK). This index evaluates the levels of education, skills and employment for the population of each country. The Total Entrepreneurship Activity indicator (TEA) is obtained from the GEM. TEA assesses the percentage of the population of working age involved either in the process of starting an entrepreneurial activity or active as owner-managers of enterprises for less than three and a half years. This study uses TEA opportunity, which only includes opportunity-driven entrepreneurs, excluding necessity-driven entrepreneurs.

Results

Table 1 shows the descriptive statistics of the score of all management practices and of its components. As can be seen, Germany, France and the UK present the best management scores in all areas of management practices. The low score of incentives management in all countries is concerning but particularly in Spain, which has the worst score.

The models have been estimated by least squares using the method proposed by White (1980) in order to obtain consistent estimators with the existence of heteroscedasticity. In addition, in line with Bloom and Van Reenen (2010), the models include interview noise variables to mitigate bias.

Column 1 in Table 2 shows the estimation of the baseline model, which corresponds to equation (2). It follows from the results that there are no returns to scale in the proposed production function, since the coefficient of the employment logarithm is statistically significant. Likewise, management practices are seen to have a positive and significant impact on labour productivity, verifying compliance with the first hypothesis. The logarithm of the assets of the firm weighted by the number of workers, the logarithm of employment and the profitability of the capital employed are also probabilistically highly significant. In addition, the statistical significance of the variable representing whether a firm is multinational allows us to conclude that multinational firms have a positive differential effect on labour productivity compared to the rest of the firms considered.

Table 1
Management practice scores by country

	Overall Management		Operations Management		Performance Monitoring		Target Setting		Incentives Management	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
France	2.95	0.46	2.91	0.85	3.45	0.63	2.89	0.54	2.60	0.49
Germany	3.30	0.56	3.44	1.23	3.64	0.74	3.16	0.68	3.08	0.43
Greece	2.71	0.57	3.03	0.84	2.94	0.82	2.55	0.69	2.54	0.53
Portugal	2.81	0.57	2.81	0.64	3.20	0.78	2.73	0.69	2.55	0.52
Spain	2.76	0.61	2.85	0.87	3.12	0.87	2.65	0.63	2.51	0.57
UK	2.99	0.47	3.06	0.71	3.58	0.64	2.96	0.60	2.69	0.46

	I&T		DDPM		Technical Innovation		Processes Innovation	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
France	2.73	0.44	3.29	0.63	2.88	0.97	2.93	0.85
Germany	3.12	0.46	3.59	0.84	3.41	1.37	3.48	1.28
Greece	2.54	0.53	2.97	0.75	3.01	0.94	3.04	1.02
Portugal	2.63	0.55	3.08	0.69	2.62	0.92	3.00	0.55
Spain	2.57	0.54	3.04	0.83	2.79	0.92	2.91	0.95
UK	2.81	0.46	3.27	0.61	3.17	0.88	2.96	0.71

Note: Overall Management is the average score in across all 18 questions of the survey (Bloom & Van Reenen, 2010).
Source: Compiled by the authors from the World Management Survey (WMS).

Table 2
Management practices and labour productivity

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.254***	0.760***	1.089***	0.126***	0.989***	0.727***
Overall management	0.117***	0.073***	0.086***	0.085***	0.093***	0.097***
Asset per worker (ln)	0.604***	0.632***	0.637***	0.636***	0.632***	0.627***
Employment (ln)	0.097***	0.080***	0.079***	0.084***	0.081***	0.071***
Age	0.001*	0.001	0.001	0.001	0.001	0.001
ROCE	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
Multinational	0.184***	0.138***	0.123***	0.132***	0.111***	0.127***
R&D		0.296***				
HK			0.385***			
TEA				0.015***		
Country dummies	NO	NO	NO	NO	YES	YES
Industry dummies	NO	NO	NO	NO	NO	YES
Settlement dummies	YES	YES	YES	YES	YES	YES
Noise controls	YES	YES	YES	YES	YES	YES
R-squared	0.601	0.632	0.632	0.626	0.641	0.674
Adjusted R-squared	0.594	0.625	0.626	0.619	0.633	0.662
Akaike Info Criterion	1.526	1.447	1.446	1.464	1.431	1.363
Observations number	767	767	767	767	767	767

Note: *** and * denote 1% and 10% significance, respectively.

The estimate is consistent with the existence of heteroscedasticity in the sample.

Note: Overall Management is the average score in across all 18 questions of the survey (Bloom & Van Reenen, 2010).

Source: Compiled by the authors.

In order to explain the effect of the location of a firm on its labour productivity, the following strategy is used. First, the different socioeconomic characteristics of each country, such as the R&D, HK, TEA allocations are used as location proxy variables. Secondly, a dummy variable is introduced for each of the countries.

The impact of more than one variable related to location cannot be analysed simultaneously as there is a high degree of collinearity between them. The estimates of these models are shown in Columns 2 to 5 of Table 2. The results show the existence of externalities generated by allocations of R&D, HK and TEA in the country in which the firms are located. These results verify the second, third and fourth hypotheses. However, the results suggest that these allocations, individually, do not account for all the externalities or spillovers attributable to the location, since the model that presents the best results is the one that uses a dummy variable for each of the countries (see Column 5). The results also verify that management practices maintain a positive influence on the labour productivity of firms.

The effect of the productive sector to which the firm belongs on labour productivity is estimated and the results, presented in Table 2 Column 6, indicate that the productive sector to which the firm belongs is a determining factor in its productivity. Therefore, it can be confirmed that differences in labour productivity of firms is seen between the different productive sectors. The influence of management practices remains statistically significant and positive, indicating that the better the management practices, the greater the labour productivity of the firm. Thus, since Spain presents, on average, worse results in management practices than Germany, France and the UK, it is not surprising that the labour productivity of Spanish firms is lower than that of other countries.

Once the influence of management practices on the labour productivity of firms is verified, the analysis moves on to look at the importance and contribution of the different types of practices, thus testing Hypothesis 5. Different models are estimated, which are presented in Table 3. As mentioned previously, three criteria for grouping management practices are considered: those proposed by Bloom and Van Reenen (2007); the classification proposed by Broszeit et al. (2019); and the analysis of technical innovation and process innovation.

The results obtained are presented in columns 2 to 5 of Table 3 and follow the grouping proposed by Bloom and Van Reenen (2007). In this case, performance monitoring and target setting are highly significant, while operations management and incentives management are only probabilistically significant with a probability of 90%. These results are in line with those obtained by Broszeit et al. (2019) in

the case of Germany.

The classification proposed by Broszeit et al. (2019) is presented in columns 6 and 7 of Table 3. The results indicate that both DDPM and I&T are probabilistically highly significant.

Finally, the results of the analysis of both technical innovation and process innovation in isolation are shown in columns 8 and 9 of Table 3. The results show that technical innovation is probabilistically significant while process innovation is not.

Having looked at the effect of management practices on productivity, the study moves on to analyse whether the behaviour of the different management practices is the same in all countries. Table 4 shows the estimates of the models that include the different management practices for each country. It can be seen that for Greece and Portugal none of the management practices are statistically significant. In other words, management practices and their components do not influence the variations in productivity of firms in these two countries. However, management practices and their different components, including process innovation, do influence labour productivity of firms in the other countries.

In order to quantify the importance of the types of management practices in labour productivity, the average elasticities for each of the areas of management practices in the countries studied are calculated. Table 5 column 1 shows that, at the aggregate level, the average elasticity for management practices for France is 0.58, for Germany 0.60, for the UK 0.50 and for Spain 0.36. Therefore, in Spain management can be seen to positively affect the labour productivity of firms but to a lesser extent than in Germany, France and the UK. For both Greece and Portugal, management are seen not to be statistically significant.

Of the types of management practices, I&T practices are particularly notable, with an average elasticity similar to that of all management practices (see Table 5 column 7). This evidence implies that the joint action of incentives management and target setting has a greater impact on labour productivity than each one separately. In addition, this evidence is consistent with studies that point out that combining different management practices has synergy effects (Battisti et al., 2010; Black & Lynch, 2001; Bresnahan et al., 2002; Brynjolfsson & Hitt, 2000; Brynjolfsson & McElheran, 2016; Caroli & Van Reenen, 2001; Dorgan & Dowdy, 2004; Huselid, 1955; Ichniowski et al., 1997). The joint incorporation of different management practices leads to better business performance. Therefore, management practices can be complementary and improve business productivity.

Table 3
 Management practices and labour productivity: Type of practices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	0.727***	0.756***	0.789***	0.753***	0.735***	0.776***	0.707***	0.764***	0.779***
Overall Management	0.097***								
Operations Management		0.046*							
Performance Monitor			0.050***						
Target Setting				0.074***					
Incentives Management					0.060*				
DDPM						0.059***			
I&T							0.098***		
Technical Innovation								0.052***	
Processes Innovation									0.020
Asset per Worker (ln)	0.627***	0.629***	0.628***	0.627***	0.630***	0.628***	0.627***	0.629***	0.631***
Employment (ln)	0.071***	0.078***	0.076***	0.076***	0.079***	0.074***	0.074***	0.074***	0.084***
Age	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Roce	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
Multinational	0.127***	0.139***	0.138***	0.134***	0.142***	0.136***	0.130***	0.134***	0.149***
Country Dummies	YES								
Industry Dummies	YES								
Settlement Dummies	YES								
Noise Controls	YES								
R-Squared	0.674	0.673	0.673	0.674	0.673	0.674	0.674	0.674	0.672
Adjusted R-Squared	0.662	0.661	0.661	0.662	0.660	0.661	0.662	0.662	0.660
Akaike Info Criterion	1.363	1.367	1.367	1.364	1.368	1.368	1.366	1.363	1.371
Observations Number	767	767	767	767	767	767	767	767	767

Note: *** and * denote 1% and 10% significance, respectively.

The estimate is consistent with the existence of heteroscedasticity in the sample.

Note: Overall Management is the average score in across all 18 questions of the survey (Bloom & Van Reenen, 2010).

Source: Compiled by the authors.

Table 4
 Management practices and labour productivity: Countries and type of practices

	Overall Management	Operations Management	Performance Monitoring	Target Setting	Incentives Management	DDPM	I&T	Technical Innovation	Process Innovation
Constant	1.009***	1.088***	1.026***	1.038***	1.061***	1.035***	1.010***	1.092***	1.061***
France	0.196***	0.128***	0.136***	0.178***	0.166***	0.144***	0.206***	0.127***	0.139***
Germany	0.192***	0.115***	0.142***	0.179***	0.157***	0.144***	0.194***	0.115***	0.123***
Greece	0.010	-0.044	-0.021	-0.011	-0.040	-0.019	0.003	-0.037	-0.008
Portugal	0.080*	0.007	0.037	0.061	0.035	0.039	0.079	0.016	0.014
Spain	0.130***	0.062***	0.078***	0.113***	0.087***	0.083***	0.132***	0.065***	0.070***
UK	0.165***	0.096***	0.110***	0.144***	0.133***	0.116***	0.170***	0.093***	0.110***
Asset per Worker (ln)	0.623***	0.626***	0.623***	0.622***	0.626***	0.624***	0.623***	0.626***	0.623***
Employment (ln)	0.072***	0.082***	0.078***	0.076***	0.080***	0.077***	0.075***	0.083***	0.080***
Age	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
ROCE	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
Multinational	0.128***	0.148***	0.140***	0.133***	0.147***	0.138***	0.131***	0.145***	0.154***
Country Dummies	NO	NO	NO	NO	NO	NO	NO	NO	NO
Industry Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Settlement Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Noise Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.668	0.663	0.660	0.662	0.669	0.665	0.666	0.668	0.665
Adjusted R-squared	0.655	0.650	0.647	0.649	0.656	0.652	0.654	0.656	0.652
Akaike Info Criterion	1.382	1.398	1.407	1.400	1.382	1.394	1.388	1.382	1.393
Observations Number	767	767	767	767	765	765	767	767	767

Note: *** and * denote 1% and 10% significance, respectively.

The estimate is consistent with the existence of heteroscedasticity in the sample.

Note: Overall Management is the average score in across all 18 questions of the survey (Bloom & Van Reenen, 2010).

Source: Compiled by the authors.

Table 5
Medium elasticities by countries and type of management practices

	Overall Management	Operations Management	Performance Monitoring	Target Setting	Incentives Management	DDPM	I&T	Technical Innovation	Process Innovation
France	0.58	0.38	0.47	0.52	0.43	0.48	0.56	0.37	0.41
Germany	0.60	0.37	0.49	0.54	0.47	0.49	0.58	0.36	0.40
Greece	0.03	-0.14	-0.06	-0.03	-0.10	-0.06	0.01	-0.11	-0.02
Portugal	0.23	0.02	0.12	0.17	0.09	0.12	0.22	0.05	0.04
Spain	0.36	0.17	0.24	0.30	0.22	0.25	0.34	0.18	0.20
UK	0.50	0.30	0.37	0.44	0.37	0.39	0.49	0.30	0.33

Note: Overall Management is the average score across all 18 questions of the survey (Bloom and Reenen, 2010).

Source: Compiled by the authors.

These results verify the fifth and sixth hypotheses since the influence on labour productivity of the various management practices is different and there are differences between countries. The study concludes that, for Portugal and Greece, management practices do not prove to be determinants of the labour productivity of their firms, but they do for France, Germany, Spain and the UK. The results highlight that management practices and each of their specific components are essential for improving the labour productivity of firms in France, Germany, Spain and the UK. Furthermore, management practices positively affect the labour productivity of firms in Spain but to a lesser extent than in Germany, France and the UK. These results could also help explain the differences in productivity in Spanish firms compared to German, French and UK firms, given that the score of management practices and the response of labour productivity to management practices is smaller in Spain than in the aforementioned countries.

Discussion and Conclusions

It is widely recognized that management practices contribute to better business performance. But, given the limited information on business management practices to date, there is little quantitative research although with more information emerging on business management practices, a more thorough analysis of the relationship between management practices and business results is becoming possible.

This study, using WMS data, focuses on analysing whether management practices are factors that can explain the differences in business productivity between firms and countries. It also looks at which areas of management practices are the most relevant using a sample of firms from France, Germany, Greece, Portugal, Spain and the UK to see whether there is evidence of a differential behaviour between firms and countries. The analysis also takes into ac-

count the factors that characterize the location of the firms, in terms of intangible capital, so that the results do not show bias due to the omission of possible externalities.

The results obtained confirm that management practices have a positive and significant impact on the labour productivity of firms. This result is robust since it is maintained when variables representative of the location of the firms and the productive sectors to which they belong are included in the models. The location of the firms is a determining factor of their labour productivity. Also, HK, R&D spending and entrepreneurial activity have a positive impact on the labour productivity of firms. This would explain, in part, the differences in the labour productivity of firms between countries.

In all countries considered, apart from Portugal and Greece, management practices positively affect the labour productivity of firms. Thus, the lower score of management practices in Spain compared to Germany, France and the UK, and the fact that the response of firms' labour productivity to management practices is less in Spain than in the other countries, would explain the lower labour productivity of Spanish firms.

Among the management practices analysed, incentives management and target setting practices are the most relevant, contributing significantly to the labour productivity of firms. This evidence implies that the joint action of incentives management and target setting has a greater impact on labour productivity than each one separately. Therefore, firms should improve both management areas at the same time. This is consistent with evidence that combining different management practices has synergy effects.

There are a number of reasons why not all firms have good management practices, even though they lead to productivity gains. These reasons include costs, regulations and reduced level of competition and human capital. As indicated by Bloom and Van Reenen (2007), although a management practice may be beneficial for productivity,

there are also costs to consider. Upgrading management is a costly investment and some firms may find that these costs outweigh the benefits of adopting better practices. So, although improving management practices increases productivity, profits will not necessarily increase. One way for governments to improve the business management of firms would be to establish subsidies for firms that present adequate plans to improve their management practices.

Regarding regulation, Broszeit et al. (2019) consider that the relatively low flexibility of the labour market makes the use of some management practices related to human resources more difficult, for example, hiring and firing, promotion or bonuses. Therefore, guaranteeing a flexible labour market could lead to improvements in business management and business performance. In addition, high levels of collective bargaining, union coverage and works councils can have similar limiting effects on management practices. It is therefore crucial that unions and works councils are sufficiently informed to understand the importance of business management.

Finally, as Bloom and Van Reenen (2010) indicate, the quality of management practices can be affected by the level of competition and training of the human capital of firms. Reduced competition can perpetuate firms with low productivity in the market, whereas greater training of workers and greater preparation of managers in business could lead to improvements in management practices. Promotion of training at all levels in business is therefore crucial to help improve productivity.

In order to consolidate the conclusions made, it would be necessary to supplement the database used to corroborate the stylized facts presented here, since the database from the WMS survey has certain limitations mainly that it shows a predominance of medium-sized and large firms, and includes only a small number of firms per country.

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